

The Scientists in Government Project • March 2010

Strengthening Science in Government: Advancing Science in the Public's Interest

Executive Summary

The Project on Scientific Knowledge and Public Policy
at The George Washington University
School of Public Health and Health Services



THE GEORGE WASHINGTON UNIVERSITY
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The search for truth, Albert Einstein has said, also implies a duty:
“One must not conceal any part of what one has recognized to be true.”¹

Introduction

The statement above serves not only as a guiding principle of good science, but as a framework for effective, science-based policy-making. The best public policies are built on a foundation of rigorous data and analyses, widely shared among scientists and the public. The fundamental obligations of a science-based society – advancing the public health, protecting the workforce, safeguarding the environment, developing appropriate energy technologies, defending the nation, and much more – depend on a full and open exchange of ideas, methods, findings, and interpretations.

New scientific knowledge constantly builds on existing scientific knowledge. When information is readily shared, new findings can be analyzed and new hypotheses vetted in an ongoing process that continually generates opportunities for further study and analysis. Science flourishes when scientific ideas are given a fair hearing by colleagues, debated on their merits, tested through replication and further research, and revised in light of new understanding.

In all that, there is a direct public benefit. Safety and effectiveness studies are essential to drug approval decisions, laboratory and animal studies provide standard-setting data for chemical exposures in the workplace, and understanding the cycle of carbon emissions helps shape the response to global climate change. Strong science drives sound decision-making and the public policies that strengthen our nation.

Beyond the merits of advancing science, the open exchange of ideas is also cherished because it is concordant with the ideals of a democratic society. Freedom of information is a core belief in the American system.

Despite these laudable goals, there is no such thing as “pure” science, no isolated chamber where scientists can expect to carry out their research, announce their findings, and assume they will be the sole consideration in addressing a real-world challenge.

An analysis of the approach to science taken by the five White House administrations that preceded that of President Barack Obama explains, “It is naïve to believe that scientific findings are the sole determinant of policy . . . Much of the funding, direction and use of American science is determined by the federal government and the political biases of the dominant party invariably influence the decisions that get made.”²

Policy decisions may be based on science, but they are not purely scientific. Preferences and political considerations shape decisions about regulation, research priorities, service delivery, and program development and evaluation. Nonetheless, the integrity of the science and the validity of the data that informs these decisions must be preserved.

Pressures on Scientists

The pressures and constraints facing scientists within government differ considerably from those present in academic settings. For the most part, the nation's universities have embraced the concept of scientific freedom, granting their faculty the unfettered right to publish their findings.

Corporate control of scientific studies is a continuing issue of concern in academia, however, especially over the past decade as reports surfaced that research sponsors blocked the publication of findings detrimental to their commercial interests on a number of occasions.³ Such was the level of distress that the editors of thirteen of the world's leading biomedical journals, including *The New England Journal of Medicine* and *The Journal of the American Medical Association*, declared in 2001 that they would not publish studies where research sponsors had the ability to control presentation of the results.⁴

Many universities have developed similar guidelines to protect the independence of research, requiring faculty members to retain full rights to disclose the information they gather, even if a commercial sponsor has funded the work.

Scientists in government are less subject to overt commercial pressures because they are on the public payroll, but the principles and practice of open science have often butted against other agendas. Industry interests, interest-group pressures, political ideology, and bureaucratic procedures all have considerable influence on the work they do.

The unique challenge of government scientists is to balance their work as researchers, regulators, and applied scientists with their role as employees of structured, hierarchical organizations. In particular, they may be expected to represent and advocate for official agency positions, regardless of their personal perspective on an issue. Conversely, they may be barred from presenting conclusions or analyses that are inconsistent with an agency's stance, even if they are speaking as private citizens.

Government scientists are typically subject to some level of approval prior to launching a research project, and their work often goes through several additional layers of review

once it is complete and results are ready to be disseminated through articles and presentations. Procedures differ from agency to agency, and there are often notable differences between the approach spelled out in formal guidance documents, if they exist, and what actually happens on the ground.

Many factors may shape research priorities and the review process, including the topic, the agency, the managerial style of those in charge, and the sensitivities of the moment. Clearance procedures are generally more complex when the work has significant policy and/or economic implications, and political appointees often have an influential voice in the review and approval process, whether or not they have scientific expertise. The Union of Concerned Scientists reported in 2008, "New and excessive analytical requirements have provided opportunities for industry groups to highlight uncertainty in agency science, and have prevented federal agencies from responding promptly to urgent threats to public health and safety."⁵

Across most agencies, the many steps involved in clearance often result in long delays before significant scientific findings are widely shared. Along the way, interactions between scientists and the media may be tightly controlled, and in some instances the free exchange of data and results with colleagues may be curtailed.

The lack of uniformity across agencies, and even among offices and centers within a single agency, is striking and highlights the need to explore and clarify the nature of the rights and responsibilities accorded government scientists. In the absence of clear policies, or in the presence of policies that place significant restrictions on scientific freedom, these employees may be constrained in their ability to meet their obligations to the scientific community, and to the public at large.

In the first decade of the 21st century, public concern about political interference with science mounted. Events such as the Food and Drug Administration's long delay in approving emergency contraception for over-the-counter sale,⁶ the use of ideological criteria to select members of federal scientific advisory committees,⁷ and the suppression and distortion of scientific findings on climate change⁸ called into question the integrity of government science.

Under both the Bush and Obama administrations, the White House Office of Science and Technology Policy (OSTP) has taken steps to advance the openness and integrity of scientific agencies. In May 2008, as directed by the America COMPETES Act, OSTP released a set of principles directing federal agencies to pursue “robust and open communication of scientific information.”⁹ In March 2009, in response to a Memorandum on Scientific Integrity from President Obama, OSTP began developing a plan to “ensure the highest level of integrity in all aspects

of the executive branch’s involvement with scientific and technological processes”¹⁰ (see box below).

Several independent, non-partisan organizations have also focused in recent years on scientific integrity, conflicts of interest, and the politicization of science. These organizations include the American Association for the Advancement of Science, the Government Accountability Project, the Institute of Medicine, the Science and Engineering Workforce Project, and the Union of Concerned Scientists.

