**Approved by ASA Board of Directors**
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# Ethical Guidelines for Statistical Practice

***Prepared by the Committee on Professional Ethics***
***of the American Statistical Association***

## Purpose of the Guidelines

The American Statistical Association's Ethical Guidelines for Statistical Practice are intended to help statistics practitioners make decisions ethically. Additionally, the ethical guidelines aim to promote accountability by informing those who rely on statistical analysis of the standards they should expect. The discipline of statistics links the capacity to observe with the ability to gather evidence and make decisions, providing a foundation for building a more informed society. Because society depends on informed judgments supported by statistical methods, all practitioners of statistics—regardless of training and occupation or job title—have an obligation to work in a professional, competent, respectful, and ethical manner.

Good statistical practice is fundamentally based on transparent assumptions, reproducible results, and valid interpretations. In some situations, guideline principles may conflict, requiring individuals to prioritize principles according to context. However, in all cases, stakeholders have an obligation to act in good faith, to act in a manner that is consistent with these guidelines, and to encourage others to do the same. Above all, professionalism in statistical practice presumes the goal of advancing knowledge while avoiding harm; using statistics in pursuit of unethical ends is inherently unethical.

Ethical statistical practice does not include, promote, or tolerate any type of professional or scientific misconduct, including, but not limited to, bullying, sexual or other harassment, discrimination based on personal characteristics, or other forms of intimidation.

The principles expressed here should guide both those whose primary occupation is statistics and those in all other disciplines who use statistical methods in their professional work. Therefore, throughout these guidelines, the term "statistician" includes all practitioners of statistics and quantitative sciences—regardless of job title or field of degree—comprising statisticians at all levels of the profession and members of other professions who utilize and report statistical analyses and their implications.

## A. Professional Integrity and Accountability

The ethical statistician uses methodology and data that are relevant and appropriate; without favoritism or prejudice; and in a manner intended to produce valid, interpretable, and reproducible results. The ethical statistician does not knowingly accept work for which he/she is not sufficiently qualified, is honest with the client about any limitation of expertise, and consults other statisticians when necessary or in doubt. It is essential that statisticians treat others with respect.

The ethical statistician:

1. Identifies and mitigates any preferences on the part of the investigators or data providers that might predetermine or influence the analyses/results.
2. Employs selection or sampling methods and analytic approaches appropriate and valid for the specific question to be addressed, so that results extend beyond the sample to a population relevant to the objectives with minimal error under reasonable assumptions.
3. Respects and acknowledges the contributions and intellectual property of others.
4. When establishing authorship order for posters, papers, and other scholarship, strives to make clear the basis for this order, if determined on grounds other than intellectual contribution.
5. Discloses conflicts of interest, financial and otherwise, and manages or resolves them according to established (institutional/regional/local) rules and laws.
6. Accepts full responsibility for his/her professional performance. Provides only expert testimony, written work, and oral presentations that he/she would be willing to have peer reviewed.
7. Exhibits respect for others and, thus, neither engages in nor condones discrimination based on personal characteristics; bullying; unwelcome physical, including sexual, contact; or other forms of harassment or intimidation, and takes appropriate action when aware of such unethical practices by others.

## B. Integrity of data and methods

The ethical statistician is candid about any known or suspected limitations, defects, or biases in the data that may affect the integrity or reliability of the statistical analysis. Objective and valid interpretation of the results requires that the underlying analysis recognizes and acknowledges the degree of reliability and integrity of the data.

The ethical statistician:

1. Acknowledges statistical and substantive assumptions made in the execution and interpretation of any analysis. When reporting on the validity of data used,

acknowledges data editing procedures, including any imputation and missing data mechanisms.

