

# Generative Artificial Intelligence in Scientific Publishing: Ethical Governance, Challenges, and Responsibilities

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## ABSTRACT

**Background.** The rapid adoption of artificial intelligence (AI) in scholarly publishing is reshaping manuscript preparation, peer review, and editorial workflows. While AI-based tools offer opportunities to enhance efficiency, accessibility, and consistency in scientific communication, their use raises substantial ethical, epistemic, and governance-related concerns, particularly regarding research integrity, transparency, authorship, and accountability.

**Material and methods.** This narrative review synthesises current evidence on the application of AI in scientific publishing. The analysis integrates empirical studies, policy documents, and position statements from leading international organisations and journals, including COPE, ICMJE, JAMA, WAME, EASE, and GAMER. AI applications were examined across key stages of the publication process: manuscript drafting and language enhancement, figure and reference generation, editorial screening, reviewer selection, and peer review.

**Results.** AI tools demonstrably enhance linguistic quality, streamline editorial processes, and promote global inclusivity by reducing language barriers. However, recurrent risks were identified, including hallucinated content and references, algorithmic bias, lack of transparency ("black box" decision-making), confidential-

ity breaches, and misuse in peer review. Current policies consistently prohibit AI authorship and emphasise mandatory disclosure, yet substantial heterogeneity persists in permitted uses, reporting standards, and enforcement mechanisms across journals and publishers.

**Conclusions.** AI is becoming an integral component of scholarly publishing, offering meaningful benefits alongside significant risks. Responsible integration requires harmonised guidelines, transparent disclosure, rigorous human verification, and sustained editorial oversight. Preserving human judgment and accountability is crucial to ensuring research integrity and maintaining trust in the scientific record as AI technologies continue to evolve.

## Introduction

The rapid advancement of artificial intelligence (AI) has revolutionised healthcare management systems worldwide, unlocking new possibilities across domains such as genetic analysis, biomedical research, and clinical diagnostics [1]. Researchers, reviewers, and editors involved in scholarly publishing can utilise AI-based tools in various ways to support and enhance different stages of the scientific publication process [2].

Authors increasingly rely on AI-based tools that support academic writing, enhance linguistic clarity, manage references, assist with statistical analyses, and help ensure compliance with reporting standards. At the same time, editors and publishers are integrating AI-based tools to screen submissions for plagiarism, image manipulation, or ethical concerns; triage incoming manuscripts; validate references; and edit and prepare content for publication across various formats. As these technologies become embedded in editorial workflows, they are reshaping traditional practices and prompting a reconsideration of roles, responsibilities, and ethical boundaries among all stakeholders involved in academic publishing [2–4].

Moreover, the integration of AI into scientific writing presents a wide range of promising opportunities. Their ability to process and interpret extensive datasets enables the rapid generation of coherent, informative content, thereby supporting the synthesis of complex information at an unprecedented scale. In the future, such capabilities may facilitate the real-time integration of newly emerging evidence, thereby contributing to the faster dissemination and updating of scientific knowledge [5]. The integration of AI into academic practice heralds a new era

that broadens opportunities for researchers and authors while simultaneously enhancing the efficiency and overall quality of scholarly communication [6]. However, this potential is accompanied by notable challenges, particularly regarding research integrity, transparency, authorship, and accountability. Although the responsible use of AI can enhance the rigour and accessibility of scientific literature, improper or uncritical application of these tools may erode the credibility of research and diminish public trust. Consequently, a clear understanding of AI's capabilities, limitations, and broader implications is crucial for establishing responsible and equitable practices within an increasingly dynamic publishing ecosystem.

While the role of AI in scientific publishing has been extensively discussed in recent literature, most existing reviews focus on selected aspects of its application, such as AI-assisted writing or editorial workflows. In contrast, the present review aims to provide a more integrative perspective by systematically addressing multiple stages of the publication process – from manuscript preparation and statistical analysis to peer review and visual content generation – while simultaneously emphasising practical implications, current limitations, and emerging ethical challenges. By combining these dimensions, this work seeks to offer a more comprehensive and practice-oriented overview of AI-driven transformations in contemporary scientific publishing.

## Material and methods

This work was developed as a narrative review and expert-informed synthesis to provide a comprehensive conceptual overview of AI applica-

tions in scientific publishing. The review focused on key domains, including AI-assisted manuscript preparation and editorial and peer review, with particular emphasis on practical implementation, limitations, and ethical considerations. A literature search was conducted covering publications up to 2026, with a primary focus on studies from 2020 to 2026 to capture recent technological advancements. The search was performed using PubMed, Scopus, and Web of Science as the primary databases. Google Scholar was additionally used as a complementary tool to identify relevant articles not indexed in major biomedical databases.