President Obama’s Memorandum on Scientific Integrity

In March 2009, the Obama Administration issued a Memorandum on Scientific Integrity that appeared to acknowledge many of the concerns that have been expressed in recent years about the limitations of information dissemination and the bias towards political considerations over scientific rigor. Specifically, the memo declared:

The public must be able to trust the science and scientific process informing public policy decisions. Political officials should not suppress or alter scientific or technological findings and conclusions. If scientific and technological information is developed and used by the Federal Government, it should ordinarily be made available to the public. To the extent permitted by law, there should be transparency in the preparation, identification, and use of scientific and technological information in policymaking. The selection of scientists and technology professionals for positions in the executive branch should be based on their scientific and technological knowledge, credentials, experience, and integrity.¹⁰

To build on those objectives, the memo called for the Office of Science and Technology Policy (OSTP) to develop a plan to ensure integrity in all aspects of government science, based on the following principles:

- (a) The selection and retention of candidates for science and technology positions in the executive branch should be based on the candidate’s knowledge, credentials, experience, and integrity;
- (b) Each agency should have appropriate rules and procedures to ensure the integrity of the scientific process within the agency;
- (c) When scientific or technological information is considered in policy decisions, the information should be subject to well-established scientific processes, including peer review where appropriate, and each agency should appropriately and accurately reflect that information in complying with and applying relevant statutory standards;
- (d) Except for information that is properly restricted from disclosure under procedures established in accordance with statute, regulation, Executive Order, or Presidential Memorandum, each agency should make available to the public the scientific or technological findings or conclusions considered or relied on in policy decisions;
- (e) Each agency should have in place procedures to identify and address instances in which the scientific process or the integrity of scientific and technological information may be compromised; and
- (f) Each agency should adopt such additional procedures, including any appropriate whistleblower protections, as are necessary to ensure the integrity of scientific and technological information and processes on which the agency relies in its decisionmaking or otherwise uses or prepares.¹⁰

OSTP called for public comments to inform its work, and the Project on Scientific Knowledge and Public Policy submitted recommendations based on the preliminary results of this research.¹¹ OSTP did not issue a plan in mid-2009 as anticipated, but was expected to do so in 2010.

Scientists in Government Project: Shaping the Debate

The federal government must ensure that its scientists are able to function effectively, both so that agencies can produce top-quality science to answer important questions and so that they can attract and retain scientific talent. Agencies must also demonstrate to the public that their scientists are working in the public's interests and that agency management is facilitating (rather than suppressing or interfering with) the production and dissemination of knowledge. The public's confidence in government science – and in the government as a whole – is at stake.

The Scientists in Government project was launched as part of a larger effort to ensure that government uses the best science to protect and promote the health and well-being of Americans. It operates under the umbrella of the Project on Scientific Knowledge and Public Policy (SKAPP) at The George Washington University School of Public Health and Health Services.

With support from the Open Society Institute, the Scientists in Government Project seeks to provoke and influence the public discussion about federal scientists' rights and responsibilities. This report presents the results of a qualitative research study that included interviews with current and former federal scientists at health and envi-

ronmental agencies, a review of publicly available online agency policies regarding agency research, and a literature review. Qualitative research is "a broad approach to the study of social phenomena ... [drawing] on multiple methods of inquiry," such as structured interviews and analysis of documents and materials.¹²

This study considers the barriers and opportunities for scientists as they set their research agendas, endeavor to speak freely with one another, disseminate their conclusions and the data that support them, and provide a firm grounding for science-based policies and practices. It also examines the internal and external influences on the research activities of government scientists, and includes recommendations to enhance transparency, minimize interference, and ensure timely access to findings. The full report is available online at <http://defendingscience.org/newsroom/Scientists-in-Government-full-report.cfm>, and the study methodology is also described in Appendix A.

The scientists who participated in this research spoke eloquently about their frustrations with a political and bureaucratic climate that sometimes impedes their best work, and offered insights about the policies and practices that can be strengthened or changed to improve their situations. Their voices are a reminder that an open exchange of information is essential to the conduct of good science, the advancement of knowledge, and ultimately the strengthening of the nation's health.

Research Questions

In exploring the role and functioning of government scientists through qualitative interviews and a review of publicly available online agency policies, Scientists in Government researchers sought answers to the following questions:

- To what extent do agencies foster environments that support scientific work in fulfillment of agency missions?
- What policies exist regarding research, publication, and communication by scientists working at science-based agencies within the federal government?
- How well do agencies facilitate the processes of conducting scientific work and disseminating results?
- What is the nature of agency review of scientific publications?
- Do government scientists retain their autonomy to publish and communicate their scientific findings and conclusions?
- What is the nature of influence affecting federal scientists and their work? How do agencies address this influence?
- Do accessible and useful feedback and dispute-resolution mechanisms exist for federal scientists?

Findings and Recommendations

The following sections describe some key findings from interviews with scientists and a review of several agencies' written policies. Each recommendation section includes an overarching principle as well as specific recommendations to address the issues raised.

The recommendations address the issues around which scientists expressed the most need for change. Addressing scientists' concerns can improve morale at federal agencies, which will in turn improve scientists' productivity and lead to better government. The recommendations below are often restatements of suggestions made by multiple scientists about how to ensure that their work proceeds efficiently and can be translated quickly into public benefits.

While the majority of the recommendations apply to agencies, White House offices and the Office of Personnel Management (OPM) also have a role to play in ensuring that recommended policies are adopted. This leads

to the first overarching recommendation pertaining to all other recommendations in this report.

Overarching Recommendation: Ensuring Policy Consistency and Clear Communication

The White House OSTP and Office of Management and Budget (OMB) should ensure that agencies adopt the policies described in this report's recommendations, and that the policies are generally consistent across agencies and appropriate within each agency's mission and scope. These policies should be clearly and actively communicated to agency leadership, scientific managers, and the federal scientific workforce.

When OPM policies (for instance, those regarding hiring and promotion) conflict with the recommendations in this report, OPM should revise its policies to allow agencies to follow the recommendations.

Research Participants' Agency Affiliations

Interviews were conducted with individuals who work for, or had previously worked for, the following agencies (some interviewees had work experience at more than one agency):

Agencies of the Department of Health and Human Services:

- Centers for Disease Control and Prevention (CDC), including the National Institute for Occupational Safety and Health (NIOSH) and the Agency for Toxic Substances and Disease Registry (ATSDR)
- Food and Drug Administration (FDA), including the Center for Drug Evaluation and Research (CDER) and the National Center for Toxicological Research (NCTR)
- National Institutes of Health (NIH)
- Indian Health Service (IHS)
- Substance Abuse and Mental Health Services Administration (SAMHSA)

Other agencies:

- US Consumer Product Safety Commission (CPSC)
- US Department of Agriculture (USDA)
- US Department of Commerce, including the National Institute of Standards and Technology (NIST)
- US Department of Defense (DoD)
- US Department of Housing and Urban Development (HUD)
- US Department of Labor, including the Occupational Safety and Health Administration (OSHA)
- US Department of Veterans Affairs, including the Veterans Health Administration (VHA)
- US Environmental Protection Agency (EPA)

“What keeps you going is [that] what you are doing is very important.”

– FDA senior manager

Morale

Scientists’ morale affects their agencies’ productivity, as well as recruitment and retention. Many of the scientists interviewed characterized their own morale, and often that of their colleagues, as being low or eroding. Their comments demonstrate the need to improve several aspects of work at science-based federal agencies.

