

Ethical Guidelines for Statistical Practice
*Committee on Professional Ethics of the American
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Good statistical practice is fundamentally based on transparent assumptions, reproducible results, and valid interpretations.

- 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.
- 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.

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.

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.

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).

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.

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.

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.

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.

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.

Case study 1: “After the fact Co-author” (John Gardenier)

- “As a professional statistician, you are called by a colleague to examine and "bless" a biomedical experimental report. You are urged to do it quickly because the report has already been submitted and accepted for publication in a prestigious journal in the author's field.
- One of the reviewers, however, had suggested that a quick review by a statistician might be in order. To your horror, the report appears to be utter statistical nonsense... You suggest that he eliminate the statistical portions and describe his work based on the qualitative reasoning which he obviously used. Initially very angry, he calms down and says, "I'll leave the contents alone, but I will add you as a coauthor. How's that?"

Case study 2: Uncounted Data from the Scintillation Counter (Center for the Study of Ethics in the Professions at Illinois Institute of Technology)

- Armstrong is a first year graduate student, working in a molecular biology laboratory. She has great admiration for Hayes, who is just finishing his thesis work. He seems to have a golden touch in the laboratory. His experiments produce clean data, with scatter consistently less than or equal to theoretical predictions.
- Because his experiments seldom need to be repeated, Hayes has produced a thesis full of fascinating and demonstrably correct results. The laboratory has already followed up on several of these with success.

Case study 2 (cont.)

- One day Armstrong notices Hayes leaving the scintillation counter and can't help noticing he has 80 vials. This barely registers in her subconscious until later in the day he shows her his experimental results with 40 data points. When she asks about the missing points, he explains that it is standard practice to eliminate outliers from the analysis. He goes on to mention that the scintillation counter is a scientific instrument that frequently produces murky readings distorted by many different kinds of factors.
- The more Armstrong thinks about this, the more distraught she becomes. A week later she summons up her courage and tells her story to the professor in whose lab she and Hayes work. He seems uninterested and irritated. He hoped she had come to present him her experimental results, which she hasn't done for months.

Case study 3: Ethics of Data Quality

- A large company serves both government and private clients. During normal operations, it collects a huge amount of data which is unavailable anywhere else. These data are used internally and also used to meet information requests from clients, the media, researchers, and the general public. The data are shared with government agencies. In some uses, the data have significant social impact.
- A statistician who meets requests for information based on this data is concerned because there are no control processes in place to assure uniform quality of the data. There are no audit procedures by which any particular counts or compilations could be verified independently. She feels that, on the whole, the data are probably "pretty good" but are likely to vary widely in quality from one data set to another. She has proposed creation of a statistical services group, which would institute data quality standards and procedures, as well as improve the availability of analytic products using these data. Her proposal has been applauded by management but perpetually left unfunded.

Case study 3 (cont.)

- Colleagues with whom the statistician has discussed this matter point out that thousands of data sets lacking data quality standards exist and are widely used. They also point out that even where data quality control standards are in place, it can take years or decades to identify and resolve specific data quality problems. Still, the individual involved is highly uncomfortable ethically with her role in preparing compilations and reports on this data. She does not want her professional reputation on the line with such products given that the recipients do not know what they are getting. She is considering adding a disclaimer to each data product to inform customers about the lack of data quality control. She is also very tempted to resolve the issue by taking other available employment.
- You are a close friend of this person, and she has asked for your advice. You are not employed by the same organization and do not know its internal politics or culture. Still, she values your judgment highly, especially in matters of professional ethics. Your advice is quite likely to be the deciding factor in her decision about what course to take.