The search strategy combined keywords and controlled vocabulary terms related to AI and scientific publishing. Terms were applied flexibly and iteratively rather than within a single predefined Boolean string, and included: "artificial intelligence", "AI", "large language models", "ChatGPT", "scientific publishing", "academic writing", "peer review", "editorial process", "statistical analysis", "data analysis", "image generation", and "research integrity". The search process was supplemented by manual screening of reference lists of selected articles to identify additional relevant publications. This approach allowed for the inclusion of both foundational and the most recent studies, reflecting the rapidly evolving nature of the field. Relevant guidelines and policy statements from international organisations were also considered.

Articles were initially screened based on titles and abstracts, followed by full-text evaluation for relevance to AI applications in the scientific publication workflow. Inclusion criteria comprised peer-reviewed articles, reviews, methodological studies, and guidelines addressing AI-supported processes in research writing, data analysis, or editorial practice. In contrast, studies unrelated to publication processes were excluded. To complement the literature review, the authors integrated domain knowledge and critical appraisal to synthesise the current evidence into a structured, practice-oriented overview. Given the heterogeneity of study designs, AI tools, and outcome measures, a quantitative synthesis was not performed. Instead, this work represents a qualitative integration of existing evidence and expert interpretation. As a narrative review, this work does not follow a formal systematic review protocol, which may introduce a risk of selection bias.

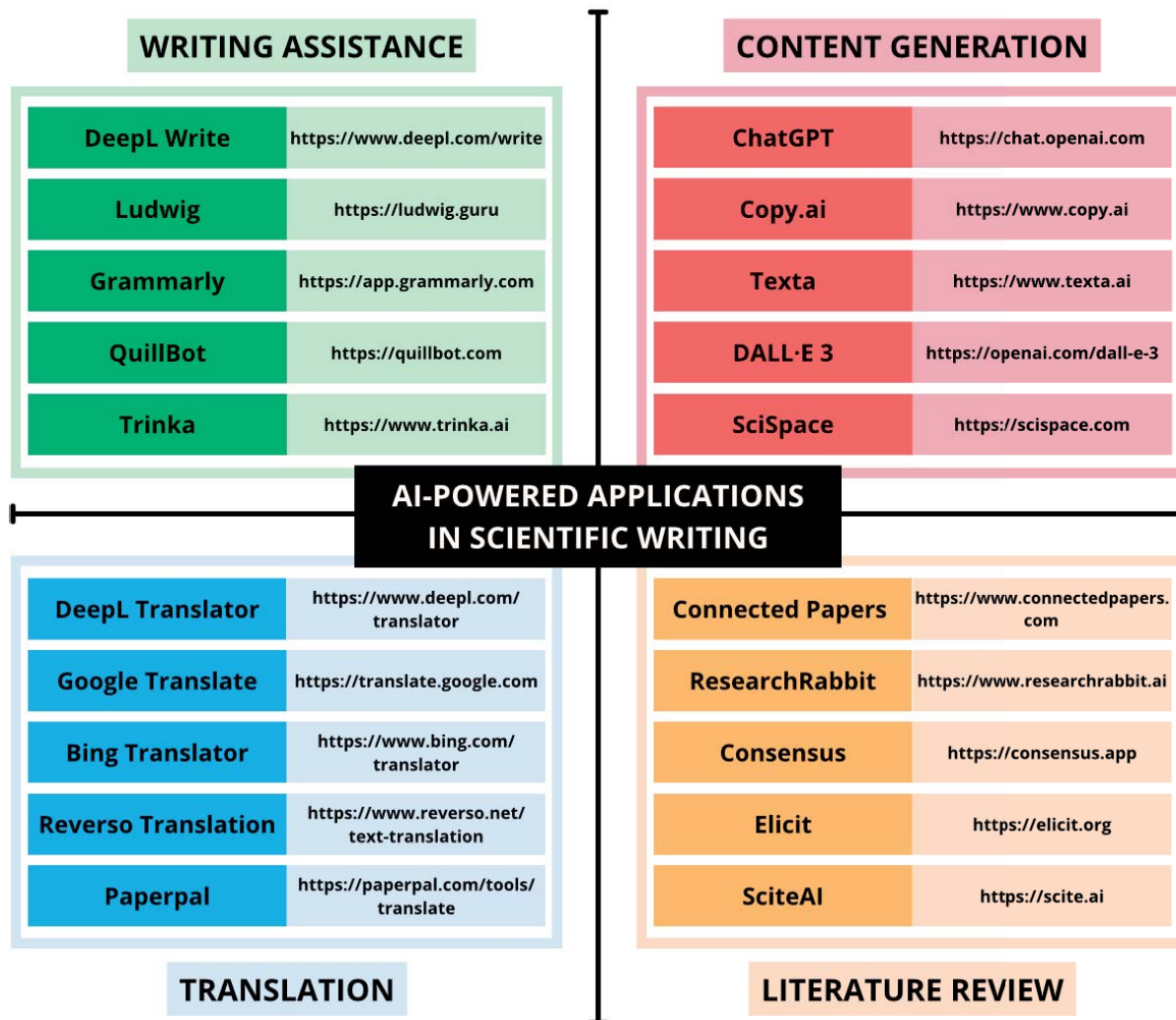
## AI Applications in Manuscript Preparation

