Comment on the Request for Information to Support the Development of a Federal Scientific Integrity Policy Framework

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Prepared with the input and guidance of the ASA Scientific and Public Affairs Advisory Committee and the ASA Committee on Professional Ethics

Founded in 1839, the American Statistical Association (ASA) is the oldest scientific professional association in the United States. With 15,000 members in academia, industry, and government, ASA's membership and expertise is especially diverse. ASA member expertise covers a myriad of topics including, for these comments, data analysis and communication of results, optimization of the scientific process, experiment and survey design, decision analysis and support, minimization of and accounting for bias, uncertainty quantification, privacy and confidentiality, and data ethics. Statistical practices such as these are pervasive across scientific disciplines, which is why the ASA developed and maintains a set of Ethical Guidelines for Statistical Practice.

We appreciate the chance to comment on White House Office of Science and Technology Policy's (OSTP) request for information (RFI) regarding the design of a federal scientific integrity policy framework. This RFI is based upon the Scientific Integrity Task Force's report, "Protecting the Integrity of Government Science (January 2022)" which was formed in response to the January 27, 2021 Memorandum on Restoring Trust in Government Through Scientific Integrity and Evidence-Based Policymaking.

We commend OSTP's development of a general scientific integrity policy. Our comments concern four considerations posed in the RFI:

1. Recommend developing and maintaining a set of ethical guidelines for scientific integrity analogous to the ASA Ethical Guidelines for Statistical Practice;
2. Describe an existing example of a unified framework for scientific policy;

3. Call attention to the professional development feedback loop; and
4. Emphasize the importance of transparency and accountability.

We elaborate on these points as follows.

1. Developing a set of ethical guidelines

Scientific integrity is vital to society. Policies supporting scientific integrity can address both existing and emerging important issues by universally encouraging rigor, reproducibility, and transparency in the design, conduct, interpretation, communication, and application of science. The ASA Ethical Guidelines for Statistical Practice were developed to set expectations for scientific integrity specifically within the domain of statistical practice. They are rooted in standards of respect, fairness, transparency, and accountability. Many of the Guidelines, however, are applicable to the broader scientific community, including Federal agencies and their employees. Further, establishing and ensuring dissemination of a similar set of ethical guidelines for scientific practice by Federal agencies would help address all four requested information topics. In response to the 2021 Request for Information To Improve Federal Scientific Integrity Policies (86 FR 34064), the ASA Committee on Professional Ethics submitted the then-current, 2018 Ethical Guidelines. Since then, the Committee has updated the Ethical Guidelines to expand the utility of the Guidelines to a broader scope of practitioners and greater application to emerging technologies.

The ASA Ethical Guidelines contain 72 elements that are divided into the following 8 sections:

- Principle A: Professional Integrity and Accountability
- Principle B: Integrity of Data and Methods
- Principle C: Responsibilities to Stakeholders
- Principle D: Responsibilities to Research Subjects, Data Subjects, or Those Directly Affected by Statistical Practices
- Principle E: Responsibilities to Members of Multidisciplinary Teams
- Principle F: Responsibilities to Fellow Statistical Practitioners and the Profession
- Principle G: Responsibilities of Leaders, Supervisors, and Mentors of Statistical Practice
- Principle H: Responsibilities Regarding Potential Misconduct
- Appendix: Responsibilities of Organizations/Institutions

RFI Topic 1 – How scientific integrity policies can address important and emergent issues of our time, including diversity, equity, inclusion and accessibility; new technologies; emerging modes of science; and coordination with related policy domains.

The approach adopted by the ASA to address important existing and emergent issues in ethical statistical practice is to formulate and promulgate a coherent set of principles, i.e., the ASA Ethical Guidelines. The same approach could be applied by OSTP to support scientific integrity in general. The adoption and understanding of such guidelines will enable Federal agencies and employees to respond ethically to important and emerging issues.

