

FINAL REPORT

**OFFICE OF RESEARCH INTEGRITY EDUCATION PROGRAM:
A NEEDS ASSESSMENT**

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TABLE OF CONTENTS

	<u>PAGE</u>
EXECUTIVE SUMMARY	i
1. INTRODUCTION	1-1
1.1 Background.....	1-2
1.2 Organization of This Report.....	1-4
2. METHODOLOGY	2-1
2.1 The Focus Group Methodology.....	2-2
2.2 The Survey Methodology	2-3
3. STUDY RESULTS AND FINDINGS.....	3-1
3.1 Findings From the Focus Groups	3-2
3.2 Responsible Conduct of Research Survey	3-4
3.3 Managing Allegations of Scientific Misconduct Survey	3-28
4. CONCLUSIONS	4-1

APPENDICES

APPENDIX A: NEEDS ASSESSMENT QUESTIONNAIRE, TRAINING IN THE RESPONSIBLE CONDUCT OF RESEARCH

APPENDIX B: NEEDS ASSESSMENT QUESTIONNAIRE, TRAINING IN MANAGING ALLEGATIONS OF MISCONDUCT

APPENDIX C: FOCUS GROUP REPORTS

APPENDIX D: FREQUENCY DISTRIBUTION OF RESPONSES, NEEDS ASSESSMENT QUESTIONNAIRE, TRAINING IN THE RESPONSIBLE CONDUCT OF RESEARCH

APPENDIX E: FREQUENCY DISTRIBUTION OF RESPONSES, NEEDS ASSESSMENT QUESTIONNAIRE, TRAINING IN MANAGING ALLEGATIONS OF MISCONDUCT

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

This report presents an assessment of the educational needs of research institutions for training related to:

- the responsible conduct of research (RCR); and,
- the handling of allegations of scientific misconduct.

This educational needs assessment was conducted for the Department of Health and Human Services' Office of Research Integrity (ORI). The report contains results from two focus groups and two surveys that were conducted to help identify the research integrity-related educational needs of institutions that receive Public Health Service grant funding for research activities. The findings from this needs assessment will assist ORI to identify, prioritize, and develop educational interventions designed to address the needs of the research community.

METHODOLOGY

This project collected information on the needs of extramural research organizations for training and educational materials related to RCR and the handling of allegations of scientific misconduct through both focus groups and surveys.

Focus Groups. CHPS Consulting conducted two focus groups with Research Integrity Officers, training grant Principal Investigators, and other interested parties from local universities, federal government agencies, and national associations. A total of 12 individuals participated in the two focus groups. Each focus group was facilitated by a CHPS staff member and met for approximately 90 minutes. The focus group discussions were summarized and findings from the focus groups were used to inform the development of the project's survey instruments.

Surveys. Two survey instruments were developed for this project. One survey instrument focused on the need for educational resources related to RCR. The second instrument focused on the need for educational resources related to the handling of allegations of scientific misconduct. The questions on the two surveys were similar and were designed to collect information regarding the present state of educational resources, topic areas in which resources are lacking, the ideal delivery medium for new resources (i.e., videos, CD-ROMs, etc.), and the audiences for which more educational resources are needed.

The potential respondent universe for this study was all 3,500 institutions that are receiving or have received PHS funds for research and have a current assurance on file with the Office of Research Integrity. Two samples were drawn for this survey effort with a total sample size of 500 survey recipients. The universe of 3,500 institutions was

divided into 4 clusters: (1) institutions that have had an allegation of scientific misconduct (150 institutions), (2) institutions that have received a training grant within the past year (200 institutions), (3) academic institutions not included in either of the first two clusters (802 institutions), and (4) all other types of institutions not included in the three clusters above (2,348 institutions). Two samples were drawn from the clusters as follows:

Sample 1: Sample One was sent the questionnaire assessing educational needs in the Responsible Conduct of Research. The sample consisted of:

- 200 educators who train students in RCR from institutions who have received RCR training grants (Cluster 2),
- 25 Research Integrity Officers (RIOs) from Category 10 institutions¹ (Cluster 3), and
- 75 RIOs from all other institutional types combined (excluding Category 10 institutions) (Cluster 4).

Sample 2: Sample Two was sent the questionnaire assessing educational needs in the handling of misconduct allegations. The sample consisted of:

- All 150 institutions that have had an allegation of scientific misconduct (Cluster 1), and
- 50 institutions from all other institutional types combined, excluding Category 10 institutions (Cluster 4).

Surveys were sent from CHPS Consulting to participants via email. A reminder email was sent to all survey participants two weeks after the initial wave of the survey was administered. A second wave of the survey was emailed to non-respondents after an additional two weeks. For those who still had not responded after the second wave of the survey, CHPS Consulting emailed a third wave of the survey and conducted telephone follow-up to encourage participants to respond.

Overall, 267 completed surveys were returned. For the RCR survey, 153 of 300 surveys were returned, a response rate of 51 percent. For the misconduct survey, 114 of 200 surveys were returned, a 57 percent response rate.

STUDY RESULTS AND FINDINGS

Findings From The Focus Groups. Participants in the first focus group were generally research integrity officers and administrators. The second group included participants who were mostly faculty that had received training grants and who had taught classes

¹ A Category 10 institution is an institution of higher education.

in research integrity. Discussion in the two focus groups covered many of the same topics, but the two groups often had different perspectives.

- Participants of both focus groups talked about the Internet as a medium for promoting research integrity (RI), but the first group was decidedly more enthusiastic about the possibilities of using the web than the second. It may be that ORI could play an important role in studying how the web can be used for promoting RI and teaching faculty who teach RCR courses how to use this powerful medium in their classes.
- Both focus groups noted the difference between what students learn in the classroom and what they may see in the laboratory. This led the first focus group to make a major point of the need to 'train the trainer'. These participants strongly supported federal requirements to get faculty and staff into research integrity training classes. The second group also acknowledged the need to train faculty, but never suggested that this should be done by requiring faculty to receive RI training. Instead, the second focus group suggested ways of integrating RI training in the university environment so that it might reach faculty.
- Participants in the second focus group focused on the need to improve faculty mentoring skills, although the first focus group mentioned mentoring needs only in the context of training the trainer.
- Both groups liked case studies for teaching research integrity and both recognized that there needs to be a variety of case studies available that are relevant to different disciplines and that acknowledge the growing diversity of students on university campuses.
- Participants in the first focus group were more interested in the evaluation of training materials and methods for teaching RI than participants in the second group. The first group spent considerable time discussing the need for evaluation of materials and teaching methods. They felt that there is already a large array of training materials and methods available for use, but little is known about which materials and training methods work best.
- Both groups saw a need to integrate research integrity training into settings beyond the RCR classroom, suggesting that materials and methods were needed for integrating RCR into regular courses and for providing opportunities to discuss RI issues outside the classroom for both faculty and students.

Finding from the Responsible Conduct Of Research Survey. The RCR survey was sent to 300 recipients, 200 of who were educators with responsibility for teaching research integrity and 100 were RIOs from both category 10 institutions and non-

category 10 institutions. One hundred and fifty-three (153) participants responded to the survey. Sixty-three percent of the respondents currently teach, or have in the past taught, one or more courses in the responsible conduct of research. Of the 153 respondents, 139 answered questions about the type of research organization at which they were employed and the size of their research institution in terms of the number of research personnel employed. The largest portion (43.8 percent), were employed by an institution of higher education that is not affiliated with an academic medical center. Survey recipients tended to be from large organizations, with 54.3 percent employed at institutions with over 500 research personnel.

Survey results are organized into 4 categories: who should receive training; what instructional materials are needed; topics training should address; and useful teaching resources, formats, and methods.

- *Who should receive training.* Respondents were asked what type of individuals they believed should receive education and training specific to RCR and the prevention of scientific misconduct. Over 90 percent of respondents said that all types of researchers and institutional research integrity officials should receive training. Respondents were least likely to say laboratory assistants and laboratory technicians should receive training, although 66.0 and 68.0 percent, respectively, did indicate that training in RCR was appropriate for these individuals.
- *What instructional materials are needed.* Respondents were asked to indicate, based on their experience, the RCR topics for which more adequate instructional materials are needed and the audiences for which more RCR instructional material are needed. Overall, the largest number (80, or 61.1 percent) of respondents chose 'scientific record keeping/ data management' as a topic needing more adequate instructional materials. Over 50 percent of respondents who answered the question also chose 'authorship/publication/credit practices,' 'intellectual property,' 'conflict of interest,' and 'misconduct in science' as topics needing more adequate instructional materials. Respondents agreed that 'laboratory safety' was the topic least in need of more adequate instructional materials regardless of whether they taught RCR or not, regardless of their place of employment, and regardless of the size of their research institution.

With regard to audiences for whom more RCR instructional materials are needed, respondents selected principal investigators and graduate students. Three-quarters of all respondents selected these two audiences. Research associates/assistants were selected by 61.8 percent of respondents and postdoctoral fellows were selected by 60.3 percent of respondents. No other audiences were selected by more than 38 percent of respondents. These results were generally consistent across teaching status of the respondent, respondent place of employment, and the size of the respondent's research institution.

- *Topics training should address.* For each possible trainee type (i.e., researchers, laboratory directors, RIO's, etc.), respondents were asked to select the types of topics training for these individuals should address. For researchers, respondents were almost unanimous in suggesting that training for these individuals should include 'conflict-of-interest', 'authorship/publication/credit practices', 'intellectual property', and 'peer review and privileged information' issues. Training for laboratory directors and grant managers, however, should focus on 'institutional/federal policies', and 'public funds and grant funds management.'
- *Useful teaching resources, formats, and methods.* Respondents were asked to rate on a scale from 1 to 5, with 1 being least useful and 5 being most useful, a list of resources that could be used to deliver instruction in RCR. Case studies were given the highest average score by respondents (4.2), followed by collections of best practices (3.6) and guidelines and codes of ethics (3.6). Only one item had an average score under 3.0 (the mid-range). This was selective bibliographies, which had an average score of 2.7. Respondents who taught RCR tended to rate resources higher than respondents who had not taught RCR.

When asked what types of instructional formats the respondents would use to deliver instruction in RCR (assuming all were conveniently available), respondents were most likely to choose seminars, and web-based modules/courses. More than half of the respondents also chose interactive CD-ROMs and videotapes.

Findings From The Managing Allegations Of Scientific Misconduct Survey. This survey was sent to 200 recipients, 150 from institutions that have had an allegation of scientific misconduct and 50 from all other non-category 10 institutions. One hundred and fourteen (114) individuals responded to the training in managing allegations of scientific misconduct survey. Thirty-nine percent of the respondents were affiliated with institutions that conduct training for administrators and staff in the handling allegations of scientific misconduct. Academic medical centers and affiliated institutions of higher education employ the largest group of respondents, 36.7 percent. The number of respondents by size of research institution was fairly evenly distributed, with the largest percentage of respondents being from institutions with over 1000 research personnel (35.2 percent). The largest institutions appeared more likely to conduct training in the handling of allegations of scientific misconduct.

As with the discussion of the RCR survey, survey results for the misconduct survey are also organized into 4 categories: who should receive training; what instructional materials are needed; topics training should address; and useful teaching resources, formats, and methods.

- *Who should receive training.* Respondents were asked what types of administrators and staff should receive training in how to manage allegations of scientific misconduct. In general, they responded that most university administrators, research integrity officials, and academic researchers should receive training. Only university presidents were thought to need training by fewer than half of survey respondents.
- *What instructional materials are needed.* Respondents were asked for what topics and for what audiences they believed better instructional materials were needed. The top five topics where better instructional materials are needed include (in order of highest agreement) 'requirements of proof', 'protection against conflicts-of-interest', 'handling evidence and sequestering of data and records', 'regulatory requirements', and 'developing investigation plans'. 'ORI/Departmental Appeals Board hearings' was selected least often. The top five audiences for which more instructional materials are needed include (again in order of highest agreement) 'institutional research integrity officers', 'principal investigators', 'department chairs', 'science deans', and 'chair, research integrity committee'. Respondents were least likely to select presidents and general counsels as needing more instructional materials.
- *Topics training should address.* Respondents selected topics training should address for four different groups of potential trainees: university administrators, research integrity officials, academic researchers, and others. Two topics, 'protection against conflicts-of-interest' and 'regulatory requirements', were among the top four topics chosen by respondents for all groups of trainees. For university administrators, respondents also frequently selected 'appeals within the institution' and 'treatment of respondents and whistleblowers' as topics that should be addressed. 'Preparing reports' and 'developing investigation plans' were among the topics most frequently selected for the training of research integrity officials.
- *Useful teaching resources, formats and methods.* Respondents were asked what instructional formats would be useful in administering or delivering instruction in managing allegations of scientific misconduct if the formats were conveniently available. The majority of respondents, 86.8 percent, indicated that web-based modules and courses would be useful. Also, more than half of the respondents indicated that videotapes and seminars would be useful. Respondents chose annual retreats and summer training institutes least often as a useful resource for delivering instruction in the handling of allegations of scientific misconduct.

Respondents were also asked what additional resources would be useful in managing allegations of scientific misconduct. The two most common responses were best practices (chosen by 70.2 percent of respondents) and case studies (chosen by 67.5 percent of respondents).

CONCLUSIONS

The most striking conclusion from the two surveys is undoubtedly the wide agreement among respondents of the need for training in both the responsible conduct of research and in the handling of allegations of scientific misconduct for the many different types of individuals involved in these activities. In particular, a large majority of respondents of the RCR survey selected all possible response options when asked what types of individuals should receive training in RCR. Respondents who had taught RCR were in even more agreement about the types of individuals who should receive RCR training. They were almost unanimous in their agreement that all types of researchers, research integrity officers and instructors, and training grant directors should be included among those who should receive training.

Respondents of the managing allegations of misconduct survey also agreed that several types of individuals need training. In general, they responded that most university administrators, research integrity officials, and academic researchers should receive training. Only university presidents were thought to need training by fewer than half of survey respondents. For all other types of administrators and staff, respondents agreed that the individuals should receive training more than 65 percent of the time.

Less agreement was found among respondents on the issue of topics for which more instructional materials are needed, however, topics were identified for which respondents felt more instruction materials are needed, particularly for training in managing allegations of scientific misconduct. Five topics were identified by more than 50 percent of RCR respondents as needing better instructional materials, while 50 percent or more of managing allegations respondents identified 9 topics as needing better instructional materials. This same pattern was followed for responses regarding audiences in need of more instructional materials.

In considering the development of new instructional materials, ORI may want to focus on those instructional formats respondents believed were most useful. There was wide agreement by both sets of survey respondents that seminars, web-based modules or courses, and video tapes were the instructional formats most useful in delivering training in both RCR and managing allegations of scientific misconduct. With regard to resources for teaching, both sets of survey respondents also most often agreed that case studies and collections of best practices were useful.

1. INTRODUCTION

1. INTRODUCTION

This report presents an assessment of the educational needs of research institutions for training related to the responsible conduct of research (RCR) and how to handle allegations of scientific misconduct. This educational needs assessment was conducted for the Department of Health and Human Services' Office of Research Integrity (ORI). The report contains results from two focus groups and two surveys that were conducted to help identify the research integrity-related educational needs of institutions that receive Public Health Service grant funding for research activities. The results of this needs assessment will be used by ORI to expand their educational efforts.

1.1 BACKGROUND

ORI oversees and directs Public Health Service (PHS) research integrity activities on the behalf of the Secretary as an independent entity within the Department of Health and Human Services. In FY2000 the PHS provided more than \$15 billion to support extramural and intramural programs conducting biomedical and behavioral research. About 3,500 institutions worldwide received research funds. These institutions include medical schools, universities, colleges, hospitals, research institutes, and for-profit research companies.

Education is an important part of ORI's mission, which also includes prevention, oversight, and compliance activities. ORI's educational responsibilities include implementing activities and programs to teach the responsible conduct of research, promote research integrity, prevent research misconduct, and improve the handling of allegations of research misconduct. ORI's RCR program is aimed at providing educational resources for the training of all researchers supported by PHS funds. In December 2000, ORI adopted (but at a later date suspended) a new policy that required all extramural research institutions to provide training in RCR to all research staff who have "direct and substantive involvement in proposing, performing, reviewing, or reporting research or who receive research training, support by PHS funds or who otherwise work on PHS-supported research projects even if the individual does not receive PHS support."

In its policy, ORI identified nine core areas of RCR instruction:

- Data acquisition, management, sharing, and ownership;
- Mentor/trainee responsibilities;
- Publication practices and responsible authorship;
- Peer review;
- Collaborative sciences;
- Human subjects;

- Research involving animals;
- Research misconduct; and,
- Conflict of interest and commitment.

ORI's short-term goal is to see researchers receive basic instruction in the core areas that are applicable to their work. The longer-term goal is to provide high-quality, relevant instruction that meets the needs of individual researchers. ORI plans to support the development of new curricula materials and methods of instructions that will help research institutions meet the training requirements set forth in the policy on instruction in RCR.

Institution may also need training in how to handle allegations of scientific misconduct. Few institutions have experience in handling allegations of misconduct. Such allegations tend to be unique events and have the potential for high impact on both the individuals and institutions involved. ORI has a program to provide technical assistance to any institution that is responding to an allegation of misconduct. The process for handling allegations of misconduct includes:

- Receipt of allegation;
- Preliminary assessment of the allegation
- Conduct of the inquiry
- Conduct of the investigation
- The institutional decision
- The ORI oversight review
- The PHS decision
- The option to request a hearing before the Departmental Appeals Board; and,
- Imposition of PHS administrative actions when misconduct is found.

A variety of important issues may arise in each stage of this process and training in the handling allegations of misconduct can help institutions to appropriately address them.