Acting as a consistent and reliable writing assistant, AI can streamline the drafting process, refine the expression of complex concepts, and offer linguistically and stylistically informed suggestions, as illustrated by selected examples of AI-powered applications that support scientific writing, as shown in **Figure 1**. Moreover, its advanced proofreading functions help eliminate grammatical and syntactic inaccuracies, ensuring precision and stylistic coherence [7,8]. More broadly, AI technologies may contribute to a more inclusive and globally accessible scientific discourse by reducing language-related barriers. This expands the impact and visibility of research across disciplines and regions [9].

### Drafting and Language Enhancement

The integration of AI into scientific writing has significantly transformed the early phases of manuscript preparation, particularly idea generation and initial drafting. When guided by precise prompts, AI can help identify research directions, develop conceptual frameworks, or propose logical structures for literature reviews. Nevertheless, since AI systems rely on pre-existing datasets, their outputs may reflect inherent biases or reproduce mainstream perspectives, limiting originality and creativity [9,10]. Moreover, the phenomenon of artificial hallucination, in which AI generates fabricated yet plausible information or references, raises serious concerns about the factual accuracy of AI-assisted writing [9]. Hence, maintaining human oversight throughout the drafting process remains crucial to preserving factual integrity and scientific accuracy.

Beyond idea generation, AI offers notable advantages in editing and language enhancement, particularly for authors from non-English-speaking backgrounds. The available writing assistance tools offer much more than basic grammar, punctuation, and spelling checks. AI tools can improve fluency, clarity, and stylistic quality, reducing barriers to participation in international research communication. By reducing the need for costly editing services, they also promote greater linguistic equity and expand access to scholarly publishing [1,11,12]. Nevertheless, these tools must be used cautiously, as



**Figure 1.** Overview of selected AI-powered applications supporting scientific writing.

they may inadvertently alter meanings, introduce bias, or substitute critical terminology. Scholars are urged to review all AI-modified sections carefully and ensure consistency with the manuscript's original intent. Overreliance on AI-assisted editing may also contribute to deskilling among researchers, reducing the development of writing competence and critical thinking. Therefore, AI should be viewed as an auxiliary mechanism for improving language quality rather than a replacement for the author's intellectual input. Transparent and critical use of AI in the drafting and editing stages ensures that scientific writing remains both linguistically refined and ethically sound.

The rapid integration of AI into the writing process has prompted an ethical debate regarding authorship and accountability. Scholarly consensus now maintains that AI tools cannot be listed

as co-authors because they lack consciousness, moral agency, and the legal responsibility necessary to take ownership of a manuscript's content. While it may be argued that generative AI exhibits certain limited forms of authorial accountability, such as the ability to trace or explain the process of text generation, it nonetheless lacks the essential dimension of moral responsibility that underpins genuine accountability. Consequently, despite its technical sophistication, generative AI cannot fulfil the ethical and normative expectations associated with authorship in scholarly publishing. Furthermore, while accountability and responsibility are interrelated, they represent distinct dimensions of moral and legal agency: responsibility concerns the capacity to make and own deliberate choices, whereas accountability involves being answerable for those choices and their consequences. Since current AI tools lack

consciousness, self-awareness, and the ability to form intentional judgments, they cannot meaningfully bear either responsibility or accountability for the content they generate [13,14].

Instead, the use of generative AI should be clearly disclosed in the manuscript, typically in the Methods or Acknowledgements sections, along with information such as the model used, its version, and the date of application [2,15]. Transparent reporting enables editors and readers to evaluate AI's contribution to text production, ensuring that the integrity of the scientific record is maintained. The bibliometric analysis showed that guidance on the use of generative AI remains inconsistent and incomplete across major publishers and journals, with only a minority of publishers and a clear majority of top-ranked journals providing formal policies. Among those with established guidelines, most prohibit AI authorship, but substantial variability in permitted uses and disclosure requirements underscores the need for standardised, harmonised regulations to safeguard scientific integrity [15].