2. Reports the limitations of statistical inference and possible sources of error.
3. In publications, reports, or testimony, identifies who is responsible for the statistical work if it would not otherwise be apparent.
4. Reports the sources and assessed adequacy of the data, accounts for all data considered in a study, and explains the sample(s) actually used.
5. Clearly and fully reports the steps taken to preserve data integrity and valid results.
6. Where appropriate, addresses potential confounding variables not included in the study.
7. In publications and reports, conveys the findings in ways that are both honest and meaningful to the user/reader. This includes tables, models, and graphics.
8. In publications or testimony, identifies the ultimate financial sponsor of the study, the stated purpose, and the intended use of the study results.
9. When reporting analyses of volunteer data or other data that may not be representative of a defined population, includes appropriate disclaimers and, if used, appropriate weighting.
10. To aid peer review and replication, shares the data used in the analyses whenever possible/allowable and exercises due caution to protect proprietary and confidential data, including all data that might inappropriately reveal respondent identities.
11. Strives to promptly correct any errors discovered while producing the final report or after publication. As appropriate, disseminates the correction publicly or to others relying on the results.

**C. Responsibilities to Science/Public/Funder/Client**

The ethical statistician supports valid inferences, transparency, and good science in general, keeping the interests of the public, funder, client, or customer in mind (as well as professional colleagues, patients, the public, and the scientific community).

The ethical statistician:

1. To the extent possible, presents a client or employer with choices among valid alternative statistical approaches that may vary in scope, cost, or precision.
2. Strives to explain any expected adverse consequences of failure to follow through on an agreed-upon sampling or analytic plan.
3. Applies statistical sampling and analysis procedures scientifically, without predetermining the outcome.

4. Strives to make new statistical knowledge widely available to provide benefits to society at large and beyond his/her own scope of applications.
5. Understands and conforms to confidentiality requirements of data collection, release, and dissemination and any restrictions on its use established by the data provider (to the extent legally required), protecting use and disclosure of data accordingly. Guards privileged information of the employer, client, or funder.

**D. Responsibilities to Research Subjects**

The ethical statistician protects and respects the rights and interests of human and animal subjects at all stages of their involvement in a project. This includes respondents to the census or to surveys, those whose data are contained in administrative records, and subjects of physically or psychologically invasive research.

The ethical statistician:

1. Keeps informed about and adheres to applicable rules, approvals, and guidelines for the protection and welfare of human and animal subjects.
2. Strives to avoid the use of excessive or inadequate numbers of research subjects—and excessive risk to research subjects (in terms of health, welfare, privacy, and ownership of their own data)—by making informed recommendations for study size.
3. Protects the privacy and confidentiality of research subjects and data concerning them, whether obtained from the subjects directly, other persons, or existing records. Anticipates and solicits approval for secondary and indirect uses of the data, including linkage to other data sets, when obtaining approvals from research subjects and obtains approvals appropriate to allow for peer review and independent replication of analyses.
4. Knows the legal limitations on privacy and confidentiality assurances and does not over-promise or assume legal privacy and confidentiality protections where they may not apply.
5. Considers whether appropriate research-subject approvals were obtained before participating in a study involving human beings or organizations before analyzing data from such a study and while reviewing manuscripts for publication or internal use. The statistician considers the treatment of research subjects (e.g., confidentiality agreements, expectations of privacy, notification, consent, etc.) when evaluating the appropriateness of the data source(s).
6. In contemplating whether to participate in an analysis of data from a particular source, refuses to do so if participating in the analysis could reasonably be interpreted by individuals who provided information as sanctioning a violation of their rights.
7. Recognizes any statistical descriptions of groups may carry risks of stereotypes and stigmatization. Statisticians should contemplate, and be sensitive to, the manner in which information is framed to avoid disproportionate harm to vulnerable groups.

**E. Responsibilities to Research Team Colleagues**

Science and statistical practice are often conducted in teams made up of professionals with different professional standards. The statistician must know how to work ethically in this environment.

The ethical statistician:

1. Recognizes other professions have standards and obligations, research practices and standards can differ across disciplines, and statisticians do not have obligations to standards of other professions that conflict with these guidelines.