ORI's evolving mission includes the proactive expansion of educational efforts related to promoting research integrity, the responsible conduct of research, and the prevention of scientific misconduct. This project assessed the educational needs of the extramural research community with regard to RCR and the handling of allegations of scientific misconduct. Findings from the needs assessment will assist ORI to identify, prioritize, and develop educational interventions designed to address the needs of the research community.

1.2 ORGANIZATION OF THIS REPORT

The remainder of this report includes three chapters and 5 appendices. Chapter 2 describes the methodology for this needs assessment. It discusses how focus group participants were recruited and how the focus groups were conducted. It describes the development of the survey instruments, the methodology for selecting a sample for the two surveys, and the survey administration. Chapter 3 presents results and findings from the focus group discussions and the surveys. Discussions from the focus groups are briefly summarized and data from the two surveys are presented. Chapter 4 reviews the major findings from the focus groups and surveys and presents the study conclusions.

This report has five appendices. Contained in the appendices are the Responsible Conduct of Research Needs Assessment Questionnaire (Appendix A), the Handling Allegations of Scientific Misconduct Needs Assessment Questionnaire (Appendix B), the focus group reports (Appendix C), and the frequency distributions of responses to all questions on the two surveys (Appendix D and E).

2. METHODOLOGY

2. METHODOLOGY

This project collected information on the needs of extramural research organizations for training and educational materials related to RCR and the handling of allegations of scientific misconduct through both focus groups and surveys. The methods employed in conducting each of these data collection efforts are described in this section.

2.1 THE FOCUS GROUP METHODOLOGY

CHPS Consulting conducted two focus groups with Research Integrity Officers, training grant Principal Investigators, and other interested parties from local universities, federal government agencies, and national associations. Participants were recruited from two lists provided by ORI. The first listed local individuals involved in issues related to research integrity whom ORI thought might be interested in attended a focus group and the second listed Principal Investigators of NIH training grants funded at local universities and other organizations. A total of 12 individuals participated in the two focus groups. Each focus group was facilitated by a CHPS staff member and met for approximately 90 minutes.

The focus group facilitator began each session by asking participants to define research integrity and RCR. In leading participants through this discussion, the facilitator attempted to bring participants to a common definition of these terms. Once a definition was agreed upon, further questions explored the experiences of participants in the promotion of research integrity and RCR. Discussion guide questions included:

- What programs, activities, publications, or materials do you use or have you seen that promote research integrity? How effective are they at promoting research integrity?
- What programs, activities, publications, or other materials should be developed to promote research integrity? To whom should these efforts be aimed?
- What programs, activities, publications, or materials do you use or have you seen that promote RCR? How effective are they at promoting RCR?
- What programs, activities, publications, or other materials should be developed to promote RCR? To whom should these efforts be aimed?

The focus group discussions were summarized and findings from the focus groups were used to inform the development of the project's survey instruments.

2.2 THE SURVEY METHODOLOGY

CHPS Consulting assisted ORI in the development of two survey instruments. One survey instrument focused on the need for educational resources related to RCR. The second instrument focused on the need for educational resources related to the handling of allegations of scientific misconduct. The questions on the two surveys were similar and were designed to collect information regarding the present state of educational resources, topic areas in which resources are lacking, the ideal delivery medium for new resources (i.e., videos, CD-ROMs, etc.), and the audiences for which more educational resources are needed. A copy of the Training in RCR Needs Assessment Questionnaire is contained in Appendix A. The Training in Managing Allegations of Scientific Misconduct Needs Assessment Questionnaire is contained in Appendix B.

Both survey instruments were pre-tested by focus group participants who agreed to assist in this process. Each pre-test participant was asked to provide comments on the format of the survey, the survey questions, any issues with the survey administration process, and the content of the solicitation letter. In addition, participants were asked to report the length of time it took them to complete the survey. Comments received as a result of the pre-test were used to finalize the survey instruments.

2.2.1 THE SAMPLE DESIGN AND SELECTION PROCESS

The potential respondent universe for this study was all 3,500 institutions that are receiving or have received PHS funds for research and have a current assurance on file with the Office of Research Integrity. Two samples were drawn for this survey effort with a total sample size of 500 survey recipients.

The sampling methods used in this study were cluster sampling and systematic random sampling. The universe of 3,500 institutions was divided into 4 clusters: (1) institutions that have had an allegation of scientific misconduct (150 institutions), (2) institutions that have received a training grant within the past year (200 institutions), (3) academic institutions not included in either of the first two clusters (802 institutions), and (4) all other types of institutions not included in the three clusters above (2,348 institutions).

Two samples were drawn from the clusters as follows:

Sample 1: Sample One was sent the questionnaire assessing educational needs in the Responsible Conduct of Research. The sample consisted of:

- 200 educators who train students in RCR from institutions who have received RCR training grants (Cluster 2),

- 25 Research Integrity Officers (RIOs) from Category 10 institutions² (Cluster 3), and
- 75 RIOs from all other institutional types combined (excluding Category 10 institutions) (Cluster 4).

This sample design was chosen for two reasons: 1) in order to have a sample that would be representative of the population and 2) in order to have the individuals/institutions who can provide more useful information carry more weight in the sample (i.e., institutions who have received RCR training grants have conducted RCR training and are more likely to know about the state of educational resources and additional needs.) The systematic random sampling method was used to select samples from clusters 3 and 4.

Sample 2: Sample Two was sent the questionnaire assessing educational needs in the handling of misconduct allegations. The sample consisted of:

- All 150 institutions that have had an allegation of scientific misconduct (Cluster 1), and
- 50 institutions from all other institutional types combined, excluding Category 10 institutions (Cluster 4).

Although only a very small percentage of the sample universe has had an allegation of scientific misconduct, these are the institutions with the knowledge and experience needed to provide the most useful information about educational resource needs in handling allegations of scientific misconduct. This methodology allows the cluster 1 institutions to have more weight in the sample.

The systematic random sampling method was used to make selections from cluster 4. Random selection of this sample occurred after 75 institutions were selected and removed from this cluster for sample 1.

2.2.2 SURVEY ADMINISTRATION PROCEDURES

Surveys were sent from CHPS Consulting to participants via email. Participants were given three options for completing the surveys:

- Surveys could be completed and submitted on-line by clicking on a web site address included in the email message;
- Respondents could download and print a copy of the survey instrument that was attached to the email message and return the survey via fax; or

² A Category 10 institution is an institution of higher education.

- Respondents could reply to the email message requesting a hardcopy of the survey, which was mailed to them with a self-addressed, stamped envelope for returning the survey.

A reminder email was sent to all survey participants two weeks after the initial wave of the survey was administered. A second wave of the survey was emailed to non-respondents after an additional two weeks. For those who still had not responded after the second wave of the survey, CHPS Consulting emailed a third wave of the survey and conducted telephone follow-up to encourage participants to respond.

2.2.3 THE SURVEY RESPONSE RATE

Survey responses were tracked and returned surveys were counted as completed if respondent answered two or more questions³. Tracked information included:

- Method by which the respondent completed and submitted the survey (i.e., on-line, mail, fax, or e-mail)
- Survey wave to which the recipient responded; and,
- The sampling category of the respondent.

Overall, 267 completed surveys were returned of the 500 mailed across both surveys. As shown in Table 2-1, 153 of 300 surveys were returned for the RCR survey, a response rate of 51 percent. For the RCR survey, the response rate varied by cluster and ranged from 32 to 64 percent. Because we had no systematic way of tracking individuals who did not respond on-line, we were unable to identify the cluster for 10 respondents of the RCR survey and, therefore, the actual response rates by cluster may be slightly higher. For the misconduct survey, 114 of 200 surveys were returned, a 57 percent response rate. Almost 60 percent of the individuals from institutions that have had misconduct activity returned a completed survey.

Results of the survey administration process are presented in Table 2-2. This table shows the mode of response for completed surveys. The majority of respondents (64 percent) took advantage of the web-based survey and responded on-line. A substantial number (29 percent) submitted completed surveys via fax as well. Few respondents requested hardcopies of the survey. Finally, this table also shows the survey wave to which the participants responded. Forty-one percent of participants responded following the first wave of the survey, 34 percent following the second wave, and 25 percent following the third wave.

³ This was an issue for the on-line survey, where respondents who entered the survey web site could exit at any point before completing the survey and a record of their visit would still exist.

**Table 2-1
Survey Response Rate**

	Number of Surveys Sent	Number Returned	Response Rate
Survey 1: Training in the Responsible Conduct of Research			
Respondent Type			
RCR trainers from training grant institutions	200	103	51.5%
RIOs from category 10 institutions	25	16	64.0%
RIOs from other than category 10 institutions	75	24	32.0%
Unidentified	--	10	--
Total	300	153	51.0%
Survey 2: Training in Managing Allegations of Misconduct			
Respondent Type			
Individuals from institutions that have had misconduct activity	150	89	59.3%
Individuals from institutions from other than category 10 institutions	50	24	48.0%
Unidentified	--	1	--
Total	200	114	57.0%

**Table 2-2
Mode of Response**

	Percent of Sent Surveys Returned Via:				
	Fax	Email	Mail	On Line	Total
Overall					
First wave	11%	1%	3%	27%	41%
Second wave	10%	1%	2%	20%	34%
Third wave	7%	0%	--	17%	25%
Total	29%	2%	5%	64%	100%
Survey 1: Training in the Responsible Conduct of Research					
First wave	7%	1%	2%	31%	42%
Second wave	8%	1%	3%	18%	30%
Third wave	7%	--	--	22%	28%
Total	22%	2%	5%	71%	100%
Survey 2: Training in Managing Allegations of Misconduct					
First wave	16%	--	4%	20%	40%
Second wave	13%	2%	2%	22%	39%
Third wave	9%	1%	--	11%	21%
Total	38%	3%	6%	54%	100%

2.2.4 ANALYSIS OF THE SURVEY DATA

Survey responses received on-line were downloaded directly into an Excel spreadsheet. Those received by mail, e-mail, and facsimile were hard entered into the spreadsheet database by a CHPS Consulting team member. All information inputted by hand was double-checked by a second team member. Frequency distributions of responses were generated for each question. These distributions are provided in Appendix D for the RCR questionnaire and Appendix E for the managing allegations of scientific misconduct questionnaire.

Summary tables were created to present the most interesting and useful results from the two surveys. Many of these tables include cross-tabulations where survey responses are presented by whether or not the respondent taught RCR (for the RCR survey), by place of employment, or by size of research institution. Where cross-tabulations are presented, only data from respondents answering both questions were used. Cross-tabulations involving place of employment grouped responses into three categories:

- Institution of higher education that is not affiliated with an academic medical center and research organization, institute, foundation, or laboratory;
- Academic medical center or affiliated institution of higher education and independent hospital; and,
- Educational organization other than higher education; other health, human resources, or environmental services organization; federal or state government; and other company/for profit company.

3. STUDY RESULTS AND FINDINGS

3. STUDY RESULTS AND FINDINGS

This chapter presents the findings from the focus groups and the two surveys. Section 3.1 provides a summary of the focus group findings. Section 3.2 and 3.3 present the results of the Training in Responsible Conduct of Research and Training in Managing Allegations of Scientific Misconduct surveys, respectively. These sections are divided into five sub-sections that present data on the characteristics of survey respondents; who should receive training; what instructional materials are needed; topics training should address; and useful teaching resources, formats, and methods.

3.1 FINDINGS FROM THE FOCUS GROUPS

3.1.1 FOCUS GROUP PARTICIPANTS

The first focus group participants included Research Integrity Officers and other administrators from local universities, the National Institute of Health (NIH), and the American Association for the Advancement of Science (AAAS). The second focus group participants included mostly training grant recipients and faculty and administrators from local universities and NIH. A list of participants is provided at the end of each focus group summary report. These reports are included in Appendix C.

3.1.2 OVERVIEW OF FOCUS GROUP FINDINGS

Participants in the two focus groups discussed many of the same topics, but often had different perspectives. In this section, we describe some of the topics where the two groups were in agreement and where they differed. (Note that the first focus group generally include research integrity officers and administrators. The second group included mostly faculty who are recipients of training grants and who have taught classes in research integrity.)

- Participants of both focus groups talked about the Internet as a medium for promoting research integrity, but the first group was decidedly more enthusiastic about the possibilities of using the web than the second. Both groups acknowledged that interaction in small groups is a vital part of research integrity (RI) training. In the first group several participants had used the web to create discussions among students at different universities, but it appeared that no one from the second group had ever used the web in this way and had a harder time imagining how this could be done. It may be that ORI could play an important role in studying how the web can be used for promoting RI and teaching faculty who teach RCR courses how to use this powerful medium in their classes.

- Both focus groups noted the difference between what students learn in the classroom and what they may see in the laboratory. This led the first focus group to make a major point of the need to 'train the trainer'. These participants strongly supported federal requirements to get faculty and staff into research integrity training classes. The second group also acknowledged the need to train faculty, but never suggested that this should be done by requiring faculty to receive RI training. Instead, the second focus group suggested several ways of integrating research integrity training in the university environment so that it might reach faculty. Suggestions included faculty meetings and brown bags lunches to discuss RI issues. In addition, the second group suggested that ORI staff could play a vital role in 'training the trainer'.
- Participants in the second focus group focused on the need to improve faculty mentoring skills. The first focus group mentioned mentoring needs, but only in the context of training the trainer. The second focus group thought that mentoring was not an activity faculty would automatically know how to do well and that training is needed that focuses directly on how to be a good mentor.
- Both groups liked case studies for teaching research integrity and both recognized that there needs to be a variety of case studies available that are relevant to different disciplines and that acknowledge the growing diversity of students on university campuses.
- Participants in the first focus group were more interested in the evaluation of training materials and methods for teaching RI than participants in the second group. The first group spent considerable time discussing the need for evaluation of materials and teaching methods. They felt that there is already a large array of training materials and methods available for use, but little is known about which materials and training methods work best. The second group discussed the need to evaluate existing materials and methods only when asked about the effectiveness of the materials that they are currently using.
- Both groups saw a need to integrate research integrity training into settings beyond the RCR classroom. For instance, the first group suggested that materials and methods were needed for integrating RCR into regular courses. The second focus group suggested that RI training needs to be a multi-faceted endeavor in which RI ideas are reiterated through a variety of sources and in which multiple opportunities to discuss RI issues outside the classroom are provided to both faculty and students.

3.2 RESPONSIBLE CONDUCT OF RESEARCH SURVEY

In this section we present the results of the survey on Training in the Responsible Conduct of Research. As we noted above, this survey was sent to 300 recipients, 200 of who were educators with responsibility for teaching research integrity and 100 were RIOs from both category 10 institutions and non-category 10 institutions. Survey results are organized into 5 areas:

- Characteristics of survey respondents;
- Who should receive training;
- What instructional materials are needed;
- Topics training should address; and,
- Useful teaching resources, formats, and methods.

3.2.1 CHARACTERISTICS OF SURVEY RESPONDENTS

One hundred and fifty-three (153) participants responded to the Training in the Responsible Conduct of Research Survey. Sixty-three percent of the respondents currently teach, or have in the past taught, one or more courses in the responsible conduct of research. Thirty-seven percent of the respondents have not taught a course in the responsible conduct of research (Table 3-1).

Of the 153 respondents, 139 answered questions about the type of research organization at which they were employed and the size of their research institution in terms of the number of research personnel employed. The largest portion (43.8 percent), were employed by an institution of higher education that is not affiliated with an academic medical center. Academic medical centers or affiliated institutions were the place of employment for 20.9 percent of survey respondents. Other respondents reported that they were employed by other health, human resources, or environmental service organizations; research organizations, institutes, foundations, or laboratories; independent hospitals; and for-profit research companies. No respondents were from federal or state government agencies or from educational organizations that were not institutions of higher education.

Survey recipients tended to be from large organizations, with 54.3 percent employed at institutions with over 500 research personnel. Seventy percent of these were from organizations with over 1,000 research personnel. A number of respondents were also from organizations with less than 100 research personnel (22.9 percent).

Table 3-1
Characteristics of Survey Respondents

	Number of Responses	Percent of Respondents
Respondents Have Taught RCR		
Yes	96	62.7%
No	57	37.3
Response Specified	153	100
Unspecified	--	--
Total	153	100
<hr/>		
	Number of Responses	Percent of Respondents
Respondent Place of Employment		
Institution of higher education that is not affiliated with an academic medical center	67	43.8%
Academic medical center or affiliated institution of higher education	32	20.9
Research organization, institute, foundation, or laboratory	9	5.9
Independent hospital	6	3.9
Educational organization other than higher education	--	--
Other health, human resources, or environmental services organization	21	13.7
Federal or state government	--	--
For-profit company	8	5.2
Response Specified	139*	90.8
Unspecified	14	9.2
Total	153	100
<hr/>		
	Number of Responses	Percent of Respondents
Number of Research Personnel at Respondent Place of Employment		
Less than 100	35	22.9%
100-500	21	13.7
501-1000	24	15.7
Over 1000	59	38.6
Response Specified	139	90.8
Unspecified	14	9.2
Total	153	100

*Column does not add because four respondents provided more than one response.

3.2.2 WHO SHOULD RECEIVE TRAINING

Respondents were asked what type of individuals they believed should receive education and training specific to RCR and the prevention of scientific misconduct. Question responses included several types of researchers (including principal investigators, research associates, postdoctoral fellows, and graduate students); laboratory directors and grant manager; RIOs and research integrity instructors (RIIs); and, laboratory assistants and technicians. All respondents chose at least one type individual that should receive training and a large majority chose several types. Table 3-2 shows the percent of respondents that selected each type of individual as appropriate for training across all survey respondents and by whether the respondent had taught RCR. As can be seen from the table, a large majority of respondents selected all possible response options as individuals who should receive training in RCR. This was particularly true for the different types of researchers. Over 90 percent of respondents said that all types of researchers listed should receive training. Over 90 percent also said that institutional RIOs should also receive training. Respondents were less likely to say laboratory assistants and laboratory technicians should receive training, although 66.0 and 68.0 percent, respectively, did indicate that training in RCR was appropriate for these individuals. Finally, 20 percent of respondents also indicated other types of individuals who should receive training, including faculty in general, medical students and undergraduates, administrators and university officials (including those in non-science related disciplines) and university general counsels and Institutional Review Board members.