Authors remain fully accountable for verifying the factual accuracy of AI-generated material, correcting possible hallucinations, and ensuring that no plagiarism or uncredited paraphrasing occurs, as failure to do so undermines both research credibility and publication ethics.

### Figure and Visual Content Generation

The integration of AI into image generation has transformed visual communication in scientific publishing, particularly in the creation of graphical abstracts (GAs) and educational illustrations. A wide range of AI-powered text-to-image generation tools is currently available, including DALL-E (integrated with Microsoft Bing Image Creator), Stable Diffusion, Craiyon, and Gemini, which enable users to generate images from natural language prompts. These systems differ in their underlying architectures, training datasets, and levels of controllability, which directly influence the quality, realism, and domain-specific accuracy of the generated outputs [16]. AI-powered tools enable researchers to generate visually compelling summaries of complex data in seconds, thereby enhancing accessibility, readership, and engagement. GAs bridge the gap between traditional text abstracts and full manuscripts, enabling key findings to be quickly

grasped and visually contextualised [17]. Studies have shown that articles featuring GAs tend to attract greater visibility and media attention, reflecting a broader shift toward multimodal dissemination of research.

However, the use of AI in image generation also raises important concerns. Despite their efficiency, AI-generated images often lack anatomical precision. They may omit critical structural details, as demonstrated in comparative studies of medical illustrations depicting the skull, heart, and brain [16]. These limitations include the frequent omission of key anatomical landmarks, such as foramina in the skull, as well as inaccurate or absent suture lines, incomplete alveolar processes, and incorrect dentition, all of which compromise structural fidelity. In cardiovascular depictions, errors include incorrect origins of coronary arteries and misrepresented branching patterns of major vessels. At the same time, neuroanatomical illustrations often fail to accurately represent the spatial organisation of gyri, sulci, and interregional relationships within the brain [16]. Consistent observations have been reported in subsequent evaluations, in which even the most advanced AI generators demonstrated only partial anatomical fidelity, often producing visually plausible yet structurally inaccurate representations, particularly of osseous anatomy such as the thoracic cage or hand skeleton. Although some models performed relatively better at depicting gross morphology, such as overall heart or brain shape, discrepancies in the number, size, and spatial arrangement of anatomical components remained common, underscoring a limited anatomical grounding for these systems. Importantly, despite their aesthetic quality and rapid generation capabilities, such inaccuracies may render these images unsuitable for medical education or scientific communication without expert validation [18].

Furthermore, ethical challenges have emerged regarding the authenticity and potential falsification of AI-generated images, particularly in microscopy, where hybrid or fabricated images may go undetected by experts [19]. Issues of data provenance, consent for training images, and the perpetuation of bias further complicate the responsible use of these technologies. Consequently, while AI offers powerful tools for producing innovative and engaging scientific visu-

als, its application must be guided by rigorous ethical standards, human oversight, and continuous refinement to ensure both scientific accuracy and integrity. Moreover, current evidence suggests that these technologies cannot yet replace expert-generated medical illustrations and should instead be considered complementary tools requiring careful validation, particularly in high-stakes domains such as medical education, research, and clinical decision support.

### Reference Generation and Citation Assistance

Authors increasingly use AI-based reference generation and citation management tools to automate the process of formatting and sourcing bibliographic material. However, studies have shown that, while these tools are often fluent, they are not always factual. These tools can produce references that appear stylistically correct and contextually appropriate. They also generate bibliographic entries that are either entirely fabricated, incomplete, or incorrectly attributed to [9]. In a controlled experiment, ChatGPT provided references to nonexistent papers and occasionally reused identical titles with altered publication years when prompted for updated sources [20]. Also, Blanco-Gonzalez et al. [21] reported that only 6% of the references generated directly by ChatGPT were verified as correct. At the same time, the remaining citations either did not exist or referred to unrelated works. These occurrences, commonly termed hallucinations, pose significant challenges to academic integrity and scientific reliability.

Such errors, if uncorrected, propagate misinformation and compromise scientific credibility. The responsibility for verifying every reference and ensuring its existence and relevance rests solely with the human author. Because AI systems cannot be held morally or legally accountable for their outputs, authors remain fully responsible for the authenticity, accuracy, and traceability of every citation included in a manuscript. Ethical practice thus requires transparent reporting of any AI assistance in reference generation and confirmation that all citations were manually verified [22,23].