Scientists cited their strong desire to work for the public good as a factor that drew them to government employment. When scientists feel that agencies are failing to advance their missions as effectively as they should, morale suffers.

During interviews, scientists described the following issues as affecting morale at their agencies:

- **Changing Priorities:** Because each change in administration brings new personnel and priorities to federal agencies, scientists often face abrupt changes in research directions. Although such changes are understandable, the effects on scientists can be harsh. A National Institute for Occupational Safety and Health (NIOSH) scientist described spending seven years working on a high-profile topic, only to be told when a new administration entered that the project was no longer a priority and funding for it was no longer available. Others reported working as much as 10 or 15 years on projects, only to have them halted before the research was completed.
- **Bureaucratic Processes:** Many scientists felt they were spending too much time on internal processes – such as getting research proposals approved or seeking clearance to publish articles – and were left with too little time for actually conducting scientific work. Some scientists said they also had to spend an inordinate amount of time dealing with office politics.

- **Inadequate Resources:** Because federal employee salaries and annual pay increases are set by the federal government and have been rising steadily, many agencies find that an increasing share of their program and research budgets must go to personnel costs. This leaves scientists competing for a shrinking pool of money to fund research, and they may have to produce lengthy proposals in order to get relatively small amounts of research funding. Some agencies try to stretch their dollars by using fewer staff people to accomplish the same amount of work or by outsourcing administrative functions, but these steps can also have the result of taking scientists’ time away from their primary responsibilities.

- **Principles Under Threat:** Of all the concerns raised in the interviews, one of the most destructive to morale was an agency’s perceived relinquishment of principles. Several scientists described situations in which they or their colleagues had taken a principled stand – e.g., advocating for a particular research agenda or project, or arguing against hiring an unqualified job candidate – only to experience negative consequences. Agencies often face outside pressure to change the course of their work. If managers stand up for scientific integrity in such cases, scientists can feel supported; however, if managers in turn pressure scientists to abandon a line of research or downplay certain results due to potential controversy, the scientists can fear that the agency has lost its integrity or is failing to live up to the mission that attracted them to the job in the first place.

Some scientists expressed concern that eroding morale is harming agencies’ abilities to recruit and retain top scientific talent. In some cases, scientists feared that while many of their agencies’ best scientists were leaving, others who were not serving the agency well and should retire were staying.

Among the scientists who described problems with low morale, some had already retired or changed jobs. Among those still at an agency, some stated that they remained in their jobs because of practical considerations, such as impending retirements or children in need of college tuition. Others noted that despite problems, they appreciated the opportunity to do important work on interesting topics that would not be available to them in academia or the private sector.

Not all scientists spoke about these problems at their agencies; some praised their managers and expressed appreciation for the research opportunities they enjoy. Also, some who described bureaucratic or budgetary frustrations considered these to be acceptable trade-offs given the stability, career development opportunities, and other benefits that government careers provide.

Several interviewees recommended that scientists considering federal-agency positions understand and accept the constraints that will necessarily accompany government employment. They suggested that agency scientists cultivate patience and thick skins.

“We need supervisors who have the courage to speak up for the science.”

– CDC branch chief

Management

One of the prominent themes that emerged from interviews was the importance of effective managers. While some scientists praised their managers, most felt that those above them were not doing all they could to ensure productivity and top-quality scientific achievements.

Many of the scientists interviewed expressed strong views about the qualifications and roles of those whose jobs involve managing scientists. Scientists from several agencies stated that managers should have enough of a background in science to understand what the scientists they supervise are doing and why. Managers should also be able to explain work conducted by scientists to

non-scientists, including other agency officials and the lawmakers who determine agency budgets and shape research priorities.

It appears that managers need a combination of political skills and toughness to perform what many scientists see as a crucial role: standing up for science and buffering scientists from political pressures. Some scientists expressed disappointment and frustration with managers who they felt were too quick to yield to pressure to avoid or minimize controversial topics or findings. Others expressed appreciation for managers who resisted such pressure and defended scientific integrity.

Managers may also need to resist pressure from agency leadership to create additional administrative tasks for scientist that will detract from their scientific work without adding commensurate value to the agency.

One theme that arose during the interviews was that scientists do not necessarily make good managers. Some scientists may seek promotion to a managerial position for which they feel little inclination because it is the only way they can continue up the career ladder to higher pay and greater responsibility. A few scientists suggested that scientists should have career advancement options that do not include managerial duties.

One issue that managers may need to address is the tension that can arise between federal civil service employees and members of the Public Health Service (PHS) Commissioned Corps. In the interviews, several scientists – civil servants and PHS members alike – noted that tensions can arise around the different promotion and advancement requirements the two types of employees face, and these tensions can harm morale.

RECOMMENDATIONS: MANAGEMENT

PRINCIPLE: Agencies should hire and promote managers who have the training and skills necessary to facilitate scientists’ ability to conduct and disseminate research.

Recommendation: Agencies should recruit and train managers who will buffer scientists against undue influence and ensure that the agency pursues its scientific mission.

“We are all scientists and we want to give our input, and we feel neglected or dismissed if we are not asked our opinion.”

– NIOSH medical officer

Recommendation: Agencies should hire managers who have enough scientific training to translate between scientists and upper management and policymakers.

Recommendation: Agencies should provide management training to those who will be managing scientists.

Recommendation: Agencies should not require scientists to become managers in order to advance in their professional careers.

Recommendation: Agencies should evaluate and address perceived and real inconsistencies in the treatment of scientists on different career pathways (e.g., PHS vs. civil servants).

Recommendation: Agencies should minimize administrative duties that detract from scientists’ ability to conduct their work.

Feedback Mechanisms

Managers at all levels could benefit from hearings scientists’ concerns and suggestions, but interviews suggested many agencies’ current mechanisms for collecting feedback are insufficient.

Many scientists felt that their observations and suggestions could be useful in improving agency policies and practices, but were frustrated by a lack of opportunities to provide feedback in a meaningful way. A few scientists provided examples of existing feedback mechanisms they considered to be effective, but many others stated that the mechanisms either did not exist or were not useful, either because scientists would not use them for fear of retribution or because those who could benefit from the feedback would ignore the results.

Scientists from several agencies stressed that feedback mechanisms must allow for anonymity, since many employees fear that stating criticisms openly could provoke retaliation. Several scientists feared that criticizing

agency management could lead to losing funding or other project support, being transferred to a less desirable location or position, and facing even more obstacles to getting research done. Some scientists had either experienced such retaliation or witnessed a colleague experiencing it.

The Whistleblower Protection Act is designed to protect those “evidencing illegal or improper government activities”;¹³ however, a few scientists reported either acting as whistleblowers or witnessing a colleague’s whistleblowing, and they stated that these protections were inadequate to prevent retaliation.