Examples of generally applicable elements from the ASA Ethical Guidelines include:

> *A2: Uses methodology and data that are valid, relevant, and appropriate, without favoritism or prejudice, and in a manner intended to produce valid, interpretable, and reproducible results.*
>
> *A4: Opposes efforts to predetermine or influence the results of statistical practices and resists pressure to selectively interpret data.*

Examples that are specific to diversity, equity, inclusion and accessibility include:

> *A3: Does not knowingly conduct statistical practices that exploit vulnerable populations or create or perpetuate unfair outcomes.*
>
> *A8: Promotes the dignity and fair treatment of all people. Neither engages in nor condones discrimination based on personal characteristics. Respects personal boundaries in interactions and avoids harassment, including sexual harassment, bullying, and other abuses of power or authority.*
>
> *B7: Explores and describes the effect of variation in human characteristics and groups on statistical practice when feasible and relevant.*
>
> *D6: Considers the impact of statistical practice on society, groups, and individuals. Recognizes that statistical practice could adversely affect groups or the public perception of groups, including marginalized groups. Considers approaches to minimize negative impacts in applications or in framing results in reporting.*
>
> *D10: Understands the provenance of the data—including origins, revisions, and any restrictions on usage—and fitness for use prior to conducting statistical practices.*
>
> *D11: Does not conduct statistical practice that could reasonably be interpreted by subjects as sanctioning a violation of their rights. Seeks to use statistical practices to promote the just and impartial treatment of all individuals.*

One example that is specific to new technologies and emerging modes of science, in addition to A2/A4 (general for science), is:

> *B6: For models and algorithms designed to inform or implement decisions repeatedly, develops and/or implements plans to validate assumptions and assess performance over*

time, as needed. Considers criteria and mitigation plans for model or algorithm failure and retirement.

Examples that are specific to coordination with related policy domains include:

E3. Ensures all communications regarding statistical practices are consistent with these guidelines. Promotes transparency in all statistical practices.

E4. Avoids compromising validity for expediency. Regardless of pressure on or within the team, does not use inappropriate statistical practices.

F4. Promotes reproducibility and replication, whether results are "significant" or not, by sharing data, methods, and documentation to the extent possible.

Regarding **RFI Topic 2, criteria that should be used to evaluate scientific integrity policies,** while the ASA Ethical Guidelines do not provide specific advice, the standards of respect, fairness, transparency, and accountability should apply to the development of any such criteria.

For **RFI Topic 3, how to ensure that scientific integrity evaluation findings lead to iterative improvement**, many elements of Principle B, Integrity of Data and Methods, could apply. In particular, the concepts contained in Element B.6 (developing plans to validate assumptions and assess performance over time, and time and considering a priori criteria for actions based on findings) are relevant.

Finally, for **RFI Topic 4, how to ensure long-term viability and implementation of Federal scientific integrity policies, practices, and culture through future Administrations,** Guideline Principles A-H and the Appendix would all apply. To ensure the long-term viability of these policies, practices, and culture, an effective training program on scientific integrity principles is essential. Training should be appropriate to the roles, responsibilities, and level of experience of trainees. Both the contents of the principles and the training need to be periodically reviewed for relevance and effectiveness.

2. Unified framework example

The Task Force report states, "A one-size-fits-all approach cannot begin to reflect the considerable diversity among agencies that conduct, manage, communicate, or use science and evidence in decision-making. While all agencies can adhere to common principles to uphold scientific integrity, individual agencies need to adapt policies to their particular functions (p. xii)." To this end, the Task Force report outlines the general requirements for a framework, and lists in Appendix B those Federal agencies with existing scientific integrity policies.