Beyond hallucination, another concern involves a lack of transparency. Current AI systems rarely disclose the provenance of suggest-

ed references or the databases, if any, from which they draw information. The opaque nature of their training data makes it impossible to evaluate the accuracy or recency of cited works. This "black box" problem underscores the importance of explicit human review, independent bibliographic verification, and thorough citation checking before submission. Authors should specify whether AI tools were used to suggest or format citations. All references must be independently validated against authentic bibliographic databases, such as MEDLINE/PubMed, Scopus, or Web of Science [24].

While AI can streamline citation management and reduce clerical effort, its current limitations, particularly hallucination, inaccuracy, and lack of transparency, require rigorous human oversight. Ultimately, authors are responsible for the authenticity, accuracy, and traceability of every reference included in a scientific manuscript. Responsible use of generative AI in citation generation thus hinges not on automation itself, but on maintaining ethical vigilance and scholarly integrity [25].

### Statistical Analysis and Data Interpretation

The integration of AI, particularly large language models such as ChatGPT, into statistical workflows has introduced new opportunities to streamline data analysis in medical research. AI tools can support multiple stages of the analytical pipeline, including data management, exploratory data analysis, statistical test selection, and result interpretation, thereby substantially improving research efficiency and accessibility [26]. For instance, ChatGPT has demonstrated utility in generating virtual datasets, performing data cleaning (e.g., handling missing values, renaming variables, and detecting outliers), and producing rapid descriptive summaries and visualisations, enabling researchers to gain immediate insights into dataset structure and distributions. Furthermore, it can assist in selecting appropriate statistical methods based on the type of data, the number of samples, and the purpose of the analysis, as well as in providing preliminary interpretations of statistical outputs, including p-values and correlation patterns [26].

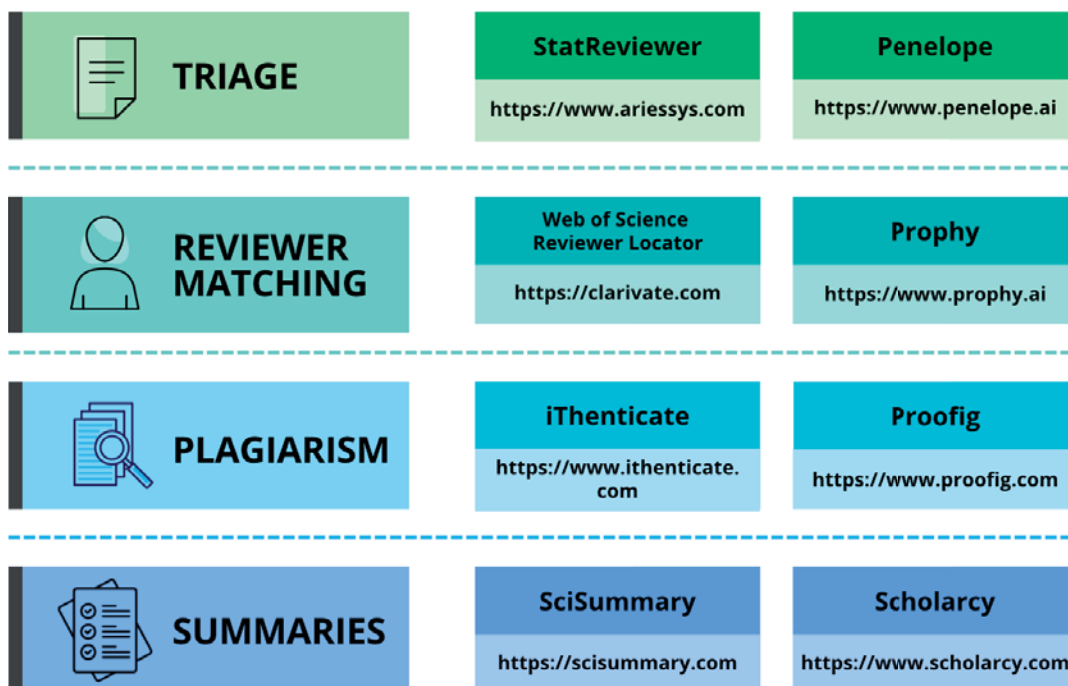
Despite these advantages, important limitations constrain the reliability and autonomy of AI-assisted statistical analysis. The accuracy of