RECOMMENDATIONS: FEEDBACK MECHANISMS

PRINCIPLE: Agencies should encourage honest feedback from scientists, and use it to inform decisions about policies and practices.

Recommendation: Provide a formal and anonymous means by which scientists can provide feedback to relevant colleagues, including upper management, without fear of retaliation.

Recommendation: Provide regular and follow-up training to ensure that all managers and supervisors are properly trained to understand employees’ rights and to comply with the procedures that protect whistleblowers.

Approving Proposed Research

Science-based agencies have a limited amount of funding to devote to specific research projects, so they often develop processes by which scientists essentially apply to their own agencies for intramural funding. Publicly available online policies governing the selection or approval of such intramural research projects are markedly less formal than those in place for extramural research (in which outside entities apply to an agency for research funding).

At the intramural level, the most consistent policy statement across agencies is that proposed, and sometimes ongoing, intramural research studies will be reviewed by experts. The Centers for Disease Control and Prevention (CDC) and NIOSH's Mining Program specifically note that those reviews are undertaken by "external" experts. NIOSH's Mining Program specifies that the reviewers must be "technical experts in their fields,"¹⁴ while CDC refers to "subject matter experts";¹⁵ both agencies' policies state that these external reviewers should be free from conflicts of interest. At the National Institutes of Health (NIH), research program priorities are shaped, in part, through "professional hiring and promotion decisions" and resource allocation decisions.¹⁶

At the research planning stage, none of the publicly available online policies reviewed for this study describe additional procedures for evaluating confidential or sensitive topics.

The relatively brief descriptions contained in publicly available online agency policies related to intramural research contrast with the complicated review processes described by scientists at NIOSH, other CDC agencies, and elsewhere. In particular, interviewees note that the lag between a proposed idea and approval to move forward is often long. Agencies may require detailed applications and extensive review processes even when the amount of funding being sought is small. Several NIOSH interviewees raised concerns about this issue, and their experience is described in the box on the next page.

Federal scientists conducting surveys must also receive clearance from OMB. The Paperwork Reduction Act, first passed in 1980 and amended in 1995, established a procedure for federal agencies to follow before initiating a collection of information (e.g., a survey) from 10 or more people. The agency must provide a 60-day notice of its proposed information collection in the Federal Register and solicit comments to "evaluate whether the proposed collection of information is necessary for the proper performance of the functions of the agency" and to "minimize the burden of the collection of information on those who are to respond."¹⁷ Although OMB has made some improvements to the process by which it evalu-

ates requests to collect information, some scientists still considered the process to be excessively burdensome.

RECOMMENDATIONS: APPROVING PROPOSED RESEARCH

PRINCIPLE: Agencies should limit the time and effort required by scientists proposing research to what is necessary to ensure that the agency is supporting high-quality research.

Recommendation: Agencies should streamline intramural proposal processes to the extent possible.

Recommendation: Agencies should make the time and effort required to propose research commensurate with the amount of funding being sought.

Recommendation: OMB should streamline the process for approving information collections subject to its oversight, and facilitate the process for the scientists involved.

Disseminating Scientific Work

In general, scientists throughout the federal science infrastructure feel a strong obligation to disseminate their findings to other scientists, and to the general public, in a timely manner. A number of government employees commented that they work for the public, and the public has a right to see their results, "since it is their tax dollars that are paying for the research in the first place."

Likewise, federal agencies typically consider it part of their mission to disseminate scientific information to the public, and encourage their employees to do so. In agency policies publicly available online, some agencies state that all information products must be cleared before being published or released. Others allow their centers to set their own requirements, and do not specify that all information products must be reviewed.

CLEARANCE

Most federal scientists must submit scientific materials for clearance before disseminating them or submitting to a journal. This process may involve review by several people at different levels within the agency.

NIOSH Scientists Describe Their Agency's Research Approval Process

At NIOSH, research projects must be determined to fit within the agency's National Occupational Research Agenda (NORA), which includes 21 priority research areas.

During interviews, NIOSH scientists described a lengthy process for seeking NORA funding. Researchers now submit a one-page letter of intent that includes a list of collaborators, a budget, preliminary data, and the NORA sector goals it is designed to meet. If the idea is of interest, researchers are asked for a full proposal that uses a format and instructions similar to that of a full extramural NIH proposal; it may be 100-200 pages in length. Far more proposals are invited than are ultimately funded – one interviewee recalled that in one funding round, 18 of the original 100 letters of intent were funded. Reflecting the commitment to move research into practice, a relatively recent requirement is to provide in the proposal a description of how study results will be used.

The proposal then moves through a lengthy approval process that begins with an internal review that typically involves the team leader, branch chief, and a number of people in the researcher's division, including the associate director of science. It is also reviewed by the Institutional Review Board, and by a person at CDC who is intimately familiar with OMB regulations.

According to scientists, the proposal may also go to OMB, which can request changes and require that the scientist revise and resubmit the proposal. Following OMB review, it may have to be returned to the IRB for approval of a revised research strategy before data collection can begin.

Scientists reported that full approval can take up to 2-1/2 years, which can be problematic. One scientist commented, "The relevance and collaborators can change during this time."

A NIOSH research chemist called the process "extremely onerous," especially for projects that do not have a lot of money at stake (there is no distinction in the process by funding level). "It takes up huge blocks of time ... I put together a 50-page proposal, single-spaced, for a project that was giving me \$15,000 a year ... Does that make sense?"

The process can also create "a negative work environment," noted the research chemist. "If you spend a lot of time competing for funding and you never get any, what work are you then hired to do?"

On the other hand, some scientists said they appreciated the NORA process because once they are funded, they are not likely to be asked for further information from their supervisors. Whether this outcome occurs seems to depend on the individual's managers and the division in which the scientist is located.

Agencies generally require internal review in addition to peer review required by the journals to which scientists submit manuscripts. The review will usually address the science, and it may also determine whether the information product has policy implications and demonstrates a high standard of editorial quality. Policies at the Department of the Interior (DOI) and DOI's United States Geological Survey (USGS) require that products be well constructed or well written in order to be cleared.

At many agencies, the nature of the information product will influence the nature of the review process. The review

process for research with policy implications typically involves more layers and takes longer to complete – something that scientists say can restrict the publication of research that challenges the status quo. Under the Information Quality Act of 2001, higher standards are in place for "influential" scientific information as defined by the OMB.

Scientists described clearance processes that often included review by multiple individuals and entailed multiple requests for revisions or responses from authors. A number of scientists stated that they could understand

“[It is] a very onerous review process . . . [it is] essentially a form of hindrance.”

– CDC branch chief

the need for the process and had benefited from reviewers’ feedback. Others found the benefits of the process to be outweighed by problems.