2. Ensures all discussion and reporting of statistical design and analysis is consistent with these guidelines.

3. Avoids compromising scientific validity for expediency.

4. Strives to promote transparency in design, execution, and reporting or presenting of all analyses.

**F. Responsibilities to Other Statisticians or Statistics Practitioners**

The practice of statistics requires consideration of the entire range of possible explanations for observed phenomena, and distinct observers drawing on their own unique sets of experiences can arrive at different and potentially diverging judgments about the plausibility of different explanations. Even in adversarial settings, discourse tends to be most successful when statisticians treat one another with mutual respect and focus on scientific principles, methodology, and the substance of data interpretations.

Out of respect for fellow statistical practitioners, the ethical statistician:

1. Promotes sharing of data and methods as much as possible and as appropriate without compromising propriety. Makes documentation suitable for replicate analyses, metadata studies, and other research by qualified investigators.
2. Helps strengthen the work of others through appropriate peer review; in peer review, respects differences of opinion and assesses methods, not individuals. Strives to complete review assignments thoroughly, thoughtfully, and promptly.
3. Instills in students and non-statisticians an appreciation for the practical value of the concepts and methods they are learning or using.
4. Uses professional qualifications and contributions as the basis for decisions regarding statistical practitioners' hiring, firing, promotion, work assignments, publications and presentations, candidacy for offices and awards, funding or approval of research, and other professional matters.

**G. Responsibilities Regarding Allegations of Misconduct**

The ethical statistician understands the differences between questionable statistical, scientific, or professional practices and practices that constitute misconduct. The ethical statistician avoids all of the above and knows how each should be handled.

The ethical statistician:

1. Avoids condoning or appearing to condone statistical, scientific, or professional misconduct.

2. Recognizes that differences of opinion and honest error do not constitute misconduct; they warrant discussion, but not accusation.

3. Knows the definitions of, and procedures relating to, misconduct. If involved in a misconduct investigation, follows prescribed procedures.

4. Maintains confidentiality during an investigation, but discloses the investigation results honestly to appropriate parties and stakeholders once they are available.

5. Following an investigation of misconduct, supports the appropriate efforts of all involved—including those reporting the possible scientific error or misconduct—to resume their careers in as normal a manner as possible.

6. Avoids, and acts to discourage, retaliation against or damage to the employability of those who responsibly call attention to possible scientific error or to scientific or other professional misconduct.

**H. Responsibilities of Employers, Including Organizations, Individuals, Attorneys, or Other Clients Employing Statistical Practitioners**

Those employing any person to analyze data are implicitly relying on the profession's reputation for objectivity. However, this creates an obligation on the part of the employer to understand and respect statisticians' obligation of objectivity.

Those employing statisticians are expected to:

1. Recognize that the ethical guidelines exist and were instituted for the protection and support of the statistician and the consumer alike.

2. Maintain a working environment free from intimidation, including discrimination based on personal characteristics; bullying; coercion; unwelcome physical (including sexual) contact; and other forms of harassment.

3. Recognize that valid findings result from competent work in a moral environment. Employers, funders, or those who commission statistical analysis have an obligation to rely on the expertise and judgment of qualified statisticians for any data analysis. This obligation may be especially relevant in analyses known or anticipated to have tangible physical, financial, or psychological effects.

4. Recognize the results of valid statistical studies cannot be guaranteed to conform to the expectations or desires of those commissioning the study or the statistical practitioner(s).

5. Recognize it is contrary to these guidelines to report or follow only those results that conform to expectations without explicitly acknowledging competing findings and the basis for choices regarding which results to report, use, and/or cite.

6. Recognize the inclusion of statistical practitioners as authors or acknowledgement of their contributions to projects or publications requires their explicit permission because it implies endorsement of the work.

7. Support sound statistical analysis and expose incompetent or corrupt statistical practice.

8. Strive to protect the professional freedom and responsibility of statistical practitioners who comply with these guidelines.