Respondents who had taught RCR tended to select more types of individuals as appropriate for training in RCR, but the two groups were still remarkably similar in their responses to this question. The largest difference between the two groups was in the training of training grant directors. Respondents who had taught RCR were almost unanimous in their agreement that training grant directors should be included among those who should receive training, but only 60 percent of respondents who had not taught RCR felt training grant directors should receive training.

When responses are looked at across place of employment and size of research institution (Tables 3-3 and 3-4, respectively), a similar pattern is seen. Regardless of place of employment or size of research institution, respondents tended to agree on what types of individuals should receive training in RCR, with the largest differences involving training grant directors and grants managers. With the exception of RIOs and RIIs, respondents who were employed by 'other' institutions (i.e., other health, human resources, or environmental services organizations, and for-profit companies) tended to be less likely to suggest types of individuals should be trained. With respect to the size of the research organization, respondents from organizations with 100 to 500 research personnel tended to agree most often that the different types of individuals should receive training.

Table 3-2
Individuals That Should Receive Education and Training
Specific to RCR and the Prevention of Scientific Misconduct

	Respondents Taught RCR Percent	Respondents Have Not Taught RCR Percent	Total*	
			Number	Percent
Researchers				
Principal investigators/ chiefs	94.8%	93.0%	144	94.1%
Research associates	97.9	84.2	142	92.8
Postdoctoral fellows	96.9	86.0	142	92.8
Graduate students	99.0	91.2	147	96.1
Laboratory Directors/Grant Managers				
Laboratory directors	87.5	80.7	130	85.0
Training grant directors	97.0	60.0	110	71.9
Grants management officers	60.4	54.4	89	58.2
RIOs who teach RCR				
Institutional RIOs	93.8	93.0	143	93.5
RIIs	92.7	82.5	136	88.9
Laboratory Assistants and Technicians				
Laboratory assistants	72.9	54.4	101	66.0
Laboratory technicians	75.0	56.1	104	68.0
Research assistants	87.5	70.2	124	81.0
Others**	20.8	15.8	29	20.0
Total Number of Respondents	96	57	153	

*For respondents answering both questions.

**Other responses indicated by more than one respondent are: faculty/medical students/undergrads; anyone involved in the research project (including subjects and clinicians recruiting subjects); administrators and university officials (including non-science related individuals); general counsel/IRB members; nurses.

**Table 3-3
Individuals That Should Receive Education and Training
By Respondent Place of Employment**

	IHE/ Research organizations	Hospitals/AMC (& affiliated IHE)	Others	Total*	
	Percent	Percent	Percent	Number	Percent
Researchers					
Principal investigators/chiefs	93.2 %	100.0%	86.2%	126	93.3%
Research associates	93.2	97.0	82.8	124	91.9
Postdoctoral fellows	94.5	97.0	86.2	126	93.3
Graduate students	95.9	100.0	93.1	130	96.3
Laboratory Directors/Grant Managers					
Laboratory directors	82.2	97.0	82.8	116	85.9
Training grant directors	69.9	87.9	62.1	98	72.6
Grants management officers	54.8	78.8	34.5	76	56.3
RIOs who teach RCR					
Institutional RIOs	91.8	93.9	96.6	126	93.3
RIIs	84.9	97.0	89.7	120	88.9
Laboratory Assistants and Technicians					
Laboratory assistants	68.5	69.7	55.2	89	65.9
Laboratory technicians	68.5	69.7	55.2	89	65.9
Research assistants	83.6	87.9	65.5	109	80.7
Others**	15.1	36.4	6.9	25	18.5
Total Number of Respondents	73	33	29	135	

*For respondents answering both questions.

**Other responses indicated by more than one respondent are: faculty/medical students/undergrads; anyone involved in the research project (including subjects and clinicians recruiting subjects); administrators and university officials (including non-science related individuals); general counsel/IRB members; nurses.

Place of Employment categories include:

- 1) Institution of higher education (IHE) that is not affiliated with an academic medical center and research organization, institute, foundation, or laboratory;
- 2) Academic medical center (AMC) or affiliated institution of higher education and independent hospital; and,
- 3) Educational organization other than higher education; other health, human resources, or environmental services organization; federal or state government; and other company/for profit company.

Table 3-4
Individuals That Should Receive Education and Training
By Size of Research Institution

	Number of Research Personnel				Total*	
	<100	100-500	501-1000	> 1000	Number	Percent
	%	%	%	%		
Researchers						
Principal Investigators/chiefs	97.1%	100.0%	87.5%	91.5%	130	93.5%
Research associates	80.0	100.0	95.8	94.9	128	92.1
Postdoctoral fellows	85.7	100.0	100.0	91.5	129	92.8
Graduate students	85.7	100.0	100.0	100.0	134	96.4
Laboratory Directors/Grant Managers						
Laboratory directors	85.7	95.2	83.3	84.7	120	86.3
Training grant directors	51.4	76.2	75.0	83.1	101	72.7
Grants management officers	45.7	81.0	58.3	54.2	79	56.8
RIOs who teach RCR						
Institutional RIOs	91.4	100.0	87.5	94.9	130	93.5
RIIs	68.6	100.0	87.5	98.3	124	89.2
Laboratory Assistants and Technicians						
Laboratory assistants	65.7	71.4	62.5	66.1	92	66.2
Laboratory technicians	57.1	71.4	75.0	66.1	92	66.2
Research assistants	71.4	85.7	75.0	86.4	112	80.6
Others**	20.0	14.3	29.2	15.3	26	18.7
Total Number of Respondents	35	21	24	59	139	

*For respondents answering both questions.

**Other responses indicated by more than one respondent are: faculty/medical students/undergrads; anyone involved in the research project (including subjects and clinicians recruiting subjects); administrators and university officials (including non-science related individuals); general counsel/IRB members; nurses.

3.2.3 WHAT INSTRUCTIONAL MATERIALS ARE NEEDED

Respondents were asked to indicate, based on their experience, the RCR topics for which more adequate instructional materials are needed and the audiences for which more RCR instructional material are needed. Tables 3-5, 3-6, and 3-7 present respondent thinking with regard to what topics need more adequate instructional materials. Overall, the largest number (80, or 61.1 percent) of respondents chose 'scientific record keeping/ data management' as a topic needing more adequate instructional materials (Table 3-5). Over 50 percent of respondents who answered the question also chose 'authorship/publication/credit practices,' intellectual property,' 'conflict of interest,' and 'misconduct in science' as topics needing more adequate instructional materials. Responses did not differ much by whether the respondent had taught RCR or not. For these two groups, the largest differences were for the topics of 'conflict-of-interest' and 'misconduct in science' with respondents who had not taught RCR more likely to choose these topics than those who had taught RCR.

Respondents from 'other' places of employment (defined on the table) added 'study design' and 'mentoring' to the list of topics most in need of more adequate instructional materials (Table 3-6). Respondents from research institutions with 501 to 1000 research personnel were also most likely to choose 'collaborative research' as a topic requiring more adequate instructional materials (Table 3-7). Respondents agreed that 'laboratory safety' was the topic least in need of more adequate instructional materials regardless of whether they taught RCR or not, regardless of their place of employment, and regardless of the size of their research institution.

Tables 3-8, 3-9, and 3-10 present respondent choices for what audiences more RCR instructional materials are needed. Overall, respondents selected principal investigators and graduate students as those audiences for whom more instructional materials are needed. Three-quarters of all respondents selected these two audiences. Research associates/assistants were selected by 61.8 percent of respondents and postdoctoral fellows were selected by 60.3 percent of respondents (Table 3-8). No other audiences were selected by more than 38 percent of respondents. These results were generally consistent across teaching status of the respondent, respondent place of employment, and the size of the respondent's research institution. One exception is the choice of laboratory assistants and laboratory technicians as needing more RCR instructional materials by over half (51.9 percent) of the respondents from institutions with over 1,000 research personnel (Table 3-10).

**Table 3-5
More Adequate Instructional Materials Needed**

	Respondents Taught RCR	Respondents Have Not Taught RCR	Total*	
	Percent	Percent	Number	Percent
Study design	38.1%	36.2%	49	37.4%
Scientific record keeping/data management	65.5	53.2	80	61.1
Human/animal subjects	34.5	34.0	45	34.4
Laboratory safety	21.4	14.9	25	19.1
Public funds and grant funds management	45.2	42.6	58	44.3
Mentoring	51.2	38.3	61	46.6
Collaborative research	52.4	44.7	65	49.6
Authorship/publication/credit practices	50.0	63.8	72	55.0
Peer review and privileged information	33.3	46.8	50	38.2
Intellectual property	52.4	59.6	72	55.0
Conflict-of-interest	44.0	63.8	67	51.1
Misconduct in science	42.9	63.8	66	50.4
Institution/federal policies	40.5	29.8	48	36.6
The whistleblower and reporting misconduct	40.5	48.9	57	43.5
Research and institutional environments and RCR	32.1	31.9	42	32.1
Total Number of Respondents	84	47	131	

*For respondents answering both questions.

**Table 3-6
Instructional Materials Needed By Respondent Place of Employment**

	IHE/ Research organizations	Hospitals/AMC (& affiliated IHE)	Others	Total*	
	Percent	Percent	Percent	Number	Percent
Study design	34.8%	31.3%	56.0%	47	38.2%
Scientific record keeping/data management	66.7	50.0	56.0	74	60.2
Human/animal subjects	36.4	40.6	20.0	42	34.1
Laboratory safety	19.7	21.9	12.0	23	18.7
Public funds and grant funds management	39.4	46.9	48.0	53	43.1
Mentoring	39.4	50.0	56.0	56	45.5
Collaborative research	53.0	50.0	36.0	60	48.8
Authorship/publication/ credit practices	60.6	56.3	40.0	68	55.3
Peer review and privileged information	33.3	50.0	36.0	47	38.2
Intellectual property	59.1	56.3	48.0	69	56.1
Conflict-of-interest	51.5	50.0	44.0	61	49.6
Misconduct in science	56.1	46.9	36.0	61	49.6
Institution/federal policies	27.3	50.0	40.0	44	35.8
The whistleblower and reporting misconduct	48.5	37.5	44.0	55	44.7
Research and institutional environments and RCR	24.2	34.4	44.0	38	30.9
Total Number of Respondents	66	32	25	123	

*For respondents answering both questions.

Place of Employment categories include:

- 1) Institution of higher education (IHE) that is not affiliated with an academic medical center and research organization, institute, foundation, or laboratory;
- 2) Academic medical center (AMC) or affiliated institution of higher education and independent hospital; and,
- 3) Educational organization other than higher education; other health, human resources, or environmental services organization; federal or state government; and other company/for profit company.

**Table 3-7
Instructional Materials Needed By Size of Research Institution**

	Number of Research Personnel				Total*	
	<100	100-500	501-1000	> 1000	No.	%
	%	%	%	%		
Study design	37.1%	33.3%	29.2%	33.9%	49	38.9%
Scientific record keeping/data management	51.4	52.4	66.7	54.2	80	63.5
Human/animal subjects	34.3	38.1	29.2	25.4	45	35.7
Laboratory safety	17.1	4.8	8.3	23.7	25	19.8
Public funds and grant funds management	42.9	28.6	33.3	42.4	58	46.0
Mentoring	28.6	38.1	54.2	45.8	61	48.4
Collaborative research	34.3	23.8	66.7	47.5	65	51.6
Authorship/publication/credit practices	54.3	42.9	66.7	42.4	72	57.1
Peer review and privileged information	37.1	33.3	45.8	28.8	50	39.7
Intellectual property	57.1	38.1	62.5	44.1	72	57.1
Conflict-of-interest	54.3	42.9	41.7	42.4	67	53.2
Misconduct in science	48.6	47.6	62.5	37.3	66	52.4
Institution/federal policies	31.4	28.6	45.8	28.8	48	38.1
The whistleblower and reporting misconduct	40.0	33.3	50.0	39.0	57	45.2
Research and institutional environments and RCR	20.0	28.6	37.5	30.5	42	33.3
Total Number of Respondents	28	19	24	55	126	

*For respondents answering both questions.

Table 3-8
Audiences Needing More RCR Instructional Materials

	Respondents Taught	Respondents Have	Total*	
	RCR	Not Taught RCR	Number	Percent
	Percent	Percent		
Principal investigators	71.4%	78.7%	97	74.0%
Research associates/assistants	59.5	66.0	81	61.8
Postdoctoral fellows	60.7	59.6	79	60.3
Graduate students	72.6	76.6	97	74.0
Laboratory directors	39.3	36.2	50	38.2
Training grant directors	34.5	21.3	39	29.8
Grants management officers	34.5	36.2	46	35.1
Research integrity officers	38.1	38.3	50	38.2
RCR instructors	36.9	36.2	48	36.6
Laboratory assistants	42.9	29.8	50	38.2
Laboratory technicians	41.7	25.5	47	35.9
Others**	7.1	--	6	4.6
Total Number of Respondents	84	47	131	

*For respondents answering both questions.

**Other responses indicated by more than one respondent are: undergraduate students.

Table 3-9
Audiences Needing More RCR Instructional Materials
By Respondent Place of Employment

	IHE/ Research organizations	Hospitals/AMC (& affiliated IHE)	Others	Total*	
	Percent	Percent	Percent	Number	Percent
Principal investigators	71.9%	81.3%	66.7%	90	73.2%
Research associates/assistants	59.4	75.0	48.1	75	61.0
Postdoctoral fellows	60.9	75.0	40.7	74	60.2
Graduate students	81.3	78.1	55.6	92	74.8
Laboratory directors	29.7	43.8	44.4	45	36.6
Training grant directors	20.3	46.9	25.9	35	28.5
Grants management officers	29.7	43.8	33.3	42	34.1
Research integrity officers	35.9	46.9	33.3	47	38.2
RCR instructors	37.5	37.5	29.6	44	35.8
Laboratory assistants	37.5	34.4	48.1	48	39.0
Laboratory technicians	35.9	31.3	44.4	45	36.6
Others**	7.8	3.1	--	6	6.3
Total Number of Respondents	64	32	27	123	

*For respondents answering both questions.

**Other responses indicated by more than one respondent are: undergraduate students.

Place of Employment categories include:

- 1) Institution of higher education (IHE) that is not affiliated with an academic medical center and research organization, institute, foundation, or laboratory;
- 2) Academic medical center (AMC) or affiliated institution of higher education and independent hospital; and,
- 3) Educational organization other than higher education; other health, human resources, or environmental services organization; federal or state government; and other company/for profit company.

Table 3-10
Audiences Needing More RCR Instructional Materials
By Size of Research Institution

	Number of Research Personnel				Total*	
	<100 %	100-500 %	501-1000 %	> 1000 %	No.	%
Principal investigators	77.4%	90.0%	78.3%	64.8%	95	74.2%
Research associates/assistants	45.2	70.0	69.6	64.8	79	61.7
Postdoctoral fellows	45.2	75.0	65.2	61.1	77	60.2
Graduate students	64.5	80.0	78.3	74.1	94	73.4
Laboratory directors	22.6	50.0	43.5	40.7	49	38.3
Training grant directors	25.8	25.0	26.1	35.2	38	29.7
Grants management officers	25.8	30.0	34.8	42.6	45	35.2
Research integrity officers	32.3	35.0	47.8	38.9	49	38.3
RCR instructors	35.5	30.0	52.2	31.5	46	35.9
Laboratory assistants	25.8	10.0	47.8	51.9	49	38.3
Laboratory technicians	22.6	10.0	39.1	51.9	46	35.9
Others**	6.5	--	8.7	3.7	6	4.7
Total Number of Respondents	31	20	23	54	128	

*For respondents answering both questions.

**Other responses indicated by more than one respondent are: undergraduate students.

3.2.4 TOPICS TRAINING SHOULD ADDRESS

For each possible trainee type (i.e., researchers, laboratory directors, RIO's, etc.), respondents were asked to select the types of topics training for these individuals should address. Table 3-11 presents the top four topics selected by respondents that training should address by trainee type. For researchers, respondents were almost unanimous in suggesting that training for these individuals should include 'conflict-of-interest', 'authorship/publication/credit practices', 'intellectual property', and 'peer review and privileged information' issues. Training for laboratory directors and grant managers, however, should focus on 'institutional/ federal policies', and 'public funds and grant funds management.' Respondents selected 'misconduct in science', 'the whistleblower and reporting misconduct', 'human/animal subjects', 'scientific record keeping/data management' most often across all trainee types (data not shown).

Table 3-12 presents the top four topics training should address by respondent RCR teaching status. The responses were very similar across respondent type although respondents who had not taught RCR were more likely to select 'laboratory safety' as a topic training should address across all trainee types.

Responses did not vary greatly by size of research institution either (Table 3-13). Regardless of size of research institution, 'misconduct in science' was among the top four topics training in RCR should address for all trainee types. 'Laboratory safety' was also in the top four topics selected for all institutions with 100 or more research personnel.