Scientists expressed frustration about a lack of clarity and consistency regarding the clearance process. Some were concerned about a lack of consensus about what constitutes policy; a number felt their agencies only wanted results that supported their predetermined policies. This seemed to be a problem for scientists at the Food and Drug Administration (FDA) in particular.

Several interviewees suggested that an individual’s experience with the clearance process depends in part on his or her rank.

The issue of reviewers’ qualifications also arose in several interviews. Scientists repeatedly stressed that a scientific review should be conducted by scientists. They also noted that the requirement to respond to all reviewers’ comments can place significant demands on scientists’ time, although not all comments are necessarily useful or relevant.

Scientists mentioned a number of incidents in which the clearance process appears to have been used to delay or prevent the publication of research because of industry concerns or agency fears about the publication igniting controversy.

DELAYS

Many scientists expressed frustration about the time-consuming nature of their agencies’ clearance processes. Some stated that lengthy, complicated processes discourage some of their colleagues from publishing. Others reported that agency scientists will remove their names from papers co-authored with others outside the agency in order to spare their colleagues the agency’s lengthy review process.

Scientists report a range of typical approval times. In some agencies, scientists say it might take three to four weeks;

for others, three to four months is typical. Delays of a year or even two were also reported. In some instances, delays reflect the complexities of research or proprietary and confidentiality concerns, but comments from scientists suggest that research with significant policy implications is particularly likely to be delayed.

At NIOSH, scientists say papers are subject to a “tripartite review” by the affected industry, labor, and government agencies (in addition to internal staff), which can take an additional 3-6 months.

Some agencies’ policies acknowledge potential problems with lengthy clearance processes and urge those responsible for developing and implementing the processes to make review times as short as possible. Some agencies have policies specifying the time frame in which the clearance is to be completed, although they differ considerably in the extent to which they cover all of the required clearance steps.

CDC’s policy calls for clearance standards that “balance the concerns of quality and timeliness,” and a timeline that should generally not exceed one month (unless the author is asked to make revisions).¹⁸ In practice, scientists report that delays in the clearance process are common.

Concerns about information products becoming bogged down in lengthy clearance processes prompted Congress to specify a firm timeline for clearance of FDA publications in the FDA Amendments Act of 2007. The legislation requires an FDA policy that gives reviewing officials 30 days to provide written clearance. If the deadline is not met, authors can submit the article for publication with the appropriate disclaimer.

DISCLAIMERS

The use of disclaimers on information products can provide an opportunity for scientists to disseminate their work without going through an agency approval process. It is common for agencies to require that employees publishing or presenting scientific work relevant to their jobs

but not cleared by the agency include a statement indicating the work is the product of an individual scientist and does not represent the views of the agency.

The use of disclaimers can be problematic, however, if they are required even when the research has been reviewed and cleared by agency officials. Interviewees reported that NIOSH and the Environmental Protection Agency (EPA) National Center for Environmental Assessment require that all publications and presentations include a disclaimer. This seemed counterintuitive to many scientists, who wondered why an agency would fund the research and then not attach its name to the findings.

The NIH policy states that the clearance process normally eliminates the need for a disclaimer, but one may still be required to make clear that the work does not necessarily represent the NIH view.

The issue of scientific publications produced on scientists' personal time also arose during the interviews. Even though such publications usually include a disclaimer stating that the work represents only the view of the author and not that of the agency where the author is employed, a few agencies still require scientists to submit these publications for agency clearance.

RECOMMENDATIONS: DISSEMINATING SCIENTIFIC WORK

PRINCIPLE: Agencies should disseminate scientific work in a timely fashion, and the clearance process should not be a tool for slowing down the dissemination of scientific information that may be deemed unfavorable.

Recommendation: All agencies should have clear policies on review and clearance, and apply them consistently and in a timely fashion.

“We are still arguing about disclaimers . . . If they're saying we don't speak for the agency, why can't we just say anything we want? Instead, it still has to be cleared.”

– CDC branch chief

Recommendation: Agencies assigning reviewers to review the content of scientific output should ensure that the reviewers have expertise in a relevant field.

Recommendation: Agencies should encourage expeditious and focused reviews.

Recommendation: Agencies should have processes for expedited clearance of time-sensitive materials.

Recommendation: Agencies should allow scientific work conducted on agency time but not approved by the agency within a reasonable timeframe to be published with a disclaimer that it represents only the views of the author(s) rather than the agency.

Recommendation: Agencies should allow scientists to disseminate scientific work done on their own time, provided they attach any necessary disclaimers, without receiving agency approval. Scientists should not face retribution if they exercise this right.

Communicating with the Public

The primary method by which scientists communicate their findings to the public is through the media, and the policies governing scientists' interactions with reporters have come under scrutiny in recent years. In 2008, OSTP instructed agencies to develop and update policies regarding employee interactions with the public and press. The policies should be designed to ensure that “employees may freely and openly discuss with the public, subject to classification restrictions and consistent with existing laws and regulations, scientific and technical ideas, approaches, findings, and conclusions based on their official work.”⁹

Agency policies publicly available online are not entirely supportive of such free and open discussion. The policies

tend to require, or strongly encourage, employees to seek prior approval before being interviewed. However, many agencies appear to offer little or no guidance on the subject, and the perception among scientists at most agencies is that some sort of preapproval is required to speak with the media.

In interviews, a picture emerged of a common agency practice requiring that all media inquiries be routed through a central office. This prevents scientists from speaking directly to reporters until the media office determines which agency employee should respond.

In some scientists' view, this practice is a necessary step to ensuring that the agency speaks to the public with a single voice. Others questioned the appropriateness of having a manager or political appointee answer questions about scientific work they may not fully understand, and some expressed frustration that they may devote a great deal of time to a project but not be the one speaking about it.

Some scientists appreciate having a media office to handle press calls when they do not view themselves as having the necessary skills to respond. Scientists noted the complexity of interacting with the media, and those working on potentially controversial topics were particularly concerned about saying the wrong thing in a media interaction. According to the scientists, some agencies offered strong media training but others did not.

In addition to deciding who should respond to press inquiries, some agency media officials also make a practice of being on the line or in the room with any scientist being interviewed. Although not all of the scientists who described this practice found it to be intrusive, some see it as potentially having a chilling effect on what scientists say.

"I would prefer to provide the information to the media . . . Otherwise information gets lost in translation."

– VHA health systems specialist

RECOMMENDATIONS: COMMUNICATING WITH THE PUBLIC

PRINCIPLE: As directed by the OSTP principles, agencies should develop policies that "provide for the widest practicable and appropriate dissemination of factual information concerning agency scientific activities and their results" and ensure free and open discussion.

Recommendation: Agencies should have clear policies on scientists' communication with the media and the public, and ensure that they are understood and consistently enforced.