AI-generated outputs remains variable and highly dependent on prompt quality, with challenges observed in more complex or nuanced analytical tasks. Moreover, such models frequently fail to adequately assess key statistical assumptions (e.g., normality and homogeneity of variance), which may lead to inappropriate test selection and potentially invalid conclusions [26]. Similar observations have been reported in broader evaluations of AI applications in medical research, where large language models were shown to support tasks such as analytical code generation, reproduction of basic statistical procedures, preliminary selection of statistical tests, and detection of formal errors; however, their performance remains highly variable, with reduced reliability in complex analytical scenarios and insufficient consideration of key statistical assumptions, underscoring the need for expert oversight, independent validation, and context-aware interpretation [27]. Additional risks include overreliance on AI-generated outputs, potential misinterpretation of findings due to the authoritative tone of responses, and concerns related to data privacy and security when handling sensitive medical datasets [26]. Consequently, while AI holds considerable promise in enhancing the efficiency

and accessibility of statistical analysis, its use must be accompanied by transparent reporting, adherence to ethical guidelines, and sustained involvement of domain experts to ensure scientific rigour and reproducibility [26,27].

## Editorial and Peer Review Considerations

AI technologies have rapidly permeated editorial workflows and peer review systems, reshaping how manuscripts are screened, evaluated, and processed. While these tools promise efficiency, consistency, and scalability, they also raise pressing ethical concerns regarding transparency, confidentiality, accountability, and the preservation of human judgment in scholarly decision-making. The following sections analyse the principal domains of AI integration in editorial and peer-review practices, highlighting both opportunities and risks and providing recommendations for responsible governance. **Figure 2** illustrates representative AI applications in this context, including manuscript triage, reviewer matching, plagiarism detection, and automated summarisation.



**Figure 2.** Overview of selected AI-powered applications in editorial and peer review workflows.

## Manuscript Screening and Editorial Pre-Assessment

AI-driven manuscript screening has become an integral part of contemporary editorial management, particularly during the pre-peer review phase. Automated systems are increasingly used to perform initial checks, including plagiarism detection, formatting validation, scope verification, and assessment of linguistic quality and clarity of expression [28–30]. Such pre-screening processes enable editors to identify manuscripts that fail to meet essential quality or ethical standards before peer review, thereby expediting decision-making and allowing human reviewers to focus on substantive scientific evaluation. By automating these preliminary steps, AI technologies have significantly enhanced editorial efficiency while helping to maintain academic integrity across an increasing volume of submissions.

Despite these benefits, ensuring originality in an era of generative AI presents unprecedented challenges. Advanced algorithms can detect textual similarities across vast corpora, yet authors increasingly employ paraphrasing strategies, such as synonym substitution, reordering of phrases, or partial rewording, to evade detection [31,32]. The growing sophistication of AI-generated or AI-assisted writing further complicates the distinction between authentic and machine-altered text, highlighting the need for approaches that incorporate semantic and contextual analysis to identify subtle forms of text manipulation [33].

Nevertheless, significant ethical and procedural concerns persist. Questions remain about data privacy, ownership, and the potential misuse of manuscripts stored in proprietary databases, particularly if unpublished work is reused for model training or misclassified in future screenings [30]. Moreover, automated systems can misinterpret legitimate textual reuse, such as self-citation or standard methodological descriptions, as plagiarism, leading to reputational harm or unfair rejection. They may also perpetuate biases by disproportionately penalising non-native English authors or researchers from low-resource institutions, where linguistic imperfections do not necessarily reflect scientific weakness [34].

Therefore, AI-based integrity assessments should be viewed as advisory instruments rath-

er than definitive arbiters of editorial judgment. Human editors must remain the ultimate decision-makers, capable of interpreting algorithmic outputs within the broader ethical and contextual landscape of scientific communication.

## Reviewer Identification and Matching Algorithms

One of the most transformative applications of AI in scholarly publishing is reviewer selection and matching. AI-driven systems, trained on bibliometric data, keyword networks, citation analyses, and prior co-authorship patterns, can efficiently identify reviewers whose expertise aligns with a manuscript's subject matter. By automating this traditionally labour-intensive process, AI substantially reduces editorial workload, accelerates turnaround times, and enhances the overall consistency and transparency of peer review. Some advanced platforms also integrate conflict-of-interest detection, assigning impartiality scores based on institutional affiliations, publication overlaps, or prior collaborations to ensure compliance with ethical standards. Beyond efficiency, AI systems expand the potential reviewer pool by identifying suitable experts beyond editors' immediate professional networks. The application of consistent selection criteria promotes procedural fairness and may reduce subjective biases [35].

However, empirical analyses indicate that such systems face notable limitations. Their performance tends to decline in interdisciplinary contexts, where they struggle to interpret nuanced methodological or theoretical distinctions. Furthermore, AI tools often display a preference for senior or highly visible researchers, occasionally suggesting individuals who are too prominent or even fictional to serve as realistic reviewers. The fact that approximately 10% of algorithm-generated reviewer suggestions are non-existent highlights the ongoing need for human oversight and verification in the reviewer selection process [35].