Table 3-11
Top Four Topics Training Should Address by Type of Trainee

Type of Trainee	No.	Total Percent
Researchers		
Misconduct in science	147	96.1%
Conflict-of-interest	145	94.6
Authorship/publication/credit practices	144	94.1
Intellectual property	144	94.1
Peer review and privileged information	144	94.1
Laboratory Directors/Grant Managers		
Institutional/ federal policies	130	85.0
Public funds and grant funds management	129	84.3
Misconduct in science	128	83.7
Conflict-of-interest	127	83.0
RIOs/RIIs		
Misconduct in science	127	83.0
The whistleblower and reporting misconduct	123	80.4
Human/animal subjects	116	75.8
Conflict-of-interest	114	74.5
Laboratory Assistants/Technicians		
Laboratory safety	131	85.6
Scientific record keeping/data management	113	73.9
The whistleblower and reporting misconduct	111	72.5
Misconduct in science	110	71.9
Others		
The whistleblower and reporting misconduct	30	19.6
Misconduct in science	29	19.0
Conflict-of-interest	25	16.3
Institutional/federal policies	24	15.7
Response Specified	149	97.4
Unspecified	4	2.6
Total	153	100

Table 3-12

**Top Four Topics Training Should Address by RCR Teaching Status*
And Type of Trainee**

Respondents Taught RCR		Respondents Have Not Taught RCR	
Topic	Percent	Topic	Percent
Researchers		Researchers	
Misconduct of science	98.9%	Misconduct of science	98.1%
Authorship/publication/ credit practices	97.9	Peer review and privileged information	96.3
Conflict-of-interest	97.9	Intellectual property	96.3
Peer review and privileged information	96.8	Conflict-of-interest	96.3
Intellectual property	96.8		
Laboratory Directors/Grant Managers		Laboratory Directors/Grant Managers	
Public funds and grant funds management	89.5%	Conflict-of-interest	83.3%
Institution/federal policies	89.5	Misconduct of science	83.3
Misconduct of science	87.4	Institution/federal policies	83.3
Conflict-of-interest	86.3	The whistleblower and reporting misconduct	83.3
RIOs/RIIs		RIOs/RIIs	
Misconduct of science	86.3%	The whistleblower and reporting misconduct	85.2%
The whistleblower and reporting misconduct	81.1	Misconduct of science	83.3
Conflict-of-interest	77.9	Human/animal subjects	79.6
Human/animal subjects	76.8	Conflict-of-interest	74.1
Laboratory Assistants/Technicians		Laboratory Assistants/Technicians	
Laboratory safety	89.5%	Laboratory safety	85.2%
Scientific record keeping/data management	82.1	The whistleblower and reporting misconduct	70.4
Misconduct of science	77.9	Misconduct of science	66.7
The whistleblower and reporting misconduct	76.8	Scientific record keeping/data management	64.8
Others		Others	
The whistleblower and reporting misconduct	23.2%	Misconduct of science	14.8%
Misconduct of science	22.1	The whistleblower and reporting misconduct	14.8
Conflict-of-interest	20.0	Human/animal subjects	13.0
Scientific record keeping/data management	18.9	Conflict-of-interest	11.1
Institution/federal policies	18.9	Institution/federal policies	11.1
Total Number of Respondents	95	Total Number of Respondents	54

*For respondents answering both questions.

Table 3-13

Top Four Topics Training Should Address By Size of Research Institution

All Trainee Types

Number of Research Personnel	Number of Responses	Total Number of Respondents
<100		35
Misconduct of science	118	
The whistleblower and reporting misconduct	114	
Human/animal subjects	113	
Scientific record keeping/data management	110	
100-500		21
Scientific record keeping/data management	78	
Misconduct of science	75	
Laboratory safety	74	
Human/animal subjects	73	
501-1000		24
The whistleblower and reporting misconduct	94	
Misconduct of science	91	
Scientific record keeping/data management	83	
Laboratory safety	82	
Institution/federal policies	82	
>1000		58
Misconduct of science	217	
The whistleblower and reporting misconduct	208	
Human/animal subjects	202	
Laboratory safety	191	

*For respondents answering both questions.

3.2.5 USEFUL TEACHING RESOURCES, FORMATS, AND METHODS

In this section, we describe the respondent answers to questions that asked how useful particular types of resources are, which instructional formats respondents would use to deliver RCR instruction, the teaching methods preferred by those respondents who have taught RCR, and the materials most often currently used by RCR instructors.

Respondents were asked to rate on a scale from 1 to 5, with 1 being least useful and 5 being most useful, a list of resources that could be used to deliver instruction in RCR. Eleven resources were listed in the response categories for this questions and we calculated an average score for each. The resources are sorted by average score in Table 3-14, with the most useful (highest average score) at the top of the table. Case studies were given the highest average score by respondents (4.2), followed by collections of 'best practices' (3.6) and guidelines and codes of ethics (3.6). Only one item had an average score under 3.0 (the mid-range). This was selective bibliographies, which had an average score of 2.7. Respondents who taught RCR tended to rate resources higher than respondents who had not taught RCR. Usefulness average scores by place of employment did not vary greatly (Table 3-15). Respondents from hospitals and AMCs, however, did rate model courses and training for trainer sessions more highly than other respondents. 'Other' category place of employment respondents found slide presentations and overheads to be useful as well. Few differences existed by size of research institution (Table 3-16).

When asked what types of instructional formats the respondents would use to deliver instruction in RCR (assuming all were conveniently available), respondents were most likely to choose seminars, and web-based modules/courses. More than half of the respondents also chose interactive CD-ROMs and videotapes. Table 3-17 presents responses for this question for all respondents and by whether the respondent had taught RCR. A majority of respondents that had not taught RCR (50.1 percent) also chose annual retreats as a preferred method for delivering instruction in RCR.

Those respondents with experience in providing instruction in RCR were asked to select those teaching methods they prefer. Table 3-18 summarizes the responses for the 108 respondents that answered this question. Eighty-seven percent of those who answered this question reported lectures as their preferred training method. This was followed by case study discussions (82.4 percent), student presentations (30.6 percent) and brown bag sessions (21.3 percent). Role playing was preferred by only 16.7 percent.

Finally, the survey asked respondents what materials they or their institution currently use in RCR instruction. The responses to this question are shown in Table 3-19. No one item was identified as being used by more than 30 percent of respondents. The most often identified item was The National Academy of Sciences publication, *On Being a Scientist*.

Table 3-14
Usefulness of Resources in Administering or Delivering RCR Instruction
By RCR Teaching Status

Resource	Respondents Taught RCR Average Score*	Respondents Have Not Taught RCR Average Score*	Total** Average Score*
Case studies	4.4	4.0	4.2
Collection of “best practices”	3.7	3.4	3.6
Guidelines/codes of ethics	3.8	3.2	3.6
Model courses	3.6	3.3	3.5
Publications	3.7	3.1	3.5
Training for trainer sessions	3.3	3.4	3.4
Guest speakers	3.4	3.2	3.3
Slide presentations/overheads	3.4	3.2	3.3
Handbooks	3.3	3.2	3.3
Collection of readings	3.4	2.6	3.1
Selective bibliographies	2.9	2.5	2.7
Total Number of Respondents	88	49	137

*Respondents scored each resource from 1 (least useful) to 5 (most useful). Average scores are calculated for each resource and sorted by score in descending order by Average Total Score.

**For respondents answering both questions.

Table 3-15
Usefulness of Resources in Administering or Delivering RCR Instruction
By Respondent Place of Employment

Resource	IHE/ Research organizations	Hospitals/AMC (& affiliated IHE)	Others	Total*
	Average Score**	Average Score**	Average Score**	Average Score**
Case studies	4.3	4.3	4.2	4.3
Publications	3.5	3.4	3.2	3.5
Collection of “best practices”	3.6	3.4	3.3	3.6
Model courses	3.5	3.6	3.5	3.5
Guidelines/codes of ethics	3.6	3.9	3.6	3.7
Slide presentations/overheads	3.3	3.5	3.6	3.4
Collection of readings	3.1	3.2	3.0	3.1
Training for trainer sessions	3.4	3.6	3.4	3.4
Guest speakers	3.3	3.5	3.3	3.3
Handbooks	3.3	3.1	3.1	3.3
Selective bibliographies	2.8	2.1	2.8	2.8
Total Number of Respondents	68	32	29	129

*For respondents answering both questions.

**Respondents scored each resource from 1 (least useful) to 5 (most useful). Average scores are calculated for each resource and sorted by score in descending order by Average Total Score.

Place of Employment categories include:

- 1) Institution of higher education (IHE) that is not affiliated with an academic medical center and research organization, institute, foundation, or laboratory;
- 2) Academic medical center (AMC) or affiliated institution of higher education and independent hospital; and,
- 3) Educational organization other than higher education; other health, human resources, or environmental services organization; federal or state government; and other company/for profit company.

Table 3-16
Usefulness of Resources in Administering or Delivering RCR Instruction
By Size of Research Institution

Resource	Number of Research Personnel				Total**
	<100	100-500	501-1000	>1000	
	Average* Score	Average* Score	Average* Score	Average* Score	
Case studies	4.1	3.8	4.3	4.4	4.2
Publications	3.5	3.4	3.6	3.4	3.5
Collection of “best practices”	3.6	3.3	3.6	3.7	3.6
Model courses	3.3	3.4	3.5	3.7	3.5
Guidelines/codes of ethics	3.6	3.5	3.5	3.8	3.6
Slide presentations/overheads	3.4	3.5	3.3	3.3	3.3
Collection of readings	3.0	3.1	3.3	3.2	3.1
Training for trainer sessions	3.4	3.3	3.2	3.5	3.4
Guest speakers	3.3	3.5	3.2	3.4	3.3
Handbooks	3.4	2.8	3.2	3.4	3.3
Selective bibliographies	3.0	2.8	2.7	2.6	2.7
Total Number of Respondents	32	21	24	57	134

*Respondents scored each resource from 1 (least useful) to 5 (most useful). Average scores are calculated for each resource and sorted by score in descending order by Average Total Score.

**For respondents answering both questions.

Table 3-17
Formats for Administering Instruction in RCR

	Number of Responses	Percent of Respondents*
Top Five Overall		
Seminars	129	86.0%
Web-based modules/courses	128	85.3
Interactive CD-ROMs	94	62.7
Video tapes	80	53.3
Summer training institute	61	40.7
Total Number of Respondents	150	
Top five for those who have taught RCR		
	Number of Responses	Percent of Respondents
Seminars	86	90.5%
Web-based modules/courses	81	85.3
Interactive CD-ROMs	55	57.9
Video tapes	52	54.7
Summer training institute	47	49.5
Total Number of Respondents	95	
Top five for those that have not taught RCR		
	Number of Responses	Percent of Respondents
Web-based modules/courses	47	85.5%
Seminars	43	78.2
Interactive CD-ROMs	39	70.9
Annual retreats	28	50.1
Summer training institute	14	25.5
Total Number of Respondents	55	

*For respondents answering both questions.

Table 3-18

Teaching Methods Preferred by Those Who Have Given Instruction in RCR

Which teaching method do you prefer to use?	Number of Responses	Percent of Respondents*
Lectures	94	87.0%
Case study discussion	89	82.4
Student presentations	33	30.6
Brown bag sessions	23	21.3
Role playing	18	16.7
Others**	11	10.2
Response Specified	108	70.6
Unspecified	45	29.4
Total	153	100

*Number of respondents (108) is the number of individuals who answered question five regardless of their response to Question 1 (whether or not they have given instruction in RCR.)

** Other responses indicated by more than one respondent are: discussion/seminars; required readings; videos.

Table 3-19
Materials Used in RCR Instruction

	Number of Responses	Percent of Respondents
The National Academy of Sciences: <i>On Being a Scientist</i>	44	28.8%
Korenman et al., <i>Teaching the Responsible Conduct of Research through a Case Study Approach</i>	28	18.3
Macrina's <i>Scientific Integrity: An Introductory Text with Cases</i>	23	15.0
American Association for the Advancement of Sciences' <i>Integrity in Scientific Research: Five Video Vignettes</i>	23	15.0
Bulger et al., <i>The Ethical Dimensions of the Biological Sciences</i>	11	7.2
Others*	48	31.4
Don't Know	25	16.3
Response Specified	122	79.7
Unspecified	31	20.3
Total	153	100

* Other responses indicated by more than one respondent are: Bebeau et al, *Moral Reasoning in Scientific Research*; handouts of article reprints/instructor materials; NIH videos, documents and web-based course.

3.3 MANAGING ALLEGATIONS OF SCIENTIFIC MISCONDUCT SURVEY

This section presents the results of the survey on Training in Managing Allegations of Scientific Misconduct. As was noted above, this survey was sent to 200 recipients, 150 from institutions that have had an allegation of scientific misconduct and 50 from all other non-category 10 institutions. As with the RCR results, survey results have been organized into 5 areas:

- Characteristics of survey respondents;
- Who should receive training;
- What instructional materials are needed;
- Topics training should address; and,
- Useful teaching resources, formats, and methods.

3.3.1 CHARACTERISTICS OF SURVEY RESPONDENTS

One hundred and fourteen (114) individuals responded to the training in managing allegations of scientific misconduct survey. As shown in Table 3-20, 38.6 percent of the respondents were affiliated with institutions that conduct training for administrators and staff in the handling allegations of scientific misconduct. Fifty-six percent of the respondents worked at institutions that do not conduct training for administrators and staff in handling allegations of scientific misconduct.

The survey captured respondents' place of employment information. Academic medical centers and affiliated institutions of higher education employ the largest group of respondents, 36.7 percent. (Also shown in table 3-20.) Institutions of higher education not affiliated with an academic medical center (18.4 percent) and research organizations, institutes, foundations, or laboratories (17.3 percent) were the two next largest types of employment institutions for respondents.

Place of employment varied only slightly between respondents employed at institutions that provided instruction in the handling of allegations of scientific misconduct and those that did not. Respondents employed at institutions where training was conducted were more likely to be employed at research organizations, institutes, foundations, or laboratories than those respondents from institutions that did not conduct training and less likely to be from institutions of higher education not affiliated with an AMC.

The number of respondents by size of research institution was fairly evenly distributed, with the largest percentage of respondents being from institutions with over 1000 research personnel (35.2 percent). The largest institutions appeared more likely to conduct training in the handling of allegations of scientific misconduct.

**Table 3-20
Characteristics of Survey Respondents**

Respondent from institution that conducts training:

	Number	Percent
Yes	44	38.6
No	64	56.1
Response Specified	108	94.7
Unspecified	6	5.3
Total	114	100

	Institution Conducts Training Percent	Institution Does Not Conduct Training Percent	Total*	
			Number	Percent
Respondent Place of Employment				
Institution of higher education not affiliated with an academic medical center	12.8%	22.0%	18	18.4%
Academic medical center or affiliated institution of higher education	35.9	37.2	36	36.7
Research organization, institute, foundation, or laboratory	28.2	10.2	17	17.3
Independent hospital	7.7	5.1	6	6.1
Educational organization other than higher education	--	3.4	2	2.0
Other health, human resources, or environmental services organization	10.3	11.9	11	11.2
Federal or state government	--	3.4	2	2.0
Other company/for profit company	5.1	6.8	6	6.1
Total Number of Respondents	39	59	98	

Number of Research Personnel at Place of Employment

Less than 100	22.7%	25.0%	26	24.1%
100-500	18.2	21.9	22	20.4
501-1000	18.2	21.9	22	20.4
Over 1000	40.1	31.3	38	35.2
Total Number of Respondents	44	64	108	

*For respondents answering both questions.

Note: Percents may not add to 100 due to rounding.

3.3.2 WHO SHOULD RECEIVE TRAINING

Respondents were asked what types of administrators and staff should receive training in how to manage allegations of scientific misconduct (Table 3-21). In general, they responded that most university administrators, research integrity officials, and academic researchers should receive training. Only university president were thought to need training by fewer than half of survey respondents. For all other types of administrators and staff, respondents agreed that the individuals should receive training more than 65 percent of the time.

Table 3-22 presents this information by respondent place of employment. Responses to whether university administrators and research integrity officials should receive training varied only slightly depending on the respondent's place of employment. However, persons employed by institutions of higher education not affiliated with an academic medical center and research organizations, institutes, foundations, or laboratories expressed a greater need for training for academic researchers.

Responses by size of research institution are presented in Table 3-23. Respondents from the largest institutions, those with over 1,000 research personnel, were more likely to say that university presidents should receive training in handling allegations of scientific misconduct (50.0 percent versus 40.9 percent for all respondents) and less likely to believe principal investigators should be trained (60.5 percent versus 70.9 percent for all). Respondents from the smallest institutions were more likely to select laboratory directors/chiefs among those who should receive training.

**Table 3-21
Who Should Receive Training in How to Manage Allegations of Scientific Misconduct**

	Number of Responses	Percent of Respondents
University Administrators		
President	45	39.5%
Vice President for Research	93	81.6
Science Deans	94	82.5
Institutional Research Integrity Officer	101	88.6
General Counsel	87	76.3
Research Integrity Officials		
Chair, Research Integrity Committee	94	82.5
Chair, Inquiry Committee	88	77.2
Chair, Investigation Committee	87	76.3
Academic Researchers		
Department Chairs	93	81.6
Laboratory Directors/Chiefs	83	72.8
Principal Investigators	78	68.4
Others*	25	21.9
Response Specified	110	96.5
Unspecified	4	3.5
Total	114	100

* Other responses indicated by more than one respondent are: research staff/research personnel; IRB members and staff; research administrators/supervisors; deans (other than science deans); department administrative managers.

Table 3-22
Who Should Receive Training in How to Manage Allegations of Scientific Misconduct By
Respondent Place of Employment

	IHE/ Research organizations	Hospitals/ AMC (& affiliated IHE)	Others	Total*	
	Percent	Percent	Percent	Number	Percent
University Administrators					
President	37.1%	46.5%	50.0%	44	44.0%
Vice President for Research	88.6	88.4	77.3	86	86.0
Science Deans	88.6	88.4	72.7	85	85.0
Institutional Research Integrity Officer	91.4	93.0	86.4	91	91.0
General Counsel	80.0	81.4	77.3	80	80.0
Research Integrity Officials					
Chair, Research Integrity Committee	82.9	88.4	81.8	85	85.0
Chair, Inquiry Committee	77.1	83.7	77.3	80	80.0
Chair, Investigation Committee	77.1	81.4	77.3	79	79.0
Academic Researchers					
Department Chairs	85.7	88.4	68.2	83	83.0
Laboratory Directors/Chiefs	85.7	67.4	72.7	75	75.0
Principal Investigators	85.7	60.5	68.2	71	71.0
Others**	31.4	20.9	9.1	22	22.0
Total Number of Respondents	35	43	22	100	

*For respondents answering both questions.

