

# ETHICAL CONSIDERATIONS FOR DEVELOPING and USING ARTIFICIAL INTELLIGENCE IN STATISTICAL PRACTICE

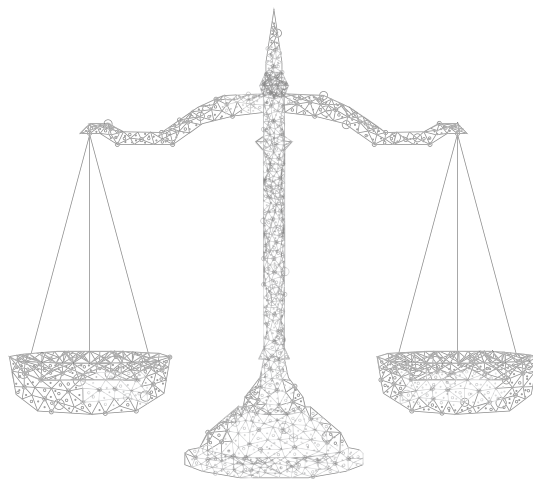
Members of the ASA Committee on Professional Ethics

There is much discussion of artificial intelligence in the popular and scientific press these days. One description of AI is that it refers to systems displaying intelligent behavior by analyzing their environment and taking actions—with some degree of autonomy—to achieve specific goals. Most AI relies on data and data-driven algorithms to determine the actions that best achieve the goals.

The ASA Ethical Guidelines for Statistical Practice (<https://bit.ly/452gmgM>) define “statistical practice” as including activities such as designing the collection of, summarizing, processing, analyzing, interpreting, or presenting data and model or algorithm development and deployment. In this way, AI often fits squarely into the space of statistical practice. Whether tuning models, building novel techniques or algorithms to accomplish a task, or mining data for patterns to influence a product life cycle, developing and using AI nearly always includes elements of statistical practice. Naturally, many statistical professionals may have questions about how AI affects their practice.

## UNDERSTAND POTENTIAL RISKS AND AVOID HARM

AI’s powerful, transformative force and profound effects on every corner of the world are undeniable. Yet we also understand AI is prone to bias, inaccuracy, and unfair outputs. The ASA Ethical Guidelines offer actionable guidance for reducing potential risks of using AI in statistical practice, including seeking to understand and mitigate known or suspected limitations, defects, or biases in the data or methods (see Principle B).



AI can collect, process, and analyze large amounts of personal and sensitive data, which can pose risk to individuals’ privacy, autonomy, and dignity. Ethical statistical practitioners should try to reduce harm by respecting privacy, equality, and autonomy of individuals and groups.

Principle D in the guidelines promotes protecting and respecting the rights and interests of people about whom data is collected and those who will be directly affected by their practice. Specifically, it includes protecting people’s privacy and confidentiality of data; obtaining proper consent for data use from respondents and data sources when applicable; considering impacts of statistical practice on society, groups, and individuals, particularly those who are disadvantaged; and minimizing adverse impacts from applications or in the reporting of results.

## PROMOTE TRANSPARENCY

Most existing AI algorithms have a “black box” nature, where the decision-making process is so complex it cannot be explained in a way that can be easily understood. Despite this, ethical statistical practitioners should seek to adopt plain language to describe the utility, methods, and risks associated with AI. In statistical practice, transparency can include listing data sources, addressing privacy concerns, explaining which methods are used and how they are implemented, and being open about the risks and biases.

For example, Principle B promotes transparency on assumptions made in the execution and interpretation of statistical practice, including methods used, limitations, possible sources of error, and algorithmic biases. Principle C encourages ethical statistical practitioners to inform stakeholders of the potential limitations on use and re-use of statistical practices in different contexts.

When developing an AI algorithm or advocating for the algorithm's usage, ethical statistical practitioners should educate nonstatistical practitioners about how to understand and interpret these limitations and concerns as part of this transparency. Promoting transparency can facilitate trust from collaborators, stakeholders, fellow statistical practitioners, and the public users of statistical products. In addition, it helps minimize harm and improve the utility of AI in statistical practice.

## APPLY AND MAINTAIN PROFESSIONAL COMPETENCE

As AI becomes more powerful and takes on tasks with fewer human instructions, it can influence, replace, or override human decision-making and actions, which raises questions about the role and responsibilities of humans in the AI era. Ethical statistical practitioners should apply and maintain their professional competence and keep up to date with the latest developments in AI and statistical practice. Specifically, professional competence involves having the ability and skill to oversee the work, identify possible sources of error and bias, support work with robust methods, and have the domain knowledge to understand questions to be addressed.

Principle A in the ASA Ethical Guidelines calls on statistical practitioners to evaluate potential tasks, assess whether they have (or can attain) sufficient competence to execute each task, and acquire and maintain competence through building skills to maintain a high standard of practice.

## BE RESPONSIBLE AND ACCOUNTABLE

Principle A requires ethical statistical practitioners to take full responsibility for their work and support valid and prudent decision-making with appropriate methodology. As statistical practice is evolving toward delegating more work and even decision-making to AI, it is increasingly critical to emphasize that statistical practitioners (not AI) should assume responsibility, oversee automated solutions, and maintain their accountability when incorporating AI in statistical practice. They can reinforce this by implementing model governance, which involves setting up quality control review points, monitoring the models over time, and formulating a plan to

## LEARN MORE

The *Nature* article titled "The Global Landscape of AI Ethics Guidelines" notes the growing global convergence of AI ethics around five ethical principles: transparency; justice and fairness; non-maleficence; responsibility; and privacy. Find it at <https://go.nature.com/3OPFFNG>.

A report by the Royal Statistical Society and Institute and Faculty of Actuaries, titled "A Guide for Ethical Data Science," addresses the ethical and professional challenges in AI-assisted data science practice. Read it at <https://bit.ly/440PNHM>.

cope with possible review outcomes. Other efforts include clearly defining operating constraints and being open about what statistical operations can and cannot be done with AI.

## TAKE A PROACTIVE ROLE IN AI DEVELOPMENT IN STATISTICAL PRACTICE

Principle B in the ASA Ethical Guidelines states ethical statistical practitioners should develop and implement plans to validate assumptions and assess performance over time for models and algorithms designed to repeatedly inform or implement decisions. Promoting interpretable and transparent AI tools can make AI applications more trustworthy.

Statistical practitioners have a certain advantage in proposing transparent and rigorous modeling approaches. They can help build a more ethical environment for AI implementation by working with researchers from other fields to promote interpretability and validation in AI development and deployment. For example, many AI algorithms only provide a deterministic outcome without a valid measure of uncertainty. Statistical practitioners are trained to add confidence estimates to the findings. Their expertise can be valuable in making AI implementation more informative and statistically sound.

## IN A NUTSHELL

We recognize ethical issues in statistical practice in the AI era are complex and multifaceted. They arise from the development, deployment, and use of AI technologies that can have significant impacts on our society and the world. There are many challenges and uncertainties in translating ethical norms into practice. Ethical issues in statistical practice in the AI era require continuous attention, reflection, and dialogue among all parties involved. ■

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