Recommendation: Agencies' default policy should be to allow scientists to handle media inquiries directly and interact with reporters without the presence of media office representatives; under certain circumstances (e.g., when the topic is a policy rather than technical issue) it may be necessary for the media office to play a more central role.

Recommendation: Agencies should not require scientists to speak with the media; those who wish to do so should be offered media training or be allowed to shift inquiries to the media office.

Professional Development

Interactions with colleagues from scientists' disciplines are crucial for professional development. For many scientists, attendance at professional meetings is the most important way for them to build professional relationships, receive feedback on projects, and learn about new developments in their fields. Nonetheless, many scientists felt their agencies did not fully appreciate the benefits of attending scientific meetings.

While some agencies actively encourage their scientists to attend outside meetings and conferences, others are reluctant to do so. Scientists reported that in recent years, funding restrictions have reduced the number of meetings

they can attend. Most scientists interviewed indicated they could attend one or two professional meetings or conferences a year; however, a few scientists mentioned that they had not attended a meeting in recent years and did not know when their next chance would arise.

CDC and NIOSH scientists explained that restrictions have recently been placed on the number of employees of their agencies who could attend any single conference. This caused particular frustration in the case of the industrial hygienists' annual conference. One scientist reported that approximately 90 NIOSH employees had customarily attended this event (since NIOSH employs more industrial hygienists than any other federal agency), but a CDC official had decided that only 12 should attend.

“There should be a commitment to professional development . . . there should be resources to do that. Managers should recognize that is part of their job, to get those resources.”

– HUD manager

Participation is sometimes contingent on presentation of a paper at the meeting the scientist wishes to attend. Scientists working on multi-year projects, or those whose agencies have lengthy clearance processes for presentations, may find this a difficult requirement to meet. NIOSH scientists indicated that conference participation is not supported until a scientist is ready to submit a manuscript to a journal for publication.

Scientists at higher levels within some agencies seem to have an easier time securing money and time for travel, which can frustrate their lower-ranking counterparts. Lower-ranking scientists commented that those who were allowed to attend the most meetings tended to be those who were the most trustworthy in the eyes of the agency.

Several scientists reported that they will pay for their own attendance at professional events if their agencies will

not cover the costs, and may even use vacation time to attend conferences and meetings.

RECOMMENDATIONS: PROFESSIONAL DEVELOPMENT

PRINCIPLE: Scientists should be encouraged to maintain their professional standing and pursue professional development through engagement with their scientific colleagues, to the extent possible given their agencies' resources.

Recommendation: Agencies should ensure that requirements determining which scientists are eligible for support to attend professional meetings and conferences are flexible, appropriate, and applied consistently.

Recommendation: Agencies should allow all scientists for whom attendance at a particular meeting is appropriate to attend without imposing arbitrary limits on the total number of employee attendees.

Inter-agency Data Sharing and Communication

Some scientists also noted the importance of interacting with colleagues from other federal agencies on topics of common interest. Accessing data from other agencies can be difficult due to both technological and bureaucratic hurdles; incompatible data systems and restrictive Memoranda of Understanding (MOUs) between agencies were two of the problems raised.

A few scientists also stated that they were discouraged from contacting colleagues at other agencies directly about issues that both agencies study. One FDA scientist stated that contacts with colleagues at other agencies to discuss scientific topics are prohibited.

RECOMMENDATIONS: INTER-AGENCY DATA SHARING AND COMMUNICATION

PRINCIPLE: Scientists should be able to communicate and share data freely and efficiently across federal agencies.

Recommendation: Agencies should develop and communicate clear policies on data sharing.

Recommendation: Agencies should end explicit or perceived prohibitions on inter-agency communications.

Recommendation: Agencies should examine the need for establishing MOUs with other agencies before data sharing occurs; when MOUs are deemed necessary, they should be developed quickly and in a straightforward manner.

Recommendation: Agencies should identify ease of data sharing as a priority when making decisions about data systems.

Influence

Federal-agency science is subject to influence from the public, private, and political arenas, particularly with regards to which topics are researched and how scientific information is disseminated. Most scientists found these influences burdensome, especially when they were asked to redirect their work based on what one scientist referred to as “political whims.” At the same time, some interviewees noted that such influences are inescapable for scientists employed by the federal government, and that a certain amount of input from stakeholders is appropriate and may be beneficial.

Many governmental processes are designed to allow for input from groups who are affected by government action or inaction on a particular issue. Scientists noted that it is often appropriate for private- and public-sector groups to communicate with federal agencies to share their experiences and expertise on particular issues that an agency may be studying. They differentiated between such appropriate activities and what they considered to be undue influence – for instance, asking an agency to deviate from standard scientific procedures. Most scientists expressed concerns about undue influence compromising scientific integrity in some specific instances at their agencies, and a few considered it a systemic problem.

POLITICAL INFLUENCE

Many interviewees cited examples of Congress exercising influence over agencies’ work. Often, members of Congress will direct an agency to study a health issue

that is of concern to a member’s constituents – even if that requirement comes without additional funding and may draw resources from work that scientists see as more important for the public’s health. Fears of Congressional disapproval, which may lead to reduced funding or greater restrictions for an agency, can also discourage agencies from addressing controversial topics or releasing complete research results.

“I used to think that politics had nothing to do with what we do here, when I was very new ... [But] politics are more important than I thought ... They influence what the agency chooses to pursue to research.”

– NIOSH team leader

Influence from government players can also operate subtly. Changes in agency leadership often spell new scientific priorities and management styles, which can subject scientific work to new research directions and requirements. Several scientists expressed concerns about additional layers of bureaucracy that they must navigate, and about additional reviews from lawyers and policy specialists that scientists find unhelpful to advancing agencies’ scientific goals.

Several scientists also brought up the difficulty of getting their work cleared by OMB, which often raises questions about particular elements of scientific information products; one scientist reported that OMB had insisted that a large amount of exposure information be deleted from a report, and the agency felt it had no choice but to comply. Since agencies must continue working with the same OMB staff members, they have an incentive to maintain harmonious relationships and may tailor their work based on expectations of what that office will object to.

PRIVATE- AND PUBLIC-SECTOR INFLUENCE

During interviews, scientists provided numerous examples of cases in which they felt that members of Congress and agency leadership were exerting influence on scientists because these officials were themselves influenced by the private sector. In general, scientists expressed more concern about private-sector influence than public-sector influence, but not all of the scientists interviewed felt that industry groups exerted inappropriate or outsized influence.

Multiple scientists gave examples of particular reports or data that they were instructed not to release because the information was unfavorable to an industry. A few scientists stated that when they or a colleague released such unfavorable information despite warnings, harmful career repercussions followed. A scientist from US Department of Agriculture (USDA) and another from FDA felt that private-sector influence was so pervasive that their agencies were now doing more to serve regulated industries than the public.