** Other responses indicated by more than one respondent are: research staff/research personnel; research administrators/supervisors; deans (other than science deans).

Place of Employment categories include:

- 1) Institution of higher education (IHE) that is not affiliated with an academic medical center and research organization, institute, foundation, or laboratory;
- 2) Academic medical center (AMC) or affiliated institution of higher education and independent hospital; and,
- 3) Educational organization other than higher education; other health, human resources, or environmental services organization; federal or state government; and other company/for profit company.

Table 3-23
Who Should Receive Training in How to Manage Allegations of Scientific Misconduct
By Size of Research Institution

	Number of Research Personnel				Total*	
	<100 Percent	100-500 Percent	501-1000 Percent	>1000 Percent	Number	Percent
University Administrators						
President	37.0%	36.4%	34.8%	50.0%	45	40.9%
Vice President for Research	77.8	90.9	69.6	94.7	93	84.5
Science Deans	81.5	81.8	78.3	94.7	94	85.5
Institutional Research Integrity Officer	88.9	86.4	91.3	97.4	101	91.8
General Counsel	70.4	90.9	69.6	84.2	87	79.1
Research Integrity Officials						
Chair, Research Integrity Committee	81.5	95.5	82.6	84.2	94	85.5
Chair, Inquiry Committee	81.5	81.8	65.2	86.8	88	80.0
Chair, Investigation Committee	85.2	81.8	65.2	81.6	87	79.1
Academic Researchers						
Department Chairs	74.1	86.4	78.3	94.7	93	84.5
Laboratory Directors/Chiefs	88.9	72.7	65.2	73.7	83	75.5
Principal Investigators	77.8	81.8	69.6	60.5	78	70.9
Others**	14.8	27.2	17.4	28.9	25	22.7
Total Number of Respondents	27	22	23	38	110	

*For respondents answering both questions.

** Other responses indicated by more than one respondent are: research staff/research personnel; IRB members and staff; research administrators/supervisors; deans (other than science deans); department administrative managers.

3.3.3 WHAT INSTRUCTIONAL MATERIALS ARE NEEDED

Respondents were also asked for what topics and for what audiences they believed better instructional materials were needed. Table 3-24 shows the top five responses from all respondents by topic and by audience.

The top five topics where better instructional materials are needed include (in order of highest agreement) 'requirements of proof', 'protection against conflicts-of-interest', 'handling evidence and sequestering of data and records', 'regulatory requirements', and 'developing investigation plans'. Almost 65 percent of respondents agreed that better instructional materials are needed on the topic of 'requirements of proof.' (At the other end of the list, only 34.2 percent agreed better materials were needed on the topic of 'ORI/Departmental Appeals Board hearings'. See page E-6 in Appendix E.) The top five audiences for which more instructional materials are needed include (again in order of highest agreement) 'institutional research integrity officers', 'principal investigators', 'department chairs', 'science deans', and 'chair, research integrity committee'. (Respondents were least likely to select presidents and general counsels as needing more instructional materials. See page E-7 of Appendix E.)

When examined by respondent place of employment, the topics for which better instructional materials are needed varied somewhat (Table 3-25). Individuals at institutions of higher education and research organizations not affiliated with an academic medical center or hospital, listed handling evidence and sequestering of data and records most frequently (67.6 percent) as needing better instructional materials. However, more than seventy percent of respondents working at hospitals and academic medical centers (and affiliated institutions of higher education) indicated that better instructional materials were needed related to protection against conflicts-of-interest and requirements of proof. Respondents from other organizations most frequently listed regulatory requirements as the topic in need of better instructional materials (84.2 percent). Respondents from 'Other' places of employment also were more likely to select 'responding to retaliation complaints' and 'restoring reputations' as topics for which better materials are needed. Few differences exist in responses by place of employment for what audiences need more instructional materials. The only figure that stands out here is that 76.2 percent of respondents from 'Other' places of employment felt that more instructional materials are needed for principal investigators.

Responses were examined by size of research institution as well (Table 3-26). There appears to be a lot of agreement across respondents at the different sized research institutions, with a few exceptions. Respondents from the smallest research institutions, those with fewer than 100 research personnel, were less likely to select 'preparing reports' and 'ORI/Departmental Appeals Board hearings' as topics for which better instructional materials are needed than other respondents. Respondents working in

institutions with 100 to 500 research personnel were more likely than others to say department chairs and principal investigators need more instructional materials.

Table 3-24
Better /More Instructional Materials Needed By Topics and Audiences
Top Five Responses

	Number of Responses	Percent of Respondents
Topics		
Requirements of proof	74	64.9%
Protection against conflicts-of-interest	73	64.0
Handling evidence and sequestering of data and records	71	62.3
Regulatory requirements	68	59.6
Developing investigation plans	65	57.0
Response Specified	105	92.1
Unspecified	9	7.9
Total	114	100
 Audiences		
Institutional Research Integrity Officer	70	61.4
Principal Investigators	70	61.4
Department Chairs	66	57.9
Science Deans	65	57.0
Chair, Research Integrity Committee	64	56.1
Response Specified	111	97.4
Unspecified	3	2.6
Total	114	100

Table 3-25
Better /More Instructional Materials Needed By Respondent Place of Employment

Topics	IHE/ Research organizations	Hospitals/ AMC (& affiliated IHE)	Others	Total*	
	Percent	Percent	Percent	Number	Percent
Regulatory requirements	52.9%	62.8%	84.2%	61	63.5%
Maintaining confidentiality	44.1	46.5	42.1	43	44.8
Protection against conflicts-of-interest	61.8	74.4	73.7	67	69.8
Assuring appropriate expertise	47.1	37.2	47.4	41	42.7
Treatment of respondents and whistleblowers	50.0	58.1	63.2	54	56.3
Developing investigation plans	58.8	62.8	63.2	59	61.5
Handling evidence and sequestering of data and records	67.6	65.1	73.7	65	67.7
Interviewing	41.2	67.4	57.9	54	56.3
Requirements of proof	64.7	72.1	73.7	67	69.8
Preparing reports	32.4	55.8	47.4	44	45.8
Responding to retaliation complaints	52.9	55.8	73.7	56	58.3
Restoring reputations	44.1	58.1	68.4	53	55.2
Appeals within institutions	23.5	46.5	63.2	40	41.7
ORI/Departmental Appeals Board hearings	26.5	39.5	36.8	33	34.4
Other	8.8	0.0	10.5	5	5.2
Total Number of Respondents	34	43	19	96	
Audiences					
President	16.7%	28.9%	28.6%	25	24.5%
Vice President for Research	61.1	55.6	47.6	57	55.9
Science Deans	52.8	66.7	42.9	58	56.9
Institutional Research Integrity Officer	58.3	66.7	52.4	62	60.8
General Counsel	41.7	44.4	47.6	45	44.1
Chair, Research Integrity Committee	44.4	66.7	52.4	57	55.9
Chair, Inquiry Committee	41.7	57.8	52.4	52	51.0
Chair, Investigation Committee	41.7	57.8	47.6	51	50.0
Department Chairs	47.2	66.7	57.1	59	57.8
Laboratory Directors	55.6	42.2	57.1	51	50.0
Principal Investigators	63.9	55.6	76.2	64	62.7
Other**	22.2	8.9	9.5	14	13.7
Total Number of Respondents	36	45	21	102	

* For respondents answering both questions.

** Other responses indicated by more than one respondent are: deans (other than science deans; research administrators; research staff/all research staff.

Place of Employment categories include:

- 1) Institution of higher education (IHE) that is not affiliated with an academic medical center and research organization, institute, foundation, or laboratory;
- 2) Academic medical center (AMC) or affiliated institution of higher education and independent hospital; and,
- 3) Educational organization other than higher education; other health, human resources, or environmental services organization; federal or state government; and other company/for profit company.

Table 3-26
Better /More Instructional Materials Needed By Size of Research Institution

	<100 %	100-500 %	501-1000 %	>1000 %	Total* No.	%
Topics						
Regulatory requirements	59.1%	68.2%	60.9%	68.4%	68	64.8%
Maintaining confidentiality	50.0	45.5	43.5	39.5	46	43.8
Protection against conflicts-of-interest	77.3	68.2	69.6	65.8	73	69.5
Assuring appropriate expertise	50.0	31.8	39.1	42.1	43	41.0
Treatment of respondents and whistleblowers	59.1	45.5	56.5	63.2	60	57.1
Developing investigation plans	63.6	59.1	60.9	63.2	65	61.9
Handling evidence and sequestering of data and records	72.7	63.6	65.2	68.4	71	67.6
Interviewing	54.5	63.6	56.5	57.9	61	58.1
Requirements of proof	63.6	81.8	78.3	63.2	74	70.5
Preparing reports	22.7	68.2	47.8	47.4	49	46.7
Responding to retaliation complaints	54.5	63.6	56.5	63.2	63	60.0
Restoring reputations	50.0	68.2	52.2	52.6	58	55.2
Appeals within institutions	45.5	54.5	43.5	36.8	46	43.8
ORI/Departmental Appeals Board hearings	13.6	54.5	34.8	42.1	39	37.1
Other	4.5	--	8.7	5.3	5	4.8
Total Number of Respondents	22	22	23	38	105	
Audiences						
President	19.2	36.4	20.8	23.1	27	24.3%
Vice President for Research	57.7	68.2	45.8	53.8	62	55.9
Science Deans	46.2	54.5	58.3	69.2	65	58.6
Institutional Research Integrity Officer	57.7	63.6	66.7	64.1	70	63.1
General Counsel	50.0	50.0	41.7	43.6	51	45.9
Chair, Research Integrity Committee	50.0	63.6	62.5	56.4	64	57.7
Chair, Inquiry Committee	46.2	59.1	45.8	56.4	58	52.3
Chair, Investigation Committee	50.0	54.5	45.8	53.8	57	51.4
Department Chairs	38.5	77.3	58.3	64.1	66	59.5
Laboratory Directors	57.7	54.5	33.3	53.8	56	50.5
Principal Investigators	65.4	81.8	58.3	53.8	70	63.1
Other**	3.8	22.7	20.8	12.8	16	14.4
Total Number of Respondents	26	22	24	39	111	

* For respondents answering both questions.

** Other responses indicated by more than one respondent are: deans (other than science deans; research administrators; research all/all research staff.

3.3.4 TOPICS TRAINING SHOULD ADDRESS

Respondents selected topics training should address for four different groups of potential trainees: university administrators, research integrity officials, academic researchers, and others. Table 3-27 presents the most frequent responses for each of the four trainee groups. Table 3-28 displays the data by the size of research organization.

Two topics, 'protection against conflicts-of-interest' and 'regulatory requirements', were among the top four topics chosen by respondents for all groups of trainees (Table 3-27). Overall, 'protection against conflicts-of-interest' was the topic chosen most frequently regardless of trainee type (data not shown). For university administrators, respondents most frequently selected 'appeals within the institution' and 'treatment of respondents and whistleblowers' as topics that should be addressed. 'Preparing reports' and 'developing investigation plans' were among the topics most frequently selected for the training of research integrity officials.

Regardless of the size of the respondent's research institution, 'protection against conflicts of interest', 'treatment of respondents and whistleblowers', and 'maintaining confidentiality' were among the top four topics training should address across all trainee types. Respondents from research institutions with 100 or more research employees also frequently indicated that 'regulatory requirements' should be addressed. Respondents from smaller (<100 research personnel) organizations indicated that 'appeals within institutions' should be addressed.

Table 3-27
Top Four Topics Training Should Address By Audience

Audience	Number of Responses	Percent of Respondents
University Administrators		
Treatment of respondents and whistleblowers	98	86.0%
Appeals within institution	94	82.5
Protection against conflicts-of-interest	94	82.5
Regulatory requirements	93	81.6
Research Integrity Officials		
Protection against conflicts-of-interest	102	89.5
Regulatory requirements	102	89.5
Developing investigation plans	101	88.6
Preparing reports	101	88.6
Academic Researchers		
Maintaining confidentiality	91	79.8
Protection against conflicts-of-interest	89	78.1
Regulatory requirements	86	75.4
Treatment of respondents and whistleblowers	67	58.8
Others		
Maintaining confidentiality	25	21.9
Regulatory requirements	18	15.8
Treatment of respondents and whistleblowers	18	15.8
Appeals within institution	17	14.9
Protection against conflicts-of-interest	17	14.9
Response Specified	114	100
Unspecified	--	--
Total	114	100

**Table 3-28
Top Four Topics Training Should Address By Size of Research Institution***

	Number of Responses (Across All Trainee Types)	Total Number of Respondents
<100		28
Protection against conflicts of interest	69	
Treatment of respondents and whistleblowers	69	
Maintaining confidentiality	64	
Appeals within institution	61	
100-500		23
Protection against conflicts of interest	64	
Regulatory requirements	64	
Treatment of respondents and whistleblowers	59	
Maintaining confidentiality	58	
501-1000		24
Regulatory requirements	65	
Maintaining confidentiality	59	
Protection against conflicts of interest	56	
Treatment of respondents and whistleblowers	56	
>1000		29
Protection against conflicts of interest	105	
Maintaining confidentiality	101	
Regulatory requirements	101	
Treatment of respondents and whistleblowers	97	

*For respondents answering both questions.

3.3.5 WHAT ARE USEFUL RESOURCES, FORMATS, AND METHODS

Respondents were asked what instructional formats would be useful in administering or delivering instruction in managing allegations of scientific misconduct if the formats were conveniently available. The majority of respondents, 86.8 percent, indicated that web-based modules and courses would be useful (Table 3-29). Also, more than half of the respondents indicated that videotapes and seminars would be useful. Respondents chose annual retreats and summer training institutes least often as a useful resource for delivering instruction in the handling of allegations of scientific misconduct.

Respondents were also asked what additional resources would be useful in managing allegations of scientific misconduct. The two most common responses were best practices (chosen by 70.2 percent of respondents) and case studies (chosen by 67.5 percent of respondents). (See Table 3-30.) In addition, respondents suggested a number of topics for guidelines that would be useful resources in managing allegations. Among these topics were protections against conflict-of-interests, conducting inquiries and investigations, policies and procedures, and assuring appropriate expertise. Additional topics suggested by respondents are also included in Table 3-30.

Table 3-29
Instructional Formats Useful for Teaching Management of Allegations of Misconduct

Instructional Formats	Number of Responses	Percent of Respondents
Web-based modules/courses	99	86.8%
Videotapes	63	55.3
Seminars	60	52.6
Interactive CD-ROMs	53	46.5
Conferences	52	45.6
Lectures	39	34.2
Teleconferences	27	23.7
Annual retreats	13	11.4
Summer training institutes	13	11.4
Other	2	1.8
	Response Specified	113
	Unspecified	1
	Total	114

**Table 3-30
Additional Resources That Would Be Useful In Managing Allegations**

Resources	Number of Responses	Percent of Respondents
Best practices	80	70.2
Case studies	77	67.5
Consultants	32	28.1
Selective bibliographies	26	22.8
Guidelines on _____*	18	15.8
Conflict-of-interest/protections against COI	4	3.5
Conducting inquiry/ investigation/ developing investigation plans/how to conduct a review	4	3.5
Available on topics upon request/ everything applicable/each subject involved	3	2.6
Procedures to follow/policies and procedures/ a "cookbook" of procedures	3	2.6
Assuring appropriate expertise	2	1.8
Guidelines unspecified	2	1.8
Handling allegations (brief, accurate and useful)/ Handling an allegation from start to finish	2	1.8
Handling evidence and sequestering of data and records	2	1.8
Interviewing	2	1.8
Maintaining confidentiality	2	1.8
Regulations/regulatory requirements	2	1.8
Requirements of proof	2	1.8
Restoring reputations	2	1.8
Other	3	2.6
	Response Specified	109
	Unspecified	5
	Total	114

*Number of respondents that indicated at least one guideline; Guidelines indicated by more than one respondent are listed.

4. CONCLUSIONS

4. CONCLUSIONS

The most striking conclusion from the two surveys is undoubtedly the wide agreement among respondents of the need for training in both the responsible conduct of research and in the handling of allegations of scientific misconduct for the many different types of individuals involved in these activities. In particular, a large majority of respondents of the RCR survey selected all possible response options when asked what types of individuals should receive training in RCR. Over 90 percent of respondents said that all types of researchers listed should receive training. Over 90 percent also said that institutional RIOs should receive training. Respondents were less likely to say laboratory assistants and laboratory technicians should receive training, although 66.0 and 68.0 percent, respectively, still indicated that training in RCR was appropriate for these individuals. Respondents who had taught RCR were in even more agreement about the types of individuals who should receive RCR training. They were almost unanimous in their agreement that all types of researchers, RIOs and RIIs, and training grant directors should be included among those who should receive training.

Respondents of the managing allegations of misconduct survey also were in agreement that several types of individuals need training. In general, they responded that most university administrators, research integrity officials, and academic researchers should receive training. Only university presidents were thought to need training by fewer than half of survey respondents. For all other types of administrators and staff, respondents agreed that the individuals should receive training more than 65 percent of the time.

The RCR Survey

'Scientific record keeping/ data management' was the RCR topic identified most often by respondents as needing more adequate instructional materials. Over 50 percent of respondents who answered this question about the need for more adequate instructional materials also chose 'authorship/publication/credit practices,' intellectual property,' 'conflict of interest,' and misconduct in science' as topics needing more adequate materials. Respondents agreed that 'laboratory safety' was the topic least in need of more adequate instructional materials.