Algorithmic bias constitutes one of the central ethical challenges in AI-assisted reviewer selection. Evidence suggests that algorithmic recommendations often display a systematic preference for researchers affiliated with prominent North American and European institutions, reflecting underlying geographical and institutional imbalances within the training data. Con-

sequently, early-career and marginalised scholars risk being underrepresented in reviewer pools [36]. Although AI has the potential to broaden participation and enhance diversity in reviewer selection, these benefits may be undermined if algorithms are not carefully designed, continuously monitored, and regularly audited. Equally concerning is the limited transparency of algorithmic decision-making – the so-called “black box” problem – which obscures how and why specific reviewers are recommended [37]. This opacity can diminish accountability and make it difficult for editors to identify or correct embedded biases. Furthermore, the automated analysis of researcher profiles introduces sensitive questions regarding data privacy, informed consent, and the ethical management of personal information [38]. These challenges collectively underscore the necessity of sustained human oversight in AI-driven reviewer selection, particularly in interdisciplinary contexts where contextual understanding remains crucial.

To address these risks, journals should establish transparent algorithmic criteria and conduct regular audits of reviewer-selection outcomes. Editorial teams must retain discretion to override automated suggestions and proactively diversify reviewer networks to ensure inclusivity. Ultimately, achieving an equitable balance between automation and human judgment remains essential for ensuring fairness, reliability, and accountability in AI-assisted peer review.

### **AI-Assisted Peer Review: Efficiency and Ethical Boundaries**

Reviewers increasingly use generative AI models to summarise manuscripts, draft structured feedback, and check grammar or factual consistency. These tools can significantly enhance efficiency, particularly when reviewing lengthy or highly technical submissions. By automatically identifying grammatical errors, stylistic inconsistencies, and discrepancies in terminology or references, AI allows reviewers to focus on the scientific substance of a paper – its methodology, results, and conceptual contributions [39,40]. Beyond linguistic support, AI can strengthen the overall integrity and quality of manuscripts. By cross-referencing submissions with extensive databases of academic literature, AI systems can identify potential ethical concerns, such as plagiarism or data

manipulation, at an early stage. This enables editors and reviewers to focus more effectively on assessing the novelty, validity, and rigour of the research [41]. In addition, AI-generated templates and structured review aids can help reviewers organise their assessments coherently, ensuring that key aspects, such as originality, ethical compliance, and methodological soundness, are systematically addressed. By streamlining technical checks and facilitating clearer, more consistent evaluations, AI serves as a valuable partner in making the peer review process both more efficient and more constructive [42].

Despite these advantages, significant limitations and ethical concerns remain. Although AI excels in processing language and identifying textual patterns, it lacks the deep subject-matter expertise and critical reasoning required to assess the conceptual depth or theoretical significance of scientific work. As a result, AI-generated feedback, while often coherent and well-structured, may overlook subtle methodological flaws, misinterpret complex arguments, or fail to recognise the true novelty and impact of research. Overreliance on AI-generated suggestions could therefore compromise the rigour of peer review, particularly in fields where nuanced expert judgement is indispensable [43]. Furthermore, the opacity of algorithmic decision-making complicates accountability and transparency, as the rationale behind specific outputs or recommendations is rarely clear. This uncertainty raises important questions about responsibility, reliability, and the overall trustworthiness of AI-assisted peer review. The epistemic value of peer review lies in its reflective and critical evaluation, something that current AI systems cannot replicate.

The use of AI tools also raises significant procedural concerns. When reviewers input unpublished manuscripts into external AI systems, they risk breaching confidentiality agreements or violating data protection laws, as many platforms store or reuse submitted material for model training. Handling sensitive, unpublished data via unsecured AI tools also exposes authors to risks related to data privacy, intellectual property, and unauthorised content use. To safeguard the integrity of the review process, journals and publishers must implement robust data protection measures, including encryption, secure storage,

and controlled access, to ensure full compliance with ethical and legal standards [44].

To preserve the epistemic and ethical integrity of peer review, transparency and human oversight are essential. Reviewers should always disclose any use of AI during the evaluation process, and journals must establish explicit policies delineating acceptable and unacceptable practices. Regular auditing, documentation of AI use, and reviewer training in ethical AI literacy are vital to ensuring responsible adoption. Ultimately, AI can serve as a valuable partner in peer review, enhancing efficiency, consistency, and quality, but it must remain firmly subordinate to human expertise, judgment, and ethical responsibility [25,45].