Scientists did not seem to fear that public-sector groups exert undue influence over agency decisions about disseminating scientific work, although a few interviewees expressed frustration about what they saw as unfounded criticism from advocacy groups about agency science being slanted in favor of industry. Scientists noted that pressure from advocacy groups – particularly those focused on specific diseases – can influence research priorities. Such influence may not be problematic if it keeps an important health issue on Congressional or agency priority lists.

Groups' ability to influence agency science can fluctuate over time. Scientists who worked with tribal groups noted that American Indians have historically had little say in research conducted in and around their tribes, but new mechanisms for soliciting tribal input are helping to address this shortfall. By contrast, NIOSH scientists reported decreased participation from affected workers in agency research about workplace hazards.

RECOMMENDATIONS: INFLUENCE

PRINCIPLE: Agencies should protect scientific work from inappropriate influence.

“The primary concern at USDA is industry, not public health.”

– USDA division director

Recommendation: Agencies should adopt policies and training programs for both managers and scientists that affirm agency commitment to scientific integrity and help employees distinguish between appropriate and inappropriate influence on scientific work.

Recommendation: Agencies should have policies in place to ensure transparency regarding input from political actors as well as private- and public-sector stakeholders.

Follow-up Survey

To investigate effects that a new administration might be having on scientists' views of the topics covered during the interviews, we conducted an online follow-up survey during July and August 2009, approximately six months after the Obama administration began. The research team used the online survey service Zoomerang¹⁹ to disseminate, collect, and analyze the anonymous survey.

Of the 30 scientists who responded, 18 are currently employed by the federal government at one of the following agencies: Veterans Health Administration (VHA), Indian Health Service (IHS), CDC (including NIOSH), USDA, or EPA.

A majority of respondents reported that there had been no change in the areas of access to data, research review processes, publication/review clearance processes, scientists' communication with the media and the public, and scientists' ability to attend meetings and conferences.

In three other areas, responses indicated that some scientists perceive improvements. Although 50% of respondents believed there to be no change in the agency providing a supportive workplace, 20% of the respondents did report a change for the better. To the

“[I don’t anticipate much change] because the bureaucratic system in place during the previous administration is now ensconced in our agency.”

– Scientist responding to follow-up survey

question about scientists’ ability and willingness to provide feedback, 33% reported improvement. And, according to 30% of respondents, the overall work environment has changed for the better.

Despite indications that some scientists perceive improvements at their agencies, comments reflected a belief that

change comes slowly, if at all, to federal agencies. Some scientists felt that entrenched managers and civil-service leadership would hamper improvements, and several noted that funding concerns have not abated and may worsen further.

Conclusion

The roles and responsibilities of scientists who work for the federal government in science-based agencies cannot be simplified into a sound bite or single issue. This study and the recommendations that have emerged from it call for ensuring a balance that will protect the fundamental principles of scientific method, integrity, freedom of inquiry, and dissemination of results as well as one that will achieve the missions and goals of the scientific agencies as established by our elected representatives.

The commitment and pride of scientists who work in federal agencies is remarkable. Their dedication to the public mission of our health and environmental agencies was demonstrated repeatedly throughout this study. Individual scientists within federal agencies, their managers, agency leaders, the relevant offices at the White House, and Congress all play critical roles in creating a work environment that promotes the morale and productivity of the scientific workforce that ultimately benefits the public.

The principles that are outlined in this report start with valuing the scientific workforce and establishing policies that are consistent across the federal government while being tailored appropriately for the mission and scope of each agency. Transparency, consistency, and accountability must be key elements in these policies.

The OSTP, along with the OMB, should bring agencies’ leadership together to establish common policy approaches. Specific policies should address

- Improving management training and overall management approaches for scientific projects and staff, including promoting opportunities for honest feedback without fear of retaliation;
- Minimizing the bureaucratic maze needed to initiate new research and to allow for publication or other dissemination of research results, with or without disclaimers;
- Providing the opportunity for scientists to communicate with the public, while also providing any support or training that scientists need to improve their skills in public communication;
- Promoting engagement with federal scientists at other agencies and with the larger scientific community, including sharing of data and professional opportunities; and
- Minimizing the impact of inappropriate influence from non-scientific directions, while recognizing the appropriate roles of elected officials and the public in shaping the missions, scientific work, and policies of the agencies.

Concerns about scientific integrity and the politicization of science have been raised across several administrations, and peaked during the first decade of the 21st century over issues ranging from climate-change research and reproductive-health issues to regulatory standards. It is notable that in follow-up research conducted after the 2009 inauguration, several scientists who participated in this research did not anticipate that the change in

administration would significantly alter their agencies' approach to science. Change in large agencies with hierarchical structures is difficult and takes time. This presents a challenge to both the new leadership and the existing career scientists to initiate and maintain new strategies and approaches for improving and sustaining the scientific workforce.

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⁴ International Committee of Medical Journal Editors Web site. <http://www.icmje.org>. Accessed September 6, 2009.

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¹⁴ National Institute for Occupational Safety and Health. Procedures for External Review of Intramural Projects. <http://www.cdc.gov/niosh/nas/mining/pdfs/procedures%20for%20external%20peer%20review%20of%20intramural%20projects.pdf>. Accessed August 11, 2009.

¹⁵ Centers for Disease Control and Prevention. Peer Review of Research. <http://www.cdc.gov/od/science/PHResearch/peerreviewpolicy.htm>. Accessed August 7, 2009.

¹⁶ National Institutes of Health. Introduction: Extramural and Intramural Research Programs. http://report.nih.gov/biennialreport/pdf/NIH_BR_Ch1_extramural.pdf. Accessed August 11, 2009.

¹⁷ Paperwork Reduction Act. 44 U.S.C. § 3501-3521 (1995).

¹⁸ US Centers for Disease Control and Prevention. Clearance of Information Products Disseminated Outside CDC for Public Use. <http://www.cdc.gov/od/science/policies/clearance.htm>. Accessed August 26, 2009.

¹⁹ Zoomerang Web site. <http://www.zoomerang.com/>. Accessed January 5, 2010.

Appendix A: Methodology

The Scientists in Government Project, launched by the Project on Scientific Knowledge and Public Policy (SKAPP) with support from the Open Society Institute, seeks to contribute to the public discussion about federal scientists' rights and responsibilities. This report presents the results of a qualitative research study that included:

- Structured, in-depth interviews with current and former federal-agency scientists, which were transcribed and coded using themes derived from Grounded Theory;
- a review of publicly available online agency policies regarding agency research; and
- a literature review.