Respondents most often agreed that principal investigators and graduate students were the audiences for whom more instructional materials are needed. Three-quarters of all respondents selected these two audiences. Research associates/assistants and postdoctoral fellows were also selected by over 60 percent of respondents. Across all audiences, respondents were most likely to select 'misconduct in science,' 'the whistleblower and reporting misconduct,' 'human/animal subjects,' and 'scientific record keeping/data management' as the topics training in RCR should address. For researchers, respondents were almost unanimous in suggesting that training for these

individuals should include 'conflict-of-interest', 'authorship/publication/credit practices', 'intellectual property', and 'peer review and privileged information' issues. Training for laboratory directors and grant managers, however, should focus on 'institutional/ federal policies,' and 'public funds and grant funds management.'

When asked to rate on a scale from 1 to 5, with 1 being least useful and 5 being most useful, a list of resources that could be used to deliver instruction in RCR, respondents rated case studies most highly, followed by collections of 'best practices' and guidelines and codes of ethics. Respondents found selective bibliographies least useful. When asked what types of instructional formats the respondents would use to deliver instruction in RCR (assuming all were conveniently available), respondents were most likely to choose seminars, and web-based modules/courses. More than half of the respondents also chose interactive CD-ROMs and videotapes. Of those respondents with experience in providing instruction in RCR, 87.0 percent reported lectures as their preferred training method. This was followed by case study discussions (82.4 percent), student presentations (30.6 percent) and brown bag sessions (21.3 percent). Role playing was preferred by only 16.7 percent.

The Managing Allegations of Scientific Misconduct Survey

Respondents identified 'requirements of proof', 'protection against conflicts-of-interest', 'handling evidence and sequestering of data and records', 'regulatory requirements', and 'developing investigation plans' as the top five topics for which better instructional materials are needed. Almost 65 percent of respondents agreed that better instructional materials are needed on the topic of 'requirements of proof.' At the other end of the list, only 34.2 percent agreed better materials were needed on the topic of 'ORI/ Departmental Appeals Board hearings'. The top five audiences for which more instructional materials are needed include 'institutional research integrity officers', 'principal investigators', 'department chairs', 'science deans', and 'chair, research integrity committee'. Respondents were least likely to select university presidents and general counsels as needing more instructional materials.

In selecting topics training should address for four different groups of potential trainees -- university administrators, research integrity officials, academic researchers, and others -- respondents selected two topics, 'protection against conflicts-of-interest' and 'regulatory requirements', among the top four topics for each group of trainees. Overall, 'protection against conflicts-of-interest' was the topic listed most frequently. For university administrators, respondents most frequently selected 'appeals within the institution' and 'treatment of respondents and whistleblowers' as topics that should be addressed. 'Preparing reports' and 'developing investigation plans' were among the topics most frequently selected for the training of research integrity officials.

A large majority of respondents, 86.8 percent, indicated that web-based modules and courses are useful for teaching management of allegations of misconduct. Also, more than half of the respondents indicated that videotapes and seminars would be useful. Respondents chose annual retreats and summer training institutes least often as a useful resource for delivering instruction in the handling of allegations of scientific misconduct.

Respondents were also asked what additional resources would be useful in managing allegations of scientific misconduct. The two most common responses were best practices and case studies. In addition, respondents suggested a number of topics for guidelines that would be useful resources in managing allegations. Among these topics were protections against conflict-of-interests, conducting inquiries and investigations, policies and procedures, and assuring appropriate expertise.

APPENDIX A

**NEEDS ASSESSMENT QUESTIONNAIRE
TRAINING IN THE RESPONSIBLE CONDUCT OF RESEARCH**

**Needs Assessment Questionnaire
Training in the Responsible Conduct of Research**

Instructions This survey is designed to obtain your views on the training and materials needed for teaching the responsible conduct of research. The **responsible conduct of research (RCR)** focuses on aspects of performing research, such as the responsibilities of research supervisors and trainees, data management, conflict-of-interest, responsible authorship, policies for handling misconduct, and policies regarding the use of human and animal subjects.

This survey will take approximately 10 to 12 minutes to complete. Your input into this needs assessment is very important, so please answer each question.

After completing the questionnaire, please return the questionnaire using the enclosed business reply envelope.

Needs Assessment Purpose This needs assessment will help determine the types of training and materials needed to teach responsible conduct of research to those involved in research activities at universities and other research organizations. Information for this survey will be summarized in a report for the Office of Research Integrity. Results will be used to design future teaching materials.

Confidentiality Information that you provide on this questionnaire will not be linked back to your name. CHPS Consulting will track those who have returned the survey for purposes of directing follow-up activities, but individual respondents will not be identified in the final report submitted to ORI or in the database created from the survey responses.

Questions If you have any questions about this needs assessment survey, you may contact Mary Gabay, the CHPS Project Director, at (410) 715-9400 or by email at mgabay@chpsconsulting.com.

THANK YOU FOR YOUR PARTICIPATION!

Burden Statement. A federal agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The valid OMB control number for this information collection is 0990-0245. Public reporting burden for this collection of information is estimated to be 10 to 12 minutes per response, including time for searching existing data sources, gathering the necessary data and completing and reviewing the collection of information.

1. Do you currently teach, or have you in the past taught, one or more courses in the responsible conduct of research (RCR)?

- Yes
 No

2. In your opinion, which of the positions below should receive education and training specific to RCR and the prevention of scientific misconduct? (Check all that apply.)

Researchers

- Principal Investigators/Chiefs
 Research Associates
 Postdoctoral Fellows
 Graduate Students

Lab Directors/Grant Managers

- Laboratory Directors
 Training Grant Directors
 Grants Management Officers

Research Integrity Officials (RIOs)/Research Integrity Instructors (RIIs) who teach RCR.

- Institutional Research Integrity Officers (RIOs are individuals appointed at institutions to handle matters of scientific misconduct and related activities.)
 Research Integrity Instructors

Laboratory Assistants and Technicians

- Laboratory Assistants
 Laboratory Technicians
 Research Assistants

Other

- Other _____

3. What topics should the training address for the different groups of trainees checked in question 2? For each **Subject** that should be addressed in RCR training, check which **Trainee** groups should have training in that subject. Check only the subjects that you feel should be addressed. If you don't think a subject needs to be addressed, leave the row blank.

	Researchers	Lab Dir./Grant	RIOs RII's	Lab Asst./Techs.	Other
Study design	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scientific record keeping/ data management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Human/Animal subjects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Laboratory safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public funds and grant funds management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mentoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collaborative research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Authorship/publication/ credit practices	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Peer review and privileged information	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Intellectual property	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conflict-of-interest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Misconduct in science	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Institutional/federal policies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The whistleblower and reporting misconduct	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Assuming they are conveniently available, which of the instructional formats below would you use in administering or delivering instruction in RCR? (Check all that apply.)

- | | |
|--|--|
| <input type="checkbox"/> Seminars | <input type="checkbox"/> Teleconferences |
| <input type="checkbox"/> Web-based modules/courses | <input type="checkbox"/> Videotapes |
| <input type="checkbox"/> Interactive CD-ROMs | <input type="checkbox"/> Annual retreats |
| <input type="checkbox"/> Audio tapes | <input type="checkbox"/> Summer training institute |
| <input type="checkbox"/> Conferences | |

5. If you have given instruction in RCR, which teaching methods did you prefer to use? (Check all that apply.) (If you have not given instruction in RCR, skip this question.)

- | | |
|--|---|
| <input type="checkbox"/> Lectures | <input type="checkbox"/> Role playing |
| <input type="checkbox"/> Student presentations | <input type="checkbox"/> Brown bag sessions |
| <input type="checkbox"/> Case study discussion | <input type="checkbox"/> Other _____ |

6. Do you or does your institution use any of the following materials in RCR instruction?

- Korenman et al. *Teaching the Responsible Conduct of Research through a Case Study Approach*
- The National Academy of Sciences: *On Being a Scientist*
- Macrina's *Scientific Integrity: An Introductory Text with Cases*
- American Association for the Advancement of Sciences' *Integrity in Scientific Research: Five Video Vignettes*
- Bulger et al., *The Ethical Dimensions of the Biological Sciences*
- Other, please cite specific material _____
- Don't know

7. Based on your experience, in what RCR topics are more adequate instructional materials needed? (Check all that apply.)

- Study design
- Scientific record keeping/data management
- Human/Animal subjects
- Laboratory safety
- Public funds and grant funds management
- Mentoring
- Collaborative research
- Authorship/publication/credit practices
- Peer review and privileged information
- Intellectual property
- Conflict-of-interest
- Misconduct in science
- Institutional/federal policies
- The whistleblower and reporting misconduct
- Research and Institutional Environments and RCR
- Other _____

8. Based on your experience, for what audiences are more RCR instructional materials needed?
 (Check all that apply.)

- | | |
|---|--|
| <input type="checkbox"/> Principal investigators | <input type="checkbox"/> Grants management officers |
| <input type="checkbox"/> Research associates/assistants | <input type="checkbox"/> Research Integrity Officers |
| <input type="checkbox"/> Postdoctoral fellows | <input type="checkbox"/> RCR instructors |
| <input type="checkbox"/> Graduate students | <input type="checkbox"/> Laboratory assistants |
| <input type="checkbox"/> Laboratory directors | <input type="checkbox"/> Laboratory technicians |
| <input type="checkbox"/> Training grant directors | <input type="checkbox"/> Other _____ |

9. Based on your experience, on a scale from 1 to 5, with 1 being least useful and 5 being most useful, please rate how useful each of the following resources are in delivering or administering RCR instruction.

Resource	Least UsefulMost Useful		
	1	2	3	4	5
Training for trainer sessions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Model courses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Case studies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Publications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Selective bibliographies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Guest speakers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Slide presentations/overheads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Handbooks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collection of "best practices"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collection of readings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Guidelines/codes of ethics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. To the best of your knowledge, what disciplines are represented by students in the RCR courses at your institution? (Check all that apply.)

- | | |
|--|---|
| <input type="checkbox"/> Anatomy | <input type="checkbox"/> Genetics |
| <input type="checkbox"/> Cell Biology | <input type="checkbox"/> Pharmacology |
| <input type="checkbox"/> Bioethics | <input type="checkbox"/> Bioengineering |
| <input type="checkbox"/> Biochemistry | <input type="checkbox"/> Biophysics |
| <input type="checkbox"/> Psychology | <input type="checkbox"/> Biostatistics |
| <input type="checkbox"/> Biology | <input type="checkbox"/> Sociology |
| <input type="checkbox"/> Physiology | <input type="checkbox"/> All of the above |
| <input type="checkbox"/> Physical anthropology | <input type="checkbox"/> Don't know |
| <input type="checkbox"/> Epidemiology | <input type="checkbox"/> Other _____ |

11. What type of research institution are you employed by?

- Institution of higher education that is not affiliated with an Academic Medical Center
- Academic Medical Center or affiliated institution of higher education
- Research organization, Institute, Foundation, or Lab
- Independent hospital
- Educational organization other than higher education
- Other health, human resources, or environmental services organization
- Federal or State Government
- Other _____

12. What is the approximate number of research personnel working at your institution?

- Less than 100
- 100 – 500
- 501 – 1000
- Over 1000

**END OF QUESTIONNAIRE
THANK YOU!**

APPENDIX B

**NEEDS ASSESSMENT QUESTIONNAIRE
TRAINING IN MANAGING ALLEGATIONS OF MISCONDUCT**

Needs Assessment Questionnaire Training in Managing Allegations of Misconduct

Instructions This survey is designed to obtain your views on educating administrators and staff about how to manage allegations of scientific misconduct. For this study, scientific misconduct is defined as fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results.

This survey will take approximately 10 to 12 minutes to complete. Your input for this needs assessment is very important, so please answer each question.

After completing the questionnaire, please return the questionnaire using the enclosed business reply envelope.

Needs Assessment Purpose This needs assessment will help determine the types of training and materials needed to educate administrators and staff about how to handle allegations of scientific misconduct. Information for this survey will be summarized in a report for the Office of Research Integrity. Results will be used to design future educational materials.

Confidentiality Information that you provide on this questionnaire will not be linked back to your name. CHPS Consulting will track those who have returned the survey for purposes of directing follow-up activities, but individual respondents will not be identified in the final report submitted to ORI or in the database created from the survey responses.

Questions If you have any questions about this needs assessment survey, you may contact Mary Gabay, the CHPS Project Director, at (410) 715-9400 or by email at mgabay@chpsconsulting.com.

THANK YOU FOR YOUR PARTICIPATION!

Burden Statement. A federal agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The valid OMB control number for this information collection is 0990-0245. Public reporting burden for this collection of information is estimated to be 10 to 12 minutes per response, including time for searching existing data sources, gathering the necessary data and completing and reviewing the collection of information.

1. Does your university/institution conduct training for administrators and staff in handling allegations of scientific misconduct?

- Yes
 No

2. In your opinion, which types of administrators and staff should receive training in how to manage allegations of scientific misconduct? (Check all that apply.)

University Administrators

- President
 Vice President for Research
 Science Deans
 Institutional Research Integrity Officer
 General Counsel

Research Integrity Officials

- Chair, Research Integrity Committee
 Chair, Inquiry Committee
 Chair, Investigation Committee

Academic Researchers

- Department Chairs
 Laboratory Directors/Chiefs
 Principal Investigators

Others

- Other _____

3. What topics should the training address for the different groups of trainees checked above? For each **Subject** that should be addressed in training, check which **Trainee** groups should have training in that subject. Check only the subjects that you feel should be addressed. If you don't think a subject needs to be addressed, leave the row blank.

	University Administrators	Research Integrity Officials	Academic Researchers	Others
Regulatory requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Maintaining Confidentiality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protection against conflicts of interest	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Assuring appropriate expertise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Treatment of respondents and whistleblowers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Developing investigation plans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Handling evidence and sequestering of data	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interviewing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preparing reports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Responding to retaliation complaints	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Restoring reputations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Appeals within institution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ORI/Departmental Appeals Board hearings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. Assuming they are conveniently available, which of the instructional formats below would be useful in administering or delivering instruction in managing allegations of misconduct? (Check all that apply.)

- | | |
|--|---|
| <input type="checkbox"/> Lectures | <input type="checkbox"/> Teleconferences |
| <input type="checkbox"/> Seminars | <input type="checkbox"/> Videotapes |
| <input type="checkbox"/> Web-based modules/courses | <input type="checkbox"/> Annual retreats |
| <input type="checkbox"/> Interactive CD-ROMs | <input type="checkbox"/> Summer training institutes |
| <input type="checkbox"/> Conferences | <input type="checkbox"/> Other _____ |

5. Given your experience, in what topics are better instructional materials needed? (Check all that apply)

- Regulatory requirements
- Maintaining Confidentiality
- Protection against conflicts-of-interest
- Assuring appropriate expertise
- Treatment of respondents and whistleblowers
- Developing investigation plans
- Handling evidence and sequestering of data and records
- Interviewing
- Requirements of proof
- Preparing reports
- Responding to retaliation complaints
- Restoring reputations
- Appeals within institutions
- ORI/Departmental Appeals Board hearings
- Other _____

6. Given your experience, for what audiences are more instructional materials in managing scientific misconduct needed? (Check all that apply.)

- President
- Vice President for Research
- Science Deans
- Institutional Research Integrity Officer
- General Counsel
- Chair, Research Integrity Committee
- Chair, Inquiry Committee
- Chair, Investigation Committee
- Department Chairs
- Laboratory Directors
- Principal Investigators
- Other _____

7. What additional resources would be useful in managing allegations? (Check all that apply.)

- Guidelines on _____
- Best practices
- Consultants
- Case studies
- Selective bibliographies
- Other _____

8. What type of research institution are you employed by?

- Institution of higher education that is not affiliated with an Academic Medical Center
- Academic Medical Center or affiliated institution of higher education
- Research organization, Institute, Foundation, or Lab
- Independent hospital
- Educational organization other than higher education
- Other health, human resources, or environmental services organization
- Federal or State Government
- Other _____

9. What is the approximate number of research personnel working at your institution?

- Less than 100
- 100 – 500
- 501 – 1000
- Over 1000

**END OF QUESTIONNAIRE
THANK YOU!**

APPENDIX C
FOCUS GROUP REPORTS

OFFICE OF RESEARCH INTEGRITY NEEDS ASSESSMENT
Focus Group Report

On February 8, 2000, CHPS Consulting held a focus group with Research Integrity Officers and other administrators from local universities, NIH and the American Association for the Advancement of Science (AAAS). The focus group was held in College Park, Maryland. A list of participants is attached. The following section presents key points from the focus group discussion, which is followed by a summary of conclusions from the focus group.

Key Discussion Points

- As an icebreaker, participants were asked to define *research integrity* and the *responsible conduct of research (RCR)*. Focus group members stated that the terms are often thought of as being the same and used interchangeably. There was general agreement, however, that the former is a goal, while the latter is the process for achieving that goal. Participants concluded that ‘to conduct research responsibly is to have integrity’ and that research integrity is not simply ‘avoiding scientific misconduct.’
- Participants stated that the focus of RCR education efforts should be to get students to think more broadly about RCR— to understand that it goes beyond issues of fabrication, falsification, and plagiarism (FFP). They felt that the most effective methods for teaching RCR are the use of examples of ambiguous situations, which provoke discussion and thought. There are existing textbooks that contain such case studies for discussion. Also helpful for students are case studies illustrating examples of misconduct that have negative impacts on students themselves.
- One participant stated that, ideally, teaching about RCR should not be needed because the system of scientific research is supposedly self-correcting (i.e., incorrect or falsified findings will be corrected when others do studies with different results). The group then discussed that the problem with this self-correction mechanism is that it is too slow, and often there is no money for replication. Participants concluded that these problems with the self-correcting model create a need for ORI to be proactive in its educational efforts. A proactive approach avoids the time lag that occurs while waiting for the self-correcting mechanism to work and reduces reliance on whistleblowers.
- When asked what materials the participants have used (or seen used) to promote research integrity, participants mentioned videos produced by the AAAS. These videos were thought to be very effective, particularly when introducing the subject to undergraduates. Again, participants felt that the use of case studies for discussion was also very useful. The textbook most often mentioned by participants was Francis Macrina’s *Scientific Integrity: An Introductory Text with Cases*. Focus group members noted that students are much more sophisticated now than in the past and that new materials are needed that are also more sophisticated. Materials focusing on FFP are not enough. One participant also mentioned using a particular web site (www.nih.gov/signs/bioethics) as a good resource for bioethics information.

