

Stage of Research Workflow	Typical AI Use Cases	Author Declaration Required?	Editorial / Reviewer Scrutiny	Rationale
Idea Generation & Brainstorming	Generating research questions, refining hypotheses, exploratory prompts	No	None	Conceptual ideation does not affect reproducibility; responsibility lies in final design and execution.
Literature Discovery	AI-assisted search, summarization of papers, citation discovery tools	Optional / High-level	None	Equivalent in risk to advanced search tools; impact is indirect and non-determinative.
Study Design & Methods Planning	Drafting protocols, suggesting methodologies, experimental design support	Yes (high-level)	Moderate	Methods shape reproducibility; editors need assurance that final decisions were human-led.
Data Collection	AI-assisted instrumentation, automated data capture, image or signal preprocessing	Yes	Moderate to High	Data provenance and integrity must be transparent to assess downstream validity.
Data Cleaning & Preprocessing	Outlier detection, normalization, missing data handling	Yes	High	These steps materially affect results and must be reproducible.
Statistical Analysis & Modeling	AI-assisted statistical tests, model selection, parameter optimization	Yes (explicit)	High	Core analytical risk area; requires strong author responsibility and reproducibility assurances.
Code Generation or Debugging	Writing analysis scripts, simulation code, or pipelines	Yes (conditional)	High	Editors need confidence that code was reviewed, tested, and can be rerun independently.

Results Interpretation	AI-assisted explanation of findings, trend identification	Optional / Contextual	Moderate	Interpretation is scholarly judgment; concern arises only if AI substitutes for reasoning.
Figure & Image Generation	Creating plots, visualizations, or illustrative images	Yes (if data-derived)	Moderate	Visuals linked to data must be traceable and reproducible.
Writing, Editing & Translation	Drafting text, improving clarity, language editing, translation	No	None	Writing assistance does not affect data or methods; stylistic policing is inappropriate.