The report considers the barriers and opportunities for scientists as they set their research agendas, endeavor to speak freely with one another, disseminate their conclusions and the data that support them, and provide a firm grounding for science-based policies and practices. It also examines the internal and external influences on the research activities of government scientists, and concludes with recommendations to enhance transparency, minimize interference, and ensure timely access to findings.

An advisory committee composed of five scientists experienced in working with federal-agency scientists provided advice and input to assist with the development of an interview guide and research-participant recruitment. Two informational interviews with experts in the field validated the interview guide. A literature review provided a foundation and rationale for the interviewing process.

The research team recruited interview participants who held advanced degrees and had at least five years of experience working in a scientific capacity for a federal agency that focuses on health or the environment. The criterion of working for a health or environment agency was broadened to include persons who may not have been working specifically at this type of agency, but whose work was related to health or the environment.

From May 2008 through January 2009, 37 structured, in-depth, confidential interviews were conducted by a researcher trained in qualitative research methods with individuals who work for, or had previously worked for, the following agencies (some interviewees had work experience at more than one agency):

Agencies of the Department of Health and Human Services:

- Centers for Disease Control and Prevention (CDC), including the National Institute for Occupational Safety and Health (NIOSH) and the Agency for Toxic Substances and Disease Registry (ATSDR)
- Food and Drug Administration (FDA), including the Center for Drug Evaluation and Research (CDER) and the National Center for Toxicological Research (NCTR)
- National Institutes of Health (NIH)
- Indian Health Service (IHS)
- Substance Abuse and Mental Health Services Administration (SAMHSA)

Other agencies:

- US Consumer Product Safety Commission (CPSC)
- US Department of Agriculture (USDA)
- US Department of Commerce, including the National Institute of Standards and Technology (NIST)
- US Department of Defense (DoD)
- US Department of Housing and Urban Development (HUD)
- US Department of Labor (DOL), including the Occupational Safety and Health Administration (OSHA)
- US Department of Veterans Affairs, including the Veterans Health Administration (VHA)
- US Environmental Protection Agency (EPA)

The term “agency” when used in this report refers not only to agencies but to departments (e.g., the US Department of Agriculture) and to offices, institutions, or bureaus (e.g., the National Institute for Occupational Safety and Health) – in short, to any organization that derives its authority from federal law.

To investigate effects that a new administration might be having on scientists’ views of the topics covered during the interviews, an online follow-up survey was conducted (using the online survey tool Zoomerang¹) during July and August 2009, approximately six months after the Obama administration began.

The 37 participants had experience working for 13 different agencies, for a total of 55 agency work experiences (see table below). It is noteworthy that 12 of the participants have experience working for NIOSH, which is part of CDC. In addition, five participants were members of the Public Health Service (PHS) Commissioned Corps; members of the PHS work for a variety of agencies within the Department of Health and Human Services (HHS) while serving in the Commissioned Corps.

Information about participants’ sex, race, and age was compared to corresponding information from the US Office of Personnel Management (OPM) Demographic

Number of Interviewees with Experience at Various Federal Agencies	
Agency	Number of Participants
US Department of Health & Human Services (HHS)	34
Centers for Disease Control & Prevention (CDC), including the Agency for Toxic Substances & Disease Registry (ATSDR) and National Institute for Occupational Safety & Health (NIOSH)	20
Food & Drug Administration (FDA), including the Center for Drug Evaluation & Research (CDER) and the National Center for Toxicological Research (NCTR)	6
Indian Health Service (IHS)	3
National Institutes of Health (NIH)	4
Substance Abuse & Mental Health Services Administration (SAMHSA)	1
US Consumer Product Safety Commission (CPSC)	1
US Department of Agriculture (USDA)	3
US Department of Commerce, including the National Institute of Standards & Technology (NIST)	1
US Department of Defense (DoD)	4
US Department of Housing & Urban Development (HUD)	1
US Department of Labor, including the Occupational Safety & Health Administration (OSHA)	1
US Department of Veterans Affairs, including the Veterans Health Administration (VHA)	2
US Environmental Protection Agency (EPA)	8

Report of 2006² regarding government employees in the “professional” category, whose description matched the study’s recruitment criteria most closely. Compared to government employees in the “professional” category, the group of study participants included more males, more employees older than age 45, and fewer employees who identify as belonging to a minority group.

Because the OPM report does not calculate average length of government service for the professional category alone, we used the average number of years of service for all federal employees, which is 14.6 years. Our participants had a longer average length of service, 16.9 years.

The team then searched online for policies from health- and environment-focused agencies regarding procedures for research, publication, and communication with the media and the public by scientists employed at federal agencies. We found relevant policies regarding at least one of these activities from the following agencies and centers:

- Agricultural Research Service (an agency of the US Department of Agriculture)
- Center for Drug Evaluation and Research (a center of the Food and Drug Administration)
- Centers for Disease Control and Prevention

- Environmental Protection Agency
- Food Safety and Inspection Service (an agency of the US Department of Agriculture)
- National Institute for Occupational Safety and Health (an institute of the Centers for Disease Control and Prevention)
- National Institutes of Health
- US Department of Agriculture
- US Department of Interior
- US Geological Survey (a bureau of the Department of Interior)

Qualitative research is “a broad approach to the study of social phenomena ... [drawing on] multiple methods of inquiry,” including structured interviews and analysis of documents and materials.³ Qualitative research also has limitations. One of these is funding, which determines the amount of time a researcher can devote to a project. Ultimately, qualitative researchers aim to reach the point of data saturation; however, a researcher is never absolutely certain that it has been attained. Qualitative research does not employ nor aspire to have a representative sample; rather, validity and reliability are achieved by rigorous application of field methods and analysis, especially recruitment for the characteristics being researched.

¹ Zoomerang Web site. <http://www.zoomerang.com/>. Accessed January 5, 2010.

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Appendix B: Acronyms

ARS – Agricultural Research Service

ATSDR – Agency for Toxic Substances and Disease Registry

CDC – Centers for Disease Control and Prevention

CDER – Center for Drug Evaluation and Research

CPSC – US Consumer Product Safety Commission

DOD – US Department of Defense

DOI – US Department of the Interior

EPA – US Environmental Protection Agency

FDA – US Food and Drug Administration

FSIS – Food Safety and Inspection Service

HHS – US Department of Health and Human Services

HUD – US Department of Housing and Urban Development

IHS – Indian Health Service

NCTR – National Center for Toxicological Research

NIH – National Institutes of Health

NIOSH – National Institute for Occupational Safety and Health

NIST – National Institute of Standards and Technology

OMB – Office of Management and Budget

OPM – Office of Personnel Management

OSHA – Occupational Safety and Health Administration

OSTP – Office of Science and Technology Policy

PHS – US Public Health Service

SAMHSA – Substance Abuse and Mental Health Services Administration

USDA – US Department of Agriculture

USGS – US Geological Survey

VHA – Veterans Health Administration

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