- Participants stated that they often use web-based technology for teaching research integrity to students. One particular exercise used is to ask students to assemble information on research integrity from the Internet. Students search for related web sites. One participant stated that some professors set up online discussions between their students and students from other universities (in the United States or internationally) to solve problems related to RCR. Listservs can also be useful for facilitating discussion and information dissemination.
- Focus group participants felt that there was a need for evaluation of web-based activities and web information about RCR and research integrity. Not all materials found on the web may be appropriate for teaching research integrity.
- The group discussed that while there is much anecdotal information about the effectiveness of RCR training materials, there is not much systematic information available. Participants recommended that ORI build an evaluation component into any future funding for the development of RCR training materials. Participants reasoned that if funding is provided for the development of training materials, then money should also be provided for evaluating how well those training materials work. Specifically, evaluation efforts should focus on the effectiveness of different materials and on the identification of the best materials to use in different teaching situations and/or with different types of students.
- Focus group members felt that efforts for developing new materials should go in the direction of the Internet. They felt that the Internet is very valuable and easily accessible for students. One participant noted that NIH has a web-based training session concerning research integrity that new employees are required to complete. Several participants cautioned, however, that self-learning has limitations. They felt that experiential learning through role-playing and discussions with others is actually a more effective way to teach research integrity.
- Participants remarked on the many “gray areas” in the practice of science and that educational efforts should focus on how to handle these gray areas. For example, students may be taught in the classroom the ideal way of behaving in terms of research integrity, which may be at odds with the behavior they observe when in a laboratory situation. Some participants approvingly noted that research integrity classes often teach students how to react appropriately to suggestions from their mentors or others that involve scientific misconduct (e.g., such as the sharing of a confidential manuscript). Participants wondered, however, if there were other efforts that were needed to improve the laboratory atmosphere.
- Another area of interest to the focus group members was pedagogy. They would like to see research efforts that focus on describing and evaluating the pedagogy for research integrity and on how best to share this information. Questions of specific interest include:
 - What are the strategies developed by teachers for using training materials for research integrity?
 - How do teachers develop their approach?
 - Is one method better than another?

- Participants wondered about the extent to which teachers use the standards set by the various scientific societies in teaching activities and whether the standards were helpful for students. In addition, they wondered if there were rules established for evaluating the standards themselves.
- Participants felt that ‘training the trainers’ might be the most effective way to promote research integrity. However, they lamented that it is difficult to get faculty to attend lectures on research integrity. Focus group members felt that ORI can help in this regard by requiring those who receive grants to get RCR training. Participants agreed that most of what is needed in terms of educational materials for students is already developed and available. The current challenge is to train the faculty, not the students. For training the trainers, there will be a need for course syllabi, new materials (such as PowerPoint presentations), and adaptations of materials that are already available.
- One participant suggested that the teaching of medical ethics in medical schools may be a good model for the teaching of RCR since medical ethics is incorporated into every course that is taught in medical school. The goal would be to integrate the teaching of RCR into all science classes. Participants emphasized that such integrating of RCR into the curriculum would not reduce the need for separate RCR classes.
- Focus group members stated that training in research integrity is also needed for non-science disciplines. They suggested that ORI could create materials for teaching research integrity that could be used, for example, in a university history department. Even though other disciplines do not necessarily receive federal funding for their research, such education is needed to create an atmosphere of research integrity throughout an institution. Participants also remarked that it is harder than one might think to incorporate non-science students into training for research integrity. Participants emphasized that research integrity training works best in small groups (e.g., through case study discussions) which does not lend itself well to larger class sizes.
- One participant remarked that a problem for RCR is that there is no reward for virtue. The participant wondered how research integrity can be promoted when there are so many incentives to disregard the proprieties in the conduct of research. For example, how do you encourage scientists to run one extra sample instead of rushing to submit their findings? How can you encourage researchers to submit one large paper instead of several small ones? It was felt that when institutions encourage competition among researchers and emphasize quantity over quality when making tenure or promotion decisions, researchers are presented with incentives that work against research integrity. Focus group participants wondered how the institutional climate could be changed to better promote research integrity.
- When asked about different approaches for implementing the needs assessment survey (i.e., paper surveys sent regular mail versus e-mailed surveys), focus group participants thought that an e-mail survey might get a better response. However, there was some discussion about whether respondents may be concerned about confidentiality issues with an e-mail survey, which might prevent some who receive the survey from returning it. Focus group

participants suggested administering the survey both ways, sending half of the surveys through the mail and the other half via e-mail.

Conclusions

Much of the focus group discussion centered not on the identification of new types of training materials, but on a more general overview of how current research integrity and RCR training might be enhanced and extended. Participants suggested the following possible contributions that ORI could make to augment current efforts to promote research integrity:

- 1) Compile and review web-based information on research integrity. Determine what information is on the web and how useful the information is.
- 2) Add an evaluation component to all future ORI funding for the development of RCR training materials. Training materials need to be evaluated to determine their effectiveness overall and for particular populations.
- 3) Explore ways to extend the Internet's role in the teaching of research integrity.
- 4) Train the trainers. Consider requirements that will get faculty and staff into research integrity training classes and develop materials (e.g., overheads and course syllabi) for training the trainers.
- 5) Study the pedagogy of RCR. Define strategies for teaching RCR and evaluate them to determine which are the most effective.
- 6) Determine how the standards developed by scientific societies are used in teaching research integrity. How can these standards be evaluated and does their use help students?
- 7) Explore ways in which RCR education can be integrated into regular science courses and develop materials to achieve integration.
- 8) Consider how institutional policies encourage scientific misconduct. Are there ways to reduce the pressures that can lead to a lowering of research standards? What rewards can be given to those who play by the rules?
- 9) Consider research integrity training for students in non-science disciplines. Develop training materials and applications that are appropriate to non-science disciplines.

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OFFICE OF RESEARCH INTEGRITY NEEDS ASSESSMENT
Focus Group Report

On March 3, 2000, CHPS Consulting held a focus group with training grant recipients and faculty and administrators from local universities and NIH. The focus group was held in College Park, Maryland. A list of participants is attached. The following section presents key points from the focus group discussion and is followed by a summary of conclusions from the focus group. Also included in this focus group report are a brief comparison of findings from the two focus groups and a discussion of next steps for this project.

Key Discussion Points

- As an icebreaker, participants were asked to define *research integrity (RI)* and the *responsible conduct of research (RCR)*. One participant offered that having integrity in research meant that you conduct your research as carefully and as thoughtfully as you can and present it as well as you can. Research integrity was thought to be a subset of RCR, with RCR including such things as being a good mentor and creating a good research environment. The participants found the definition of research integrity included in the focus group discussion guide -- “a system for preventing, detecting, and investigating scientific misconduct” -- to be wanting. They suggested research integrity would be better defined in a statement that focused on what it is, rather than on what it is not (i.e., scientific misconduct). Participants also wondered about the word ‘system’ in this definition, suggesting that they did not see RI as a ‘system.’
- Two participants described the RCR courses that they teach. One described an RCR course offered during the winter break session. This class meets for 6 straight days, 2 hours per day. The textbook used in the class is Francis Macrina’s *Scientific Integrity: An Introductory Text with Cases*. The format for each day of class is a lecture, followed by presentation of a case study. Faculty present the case studies (different faculty attend each session and present different case studies) and lead the graduate and post-doctoral students (for whom this is a required class) in discussion.
- A second participant described a 1-credit RCR course that runs 7 to 8 weeks and generally has about 130 students. No text is used for this class, but course materials include materials from the National Academy of Sciences and from Sigma Xi (the Scientific Research Society). The University also has 2 3-credit courses that run the whole semester and have a total of 40 to 50 students. Courses in RCR at this university are required for all research students, not just those on training grants.
- All participants agreed that it is important (but a challenge) to involve faculty in research integrity education. Since it is often difficult to get faculty into RI classes, participants felt there must be other ways of bringing this type of information to faculty. One participant recounted that at her University, RI issues are sometimes included on the agenda at faculty meetings. A speaker will address a particular topic such as fraud, data management, authorship, confidentiality, etc. Another participant mentioned the use of brown bag lunch seminars on RI topics as another method of getting the information to both faculty and

students. They have done brown bags on things such as how to keep a lab notebook. The participant noted that the practicality of the topic is important for encouraging attendance – the more practical the topic the more likely you are to get good attendance. Another participant mentioned including RCR information in a course on grant writing. All participants agreed that RI and RCR issues must be incorporated into many different places and activities, that repetition of the issues increases the impact, and that it's very important to get faculty involved.

- Participants were generally happy with the use of case studies as the primary method for teaching RI and RCR. They noted, however, that it is difficult to collect a set of good case studies on a variety of topics and relevant to all types of students. Participants pointed out that case studies developed for chemistry students may not be relevant to social work students or statisticians. They also pointed out that case studies need to address the differences in the power structure between students and faculty and the increasing diversity of the student population. Participants agreed that many international students come from different cultural backgrounds where things like plagiarism (in particular) might not be seen as wrong. Participants also noted that international students are especially vulnerable to problems in the power structure, because they may fear losing their student status and being forced to leave the country.
- In discussing the use of the Internet for RI education, participants were a little skeptical. They felt that interaction between students is a powerful part of RI education and wondered how you would facilitate such interaction on the web. There seemed to be a consensus that the Internet might be useful as a place to display campus scientific misconduct policies and other rules and regulations, but would not be an appropriate medium for actually teaching RI, due to the lack of interaction with other students. As one participant put it, the web could be good for learning the rules for the use of animals in research, but would not be good for learning the rules you will use to conduct research with integrity.
- When asked if they felt the materials they use for teaching research integrity are effective, participants wondered about how you evaluate this. They questioned what you would measure in a study of the impact of RI courses and materials. Would you be looking for a future decrease in scientific misconduct cases? Or are cases of misconduct rare enough that it would be difficult to see any change? One participant suggested that you could survey students to get an idea of their change in attitudes before and after having taken a RI course. Another participant suggested that an evaluation approach might be similar to the type of research that ethicists conduct.
- In discussing the size of the scientific misconduct problem, several participants noted that authorship disputes are common, whereas the types of misconduct cases that result in ORI involvement happen infrequently. Participants also agreed that poor mentorship is a frequent problem, as evidenced by the number of students that complain that their mentors have treated them unfairly. One participant noted that there are complications here related to the power structure and also to a lack of understanding that some students may have regarding such issues as who owns the data and ideas generated by the research project.

- When asked what materials participants didn't have but wished they did, one participant mentioned a RI web course developed specifically for technicians and research assistants. This participant preferred that technicians not take the same course as graduate students. Education materials for technicians would have to be targeted to these individuals, using appropriate terminology and examples.
- Participants suggested that, system-wide, materials used to promote RI need to be clearly articulated and well integrated into actual research operations. One way to integrate RI promotion into research operations is to teach good mentorship skills. Participants suggested that some mentors might need to be taught how to communicate the pride they take in doing good science to their students. Faculty are not trained to do anything other than research. To train faculty to be good mentors, the administration of the University must think mentorship is important and must be willing to reward faculty who are good mentors. Rewards for good mentorship implies that mentorship would have to be evaluated, and participants discussed how this might be accomplished. One participant suggested that mentors could be evaluated by students who have graduated.
- Another participant suggested that it might be helpful to have seminars for a particular research group. Education could be brought into the lab for a group of researchers (both students and technicians) who work together. This participant suggested that you might not want to include faculty in such a group because members of the faculty tend to dominate discussion.
- Participants noted that faculty often feel uncomfortable in teaching research integrity. As researchers, faculty generally deal in facts that can be measured, which is quite different from the ambiguous nature of some of the case studies used for RCR education. One participant mentioned a faculty member who teaches a case study in research integrity that describes the faculty member's own experience in uncovering a case of scientific misconduct. The faculty member recounts how he discovered the misconduct and how he proceeded to get the case investigated. The participants noted that this type of information is useful for faculty as well as students who may feel that they don't know what to do when confronted with a case of scientific misconduct.
- One participant suggested that institutions should capitalize on cases of scientific misconduct by using actual cases as case studies.
- Participants admitted that there is a lack of people qualified to teach research integrity courses. It is difficult to squeeze time out of the faculty for this purpose. Hopkins has a Bioethics Institute that is used to train trainers. One participant suggested that it might be a good idea to encourage universities to build bio-ethics programs that would teach the subject and do research. Another participant felt, however, that training should involve ordinary faculty.
- Another option suggested by participants was using staff from ORI to visit campuses to train trainers, teach mentorship skills, and educate faculty about RCR issues. Participants

suggested ORI might have to change the make-up of their staff from lawyers to scientists with good teaching personalities and the ability to train others.

- When asked to choose which group (faculty, technicians, or students) they would focus RI education on if they could only choose one, participants agreed they would focus on students. They felt RI training of students has the potential for the greatest influence. The effect would be long term, and students would be likely to share their experiences with others. Participants felt education of mentors is also important, however, because no matter how judiciously you teach students about RI in a classroom, they will conform to the practices they see in the lab. Mentors were seen by participants as having a large influence on students. Participants felt students need mentors to model how research is conducted with integrity.
- On the subject of particular materials used for RI education, one participant described tapes developed by NSF for this purpose as ‘pitiful’. This participant remarked that there is an NAS booklet on research integrity that is given to all new graduate students at her university. Also mentioned by participants was the Nova film on the subject of the Tuskegee experiments, which was seen as particularly good for discussions of research on human subjects. Participants noted that most students today are video/computer oriented, which requires materials developed for that medium.
- Other suggestions made by participants included having ORI sponsor local area best practice discussions where faculty from local universities could get together to discuss how they approach teaching RI and the dissemination of RI related information. Participants also mentioned the need for ideas on how university administrations can foster RI on campus. One participant noted that administrators needed to earmark funds that could be allocated to RI education activities on campus.
- On the issue of the survey, participants like the idea of an email survey, but suggested that, if an email survey were sent, there would need to be an option for downloading the survey and returning it via fax. They felt the survey should take no more than 15 minutes to complete and warned that a survey would likely be discarded quickly if it sounded ‘foolish’ or ‘not useful.’ The subject line heading on the email would be very important. They suggested that if the survey could be sent from the agencies that sponsored the grants and was a requirement for the administration of the grant, it would likely get a better response. Participants mentioned that they received so much email that anything that can not be answered quickly tends to sink down to the bottom of the in-box and may never get answered.

Conclusions

A review of the focus group discussion suggests the following list of items that ORI may want to consider adding to their current efforts to promote research integrity:

- Prepare a collection of case studies that cover each of the various topics involved in RI and that are relevant to different disciplines, that address the issue of the power structure in

research settings, and that acknowledge the increasing diversity of the student population (i.e., international students).

- Develop information on how to use the web for RI training activities. Include methods for creating the equivalent of a small group discussion.
- Create training materials for faculty that focus on improving mentorship. Develop methods for evaluating mentorship and discuss ways to encourage institutions to reward good mentorship.
- Develop a web course on RI for laboratory technicians. Ensure the course materials use vocabulary and laboratory situations most relevant to technicians.
- Have ORI staff visit campuses to present seminars on RI issues or to train faculty in mentorship or how to teach RI.
- Sponsor local areas best practice discussions in which faculty from various universities in a local area meet to discuss their methods for promoting research integrity.

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APPENDIX D

FREQUENCY DISTRIBUTION OF RESPONSES

**NEEDS ASSESSMENT QUESTIONNAIRE
TRAINING IN THE RESPONSIBLE CONDUCT OF RESEARCH**

1. Do you currently teach, or have you in the past taught, one or more courses in the responsible conduct of research (RCR)?

	Number	Percent
Yes	96	62.7
No	57	37.3
Response Specified	153	100
Unspecified	--	--
Total	153	100

2. In your opinion, which of the positions below should receive education and training specific to RCR and the prevention of scientific misconduct? (Check all that apply.)

	Number	Percent
Researchers		
Principal investigators/chiefs	144	94.1
Research associates	142	92.8
Postdoctoral fellows	142	92.8
Graduate students	147	96.1
Laboratory Directors/Grant Managers		
Laboratory directors	130	85.0
Training grant directors	110	71.9
Grants management officers	89	58.2
Research Integrity Officials (RIOs)/ Research Integrity Instructors (RIIs) who teach RCR		
Institutional research integrity officers*	143	93.5
Research integrity instructors	136	88.9
Laboratory Assistants and Technicians		
Laboratory assistants	101	66.0
Laboratory technicians	104	68.0
Research assistants	124	81.0
Others		
Faculty/Medical students/Undergrads	11	7.2
Anyone involved in the research project (including subjects and clinicians recruiting subjects)	9	5.9
Administrators and university officials (including non-science related individuals)	8	5.2
General counsel/ IRB members	2	1.3
Nurses	2	1.3
Billing/Personnel Account staff	1	0.7
Other, unspecified	1	0.7
Response Specified	153	100
Unspecified	--	--
Total	153	100

*RIOs were defined as individuals appointed at institutions to handle matters of scientific misconduct and related activities.

3. What topics should training address for the different groups of trainees listed below? For each **Subject** that should be addressed in RCR training, check which **Trainee** groups should have training in that subject. Check only the subjects that you feel should be addressed. If you don't think a subject needs to be addressed, leave the row blank.