The Office of Management and Budget Statistical Policy Directives (OMB) Nos. 1 through 4 offer a concrete example of a coherent framework that applies to all "Federal statistical agencies and recognized statistical units" which form a diverse set (e.g. Census Bureau, Bureau of Economic Analysis, National Animal Health Monitoring System). These directives outline the responsibilities of these agencies/units and provide guidelines for data collection,

dissemination, and evaluation. Furthermore, they specifically integrate the guidance from the March 9, 2009 Memorandum and subsequent December 17, 2010 Memorandum on scientific integrity policy which the Task Force report refers to. However, as a complement, each Federal statistical agency/unit has a tailored implementation of the OMB policies fitting its mission.

This example also highlights a fruitful exchange between government and the wider scientific community in policy development. The National Research Council (NRC) and the National Academy of Sciences (NAS) publish *Principles and Practices for a Federal Statistical Agency* (P&P), the most recent (seventh) edition issued in 2021. The OMB Directives reflect the material found in P&P, and P&P is written with input from NRC and NAS.

P&P's principles and practices are all relevant to scientific integrity: Five principles are identified therein: "(1) relevance to policy issues and society, (2) credibility among data users and stakeholders, (3) trust among the public and data providers, (4) independence from political and other undue external influence, and (5) continual improvement and innovation."

P&P identifies ten practices: "(1) a clearly defined and well-accepted mission, (2) necessary authority and procedures to protect independence, (3) commitment to quality and professional standards of practice, (4) professional advancement of staff, (5) an active research program, (6) strong internal and external evaluation processes for an agency's statistical programs, (7) coordination and collaboration with other statistical agencies, (8) respect for data providers and protection of their data, (9) dissemination of statistical products that meet users' needs, and (10) openness about sources and limitations of the data provided."

Appendix C outlines frameworks from outside the United States, including the United Nations, the European Statistical System, and the Organisation for Economic Co-operation and Development (OECD).

While this example focuses on statistical agencies, it offers OSTP a blueprint for an architecture applicable to the sciences as a whole.

3. The professional development feedback loop

The December 17, 2010 Memorandum emphasized the importance of professional development as a component of maintaining scientific integrity within the federal government. The task force incorporated it into its report, stating that, "A culture that supports continued development of Federal scientists…is the culture that best supports scientific integrity (p. 25)."

The ASA would like to underscore this point. Professional development activities—such as conference participation, peer review, and involvement in professional societies—help to preserve other pillars of scientific integrity such as transparency, accountability, and a way to interact with the public. Moreover, such activities can aid, as indicated in the RFI, with managing "(2) New technologies, such as artificial intelligence, machine learning, and the lack of transparency and potential for bias in computer algorithms and associated data; (3) Emerging modes of science, such as citizen science and community-engaged research; and (4) Coordination with related policy domains, such as open science and data; quality guidelines for

data and information that agencies release…(p. 12166).” Ultimately, they provide a feedback loop for Federal scientists to learn, model, and uphold scientific integrity and build a culture of probity and innovation.

4. Emphasizing the importance of transparency and accountability

We commend the Task Force for calling for transparency and accountability, and developing clear guidelines regarding violations thereof. An example from statistics regarding the quality and integrity of data issued by Federal agencies, that can be used as a template for formulating a general policy, is the guidance issued by OMB and in turn by Federal agencies as required by the Information Quality Act (also referred to as the Data Quality Act) [Section 515(a) of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Public Law 106-554; H.R. 5658) (pg. 153-154)]. Specifically, the Act and related guidance include provisions for challenging the quality of data employed by a Federal agency as well as for appealing an agency’s determination with respect to such a challenge. Furthermore, it also requires annual reports to OMB on the challenges and their disposition.

Summary

Going forward, we believe that a federal framework established across executive agencies is required, with each agency echoing that policy framework and providing its set of policies and practices designed to implement the framework within its scope of influence. That framework must be rooted in scientific integrity and ethics. We hope that our comments offer examples of how to develop a set of ethical guidelines and what an overarching policy could be along with expressing our willingness to be of further assistance to the Task Force as it works to develop that policy.