	Researchers		Lab Dir. /Grant Manager		RIOs RIIs		LabAsst./ Techs.		Other	
	No.	%	No.	%	No.	%	No.	%	No.	%
Study design	130	85.0	73	47.7	68	44.4	37	24.2	10	6.5
Scientific record keeping/data management	140	91.5	113	73.9	106	69.3	113	73.9	21	13.7
Human/animal subjects	139	90.8	115	75.2	116	75.8	104	68.0	23	15.0
Laboratory safety	125	81.7	119	77.8	94	61.4	131	85.6	16	10.5
Public funds and grant funds management	128	83.7	129	84.3	79	51.6	15	9.8	11	7.2
Mentoring	135	88.2	82	53.6	59	38.6	27	17.6	11	7.2
Collaborative research	137	89.5	93	60.8	84	54.9	45	29.4	17	11.1
Authorship/publication/credit practices	144	94.1	87	56.9	94	61.4	65	42.5	20	13.1
Peer review and privileged information	144	94.1	95	62.1	94	61.4	54	35.3	19	12.4
Intellectual property	144	94.1	116	75.8	101	66.0	52	34.0	21	13.7
Conflict-of-interest	145	94.8	127	83.0	114	74.5	63	41.2	25	16.3
Misconduct in science	147	96.1	128	83.7	127	83.0	110	71.9	29	19.0
Institutional/federal policies	139	90.8	130	85.0	109	71.2	66	43.1	24	15.7
The whistleblower and reporting misconduct	137	89.5	124	81.0	123	80.4	111	72.5	30	19.6
Others										
Ethics	1	0.7	1	0.7	1	0.7	1	0.7	--	--
Writing papers and grants	1	0.7	1	0.7	--	--	--	--	--	--
Clinical studies	--	--	--	--	--	--	--	--	1	0.7
Research in developing countries	1	0.7	--	--	--	--	--	--	1	0.7
Data interpretation	--	--	--	--	1	0.7	1	0.7	--	--
Conflict resolution	1	0.7	--	--	1	0.7	--	--	--	--
Use of hazardous materials	1	0.7	1	0.7	--	--	1	0.7	1	0.7
Billing for research expense	1	0.7	1	0.7	1	0.7	--	--	1	0.7
Other, unspecified	1	0.7	1	0.7	1	0.7	2	1.3	1	0.7
Response Specified	149	97.4								
Unspecified	4	2.6								
Total	153	100								

4. Assuming they are conveniently available, which of the instructional formats below would you use in administering or delivering instruction in RCR? (Check all that apply.)

	Number	Percent
Seminars	129	84.3
Web-based modules/courses	128	83.7
Interactive CD-ROMs	94	61.4
Audio tapes	17	11.1
Conferences	58	37.9
Teleconferences	26	17.0
Video tapes	80	52.3
Annual retreats	39	25.5
Summer training institute	61	39.9
Others		
Dependent on audience size and whether instruction is part of broader course	1	0.7
Summer training institute (Administrators only)	1	0.7
Response Specified	150	98.0
Unspecified	3	2.0
Total	153	100

5. If you have given instruction in RCR, which teaching methods did you prefer to use? (Check all that apply.) (If you have not given instruction in RCR, skip this question.)*

	Number	Percent
Lectures	94	87.0
Student presentations	33	30.6
Case study discussion	89	82.4
Role playing	18	16.7
Brown bag sessions	23	21.3
Others		
Required readings (e.g. policy handbook)	2	1.9
Videos	2	1.9
Discussion/seminars	2	1.9
Completing IRB forms for hypothetical studies	1	0.9
Examples of fraud from science literature	1	0.9
Exercises to consider issues and design studies	1	0.9
Regular seminar series	1	0.9
Roundtable with students and faculty	1	0.9
Web-based information	1	0.9
Response Specified	108	70.6
Unspecified	45	29.4
Total	153	100

*Percents are calculated based on the number of individuals that responded to this question.

7. Based on your experience, in what RCR topics are more adequate instructional materials needed? (Check all that apply.)

	Number	Percent
Study design	49	32.0
Scientific record keeping/data management	80	52.3
Human/animal subjects	45	29.4
Laboratory safety	25	16.3
Public funds and grant funds management	58	37.9
Mentoring	61	39.9
Collaborative research	65	42.5
Authorship/publication/credit practices	72	47.1
Peer review and privileged information	50	32.7
Intellectual property	72	47.1
Conflict-of-interest	67	43.8
Misconduct in science	66	43.1
Institutional/federal policies	48	31.4
The whistleblower and reporting misconduct	57	37.3
Research and institutional environments and RCR	42	27.5
Others		
Billing for research expenses	1	0.7
Clinical research data management and process issues	1	0.7
Critical thinking about research ethics issues	1	0.7
More current information on all topics	1	0.7
Real case studies	1	0.7
Research ethics/ethical decision making	1	0.7
Separating the roles of researcher and practitioner	1	0.7
Volume that covers all of these issues as a package	1	0.7
Other, unspecified	3	2.0
Response Specified	131	85.6
Unspecified	22	14.4
Total	153	100

8. Based on your experience, for what audiences are more RCR institutional materials needed? (Check all that apply.)

	Number	Percent
Principal investigators	97	63.4
Research associates/assistants	81	52.9
Postdoctoral fellows	79	51.6
Graduate students	97	63.4
Laboratory directors	50	32.7
Training grant directors	39	25.5
Grants management officers	46	30.1
Research integrity officers	50	32.7
RCR instructors	48	31.4
Laboratory assistants	50	32.7
Laboratory technicians	47	30.7
Other		
Undergraduate students	4	2.6
Deans, university presidents	1	0.7
Potential research subjects	1	0.7
Response Specified	131	85.6
Unspecified	22	14.4
Total	153	100

9. Based on your experience, on a scale of 1 to 5, with 1 being least useful and 5 being most useful, please rate how useful each of the following resources are in delivering or administering RCR instruction.

Resource	Least Useful...		...Most Useful			No. of Responses	Avg.
	1	2	3	4	5		
Training for trainer sessions	17	14	35	27	34	127	3.4
Model courses	6	13	43	41	24	127	3.5
Case studies	3	7	14	40	69	133	4.2
Publications	8	9	49	47	19	132	3.5
Selective bibliographies	23	29	48	19	11	130	2.7
Guest speakers	10	20	41	37	24	132	3.3
Slide presentations/ overheads	7	20	40	44	17	128	3.3
Handbooks	8	19	45	49	10	131	3.3
Collection of “best practices”	7	10	42	42	29	130	3.6
Collection of readings	10	29	39	37	13	128	3.1
Guidelines/codes of ethics	4	15	39	44	32	134	3.6
Other							
Video	--	--	--	2	1	3	4.3
Panel discussion	--	--	--	--	1	2*	5.0
Web based	--	--	--	--	1	1	5.0
Interactive CD-ROM covering regulations and case studies	--	--	--	--	--	1*	--
	Number		Percent				
Response Specified	141		92.2				
Unspecified	12		7.8				
Total	153		100				

*Two “other” responses (panel discussion, interactive CD-ROM covering regulations and case studies) were listed by two separate respondents, but neither was rated.

10. To the best of your knowledge, what disciplines are represented by students in the RCR courses at your institution? (Check all that apply.)

Discipline	Number	Percent
Anatomy	41	26.8
Cell biology	58	37.9
Bioethics	26	17.0
Biochemistry	61	39.9
Psychology	53	34.6
Biology	56	36.6
Physiology	53	34.6
Physical anthropology	11	7.2
Epidemiology	27	17.6
Genetics	60	39.2
Pharmacology	51	33.3
Bioengineering	34	22.2
Biophysics	28	18.3
Biostatistics	28	18.3
Sociology	26	17.0
All of the above*	9	5.9
Don't know	36	23.5
Other		
Clinical medicine	3	2.0
Health professionals	2	1.3
Microbiology	3	2.0
Nursing	5	3.3
No course offered	3	2.0
Social work and behavioral sciences	3	2.0
Veterinary medicine/animal science	3	2.0
Other responses cited once**	1	0.7
Response Specified	139	90.8
Unspecified	14	9.2
Total	153	100

*All of the above responses are also included in frequency calculations for each individual response.

** Each of these disciplines were listed once: Chemistry, including Medicinal and Pharmaceutical; Clinical Research; Dentistry; Earth & Natural Science; Education; Entomology; Environmental Science; Geography & Meteorology; Immunology; Molecular Biology; Neuroscience; Pharmacology; and Radiation Physics.

11. What type of research institution are you employed by?

	Number	Percent
Institution of higher education that is not affiliated with an academic medical center	67	43.8
Academic medical center or affiliated institution of higher education	32	20.9
Research organization, institute, foundation, or laboratory	9	5.9
Independent hospital	6	3.9
Educational organization other than higher education	--	--
Other health, human resources, or environmental services organization	21	13.7
Federal or state government	--	--
Other		
For-profit company	8	5.2
Response Specified	139*	90.8
Unspecified	14	9.2
Total	153	100

*Four respondents checked two types of research institution.

12. What is the approximate number of research personnel working at your institution?

	Number	Percent
Less than 100	35	22.9
100-500	21	13.7
501-1000	24	15.7
More than 1000	59	38.6
Response Specified	139	90.8
Unspecified	14	9.2
Total	153	100

*Numbers may not add due to rounding.

APPENDIX E

FREQUENCY DISTRIBUTION OF RESPONSES

**NEEDS ASSESSMENT QUESTIONNAIRE
TRAINING IN MANAGING ALLEGATIONS OF MISCONDUCT**

1. Does your university/institution conduct training for administrators and staff in handling allegations of scientific misconduct?

	Number	Percent
Yes	44	38.6
No	64	56.1
Response Specified	108	94.7
Unspecified	6	5.3
Total	114	100

2. In your opinion, which types of administrators and staff should receive training in how to manage allegations of scientific misconduct? (Check all that apply.)

	Number	Percent
University Administrators		
President	45	39.5
Vice president for research	93	81.6
Science deans	94	82.5
Institutional research integrity officer	101	88.6
General counsel	87	76.3
Research Integrity Officials		
Chair, research integrity committee	94	82.5
Chair, inquiry committee	88	77.2
Chair, investigation committee	87	76.3
Academic Researchers		
Department chairs	93	81.6
Laboratory directors/chiefs	83	72.8
Principal investigators	78	68.4
Others		
Research staff/research personnel	4	3.5
IRB members and staff	3	2.6
Research administrators/supervisors	3	2.6
Deans (other than science deans)	2	1.8
Department administrative managers	2	1.8
Associate provosts	1	0.9
Chair, board of trustees	1	0.9
Chief medical officer	1	0.9
Deans and directors	1	0.9
Faculty	1	0.9
Graduate program directors	1	0.9
Grant administration officer	1	0.9
Key personnel on grants and in labs	1	0.9
Laboratory directors and principal investigators – voluntary	1	0.9
Non-academic professional staff	1	0.9
Research compliance coordinator	1	0.9
Task leaders	1	0.9
Technology transfer officer	1	0.9
Response Specified	110	96.5
Unspecified	4	3.5
Total	114	100

3. What topics should the training address for the different groups of trainees checked above? For each **Subject** that should be addressed in training, check which **Trainee** groups should have training in that subject. Check only the subjects that you feel should be addressed. If you don't think a subject needs to be addressed, leave the row blank.

Subject	University Administrators		Research Integrity Officials		Academic Researchers		Others*	
	No.	%	No.	%	No.	%	No.	%
Regulatory requirements	93	81.6	102	89.5	86	75.4	18	15.8
Maintaining confidentiality	83	72.8	100	87.7	91	79.8	25	21.9
Protection against conflicts-of-interest	94	82.5	102	89.5	89	78.1	17	14.9
Assuring appropriate expertise	72	63.2	87	76.3	44	38.6	12	10.5
Treatment of respondents and whistleblowers	98	86.0	100	87.7	67	58.8	18	15.8
Developing investigation plans	70	61.4	101	88.6	23	20.2	7	6.1
Handling evidence and sequestering of data	69	60.5	98	86.0	39	34.2	9	7.9
Interviewing	55	48.2	99	86.8	25	21.9	10	8.8
Preparing reports	59	51.8	101	88.6	18	15.8	9	7.9
Responding to retaliation complaints	84	73.7	98	86.0	37	32.5	10	8.8
Restoring reputations	88	77.2	90	78.9	35	30.7	10	8.8
Appeals within institution	94	82.5	96	84.2	51	44.7	17	14.9
ORI/Departmental Appeals Board hearings	78	68.4	85	74.6	21	18.4	8	7.0
Other	3	2.6	2	1.8	3	2.6	3	2.6
Whatever else is appropriate	--	--	--	--	--	--	1	0.9
University policy	1	0.9	--	--	1	0.9	--	--
OHRP-ORI relationship	1	0.9	1	0.9	1	0.9	1	0.9
Institutional procedures	1	0.9	1	0.9	1	0.9	1	0.9
Response Specified	114	100						
Unspecified	--	--						
Total	114	100						

* One respondent defined 'others' as students, one defined 'others' as general counsel, and the remainder did not define 'others'.

4. Assuming they are conveniently available, which of the instructional formats below would be useful in administering or delivering instruction in managing allegations of misconduct?
(Check all that apply.)

	Number	Percent
Lectures	39	34.2
Seminars	60	52.6
Web-based modules/courses	99	86.8
Interactive CD-ROMs	53	46.5
Conferences	52	45.6
Teleconferences	27	23.7
Videotapes	63	55.3
Annual retreats	13	11.4
Summer training institutes	13	11.4
Other		
Workshop templates (for own institution)	1	0.9
Brochures	1	0.9
Response Specified	113	99.1
Unspecified	1	0.9
Total	114	100

5. Given your experience, in what topics are better instructional materials needed? (Check all that apply.)

	Number	Percent
Regulatory requirements	68	59.6
Maintaining confidentiality	46	40.4
Protection against conflicts-of-interest	73	64.0
Assuring appropriate expertise	43	37.7
Treatment of respondents and whistleblowers	60	52.6
Developing investigation plans	65	57.0
Handling evidence and sequestering of data and records	71	62.3
Interviewing	61	53.5
Requirements of proof	74	64.9
Preparing reports	49	43.0
Responding to retaliation complaints	63	55.3
Restoring reputations	58	50.9
Appeals within institutions	46	40.4
ORI/Departmental Appeals Board hearings	39	34.2
Other		
Bad faith allegations	1	0.9
None of the above	1	0.9
Not familiar with any	1	0.9
Not familiar with current materials	1	0.9
Other unspecified	1	0.9
Response Specified	105	92.1
Unspecified	9	7.9
Total	114	100

6. Given your experience, for what audiences are more instructional materials in managing scientific misconduct needed? (Check all that apply.)

	Number	Percent
President	27	23.7
Vice president for research	62	54.4
Science deans	65	57.0
Institutional research integrity officer	70	61.4
General counsel	51	44.7
Chair, research integrity committee	64	56.1
Chair, inquiry committee	58	50.9
Chair, investigation committee	57	50.0
Department chairs	66	57.9
Laboratory directors	56	49.1
Principal investigators	70	61.4
Other		
Deans (other than science deans)	2	1.8
Research administrators	2	1.8
Research staff/All research staff	2	1.8
Departmental administrative managers	1	0.9
Faculty and research associates	1	0.9
IRB Chair/Members	1	0.9
None needed	1	0.9
None of the above	1	0.9
Not familiar with current materials	1	0.9
Students	1	0.9
Support staff	1	0.9
Varies by what training is referred to	1	0.9
Other unspecified	1	0.9
Response Specified	111	97.4
Unspecified	3	2.6
Total	114	100

7. What additional resources would be useful in managing allegations? (Check all that apply.)

	Number	Percent
Guidelines on _____*	18	15.8
Conflict-of-interest/protections against COI	4	3.5
Conducting inquiry/ investigation/ developing investigation plans/how to conduct a review	4	3.5
Available on topics upon request/ everything applicable/each subject involved	3	2.6
Procedures to follow/policies and procedures/ a "cookbook" of procedures	3	2.6
Assuring appropriate expertise	2	1.8
Guidelines unspecified	2	1.8
Handling allegations (brief, accurate and useful)/ Handling an allegation from start to finish	2	1.8
Handling evidence and sequestering of data and records	2	1.8
Interviewing	2	1.8
Maintaining confidentiality	2	1.8
Regulations/regulatory requirements	2	1.8
Requirements of proof	2	1.8
Restoring reputations	2	1.8
Appeals within institutions	1	0.9
Bad faith allegations	1	0.9
ORI/Departmental Appeals Board hearings	1	0.9
Preparing reports	1	0.9
Responding to retaliation complaints	1	0.9
Responsible conduct of research	1	0.9
Standards for weighing evidence	1	0.9
Treatment of respondents and whistleblowers	1	0.9
Best practices	80	70.2
Consultants	32	28.1
Case studies	77	67.5
Selective bibliographies	26	22.8
Other		
Conflict-of-interest detailed explanation	1	0.9
Medical policies	1	0.9
None of the above	1	0.9
Response Specified	109	95.6
Unspecified	5	4.4
Total	114	100

*Number of respondents that indicated at least one guideline.

8. What type of research institution are you employed by?

	Number	Percent
Institution of higher education that is not affiliated with an academic medical center	20	17.5
Academic medical center or affiliated institution of higher education	45	39.5
Research organization, institute, foundation, or laboratory	21	18.4
Independent hospital	8	7.0
Educational organization other than higher education	2	1.8
Other health, human resources, or environmental services organization	15	13.2
Federal or state government	4	3.5
Other company/For profit company	7	6.1
Response Specified	112*	98.2
Unspecified	2	1.8
Total	114	100

* Eight respondents checked two or more types of research institutions (ten additional responses).

9. What is the approximate number of research personnel working at your institution?

	Number	Percent*
Less than 100	28	24.6
100-500	23	20.2
501-1000	24	21.1
Over 1000	39	34.2
Response Specified	114	100
Unspecified	--	--
Total	114	100

* Percents may not add due to rounding