## Guidelines and Recommendations

The responsible integration of AI into scientific publishing requires clear, harmonised guidance from leading organisations and editorial boards. Existing recommendations address key aspects such as authorship, disclosure, accountability, and the role of editors and reviewers, reflecting a growing consensus on the need for transparency and human oversight. The following section discusses these guidelines in detail, outlining their implications for research integrity and publication ethics, while **Figure 3** provides a structured overview of the principal recommendations across major organisations.

ORGANIZATION	AI AND AUTHORSHIP	AI USE AND DISCLOSURE	RESPONSIBILITY AND ACCOUNTABILITY	AI AND EDITORS/PEER REVIEWERS
COPE	AI tools cannot be listed as authors.	Authors must disclose AI use, including tool name and purpose, in the Methods or similar section.	Authors are fully responsible for all manuscript content, including that generated by AI.	Editors should apply human oversight and ensure confidentiality; AI must not replace editorial judgment.
ICMJE	AI tools cannot be listed as authors.	AI use must be disclosed in the Method section, with a clear description of its role.	Authors are accountable for accuracy, originality, and plagiarism prevention.	Reviewers and editors must not upload confidential manuscripts to AI tools; confidentiality must be protected.
CSE	AI tools cannot be listed as authors.	Authors must declare AI use and provide technical details if requested. Editorial policies should define how AI-assisted content must be acknowledged, including potential requirements for technical specifications such as name, version, model, or query structure.	Human authors remain responsible for all aspects of the manuscript.	Editors should use discretion and rely on author declarations due to limits of AI-detection tools.
WAME	AI tools cannot be listed as authors.	Authors must disclose tool name, version, and scope of AI use; prompts may be shared for transparency.	Authors are responsible for verifying accuracy, correcting bias, and avoiding plagiarism.	Editors and reviewers should not use AI for manuscript evaluation or review writing; confidentiality must be maintained.
EASE	AI tools cannot be listed as authors.	Any use of AI in writing, editing, data analysis, code generation, visualization, or other research activities must be clearly disclosed.	Authors and reviewers are responsible for compliance and content reliability.	Reviewers should follow journal AI policies; editors must inform about use of AI-detection tools.
JAMA	AI tools cannot be listed as authors.	AI use must be disclosed in acknowledgements; basic grammar tools are exempt.	Authors are responsible for integrity, intellectual property, and AI-related bias.	Reviewers must not use AI tools that could compromise manuscript confidentiality.
GAMER	Not reported.	Detailed reporting of AI use required, including tool name, version, prompts, and scope.	Authors must verify AI-generated content, ensure data privacy, and assess bias.	The inclusion of explicit reporting items (e.g., prompts, verification, tool specifications) is designed to streamline and strengthen the peer-review process.

**Figure 3.** Overview of selected guidelines and recommendations for the use of AI in scientific publishing. Legend: COPE, Committee on Publication Ethics; ICMJE, International Committee of Medical Journal Editors; CSE, Council of Science Editors; WAME, World Association of Medical Editors; EASE, European Association of Science Editors; JAMA, Journal of the American Medical Association; GAMER, Generative AI in Research and Publishing.

### **Committee on Publication Ethics (COPE)**

The COPE position reiterates that AI tools do not meet the requirements to be recognised as co-authors, since they cannot take responsibility for the content of a publication, including addressing conflicts of interest or copyright agreements. Authors who use AI tools are obliged to disclose the fact of their use, as well as the manner or extent, in the appropriate sections – mainly in Materials and Methods if this concerns writing the article, preparing figures, or collecting and analysing data. The authors alone bear full responsibility for the content presented in the manuscript, including content generated directly by AI tools [46].

### **Council of Science Editors (CSE)**

CSE guidance states that AI tools should not be considered co-authors because, as non-human entities, they cannot be held accountable for the fundamental requirements of authorship, such as the accuracy, integrity, and originality of the submitted work. They also cannot hold or transfer copyright. Authors must disclose the use of AI tools during manuscript preparation. At present, journals ask authors to declare and describe the extent of AI use, for example, in the cover letter. This should be described in detail in the policy of the given journal, and the editorial office may require technical details. However, it is the human authors who bear responsibility for all aspects of the prepared manuscript, including appropriate content and issues such as plagiarism. Tools for detecting AI-generated text are becoming available, but as long as they remain unreliable, editors must rely on authors' honest declarations in this matter [47].

### **Journal of the American Medical Association (JAMA)**

JAMA Network Guidance has outlined recommendations for researchers in their role as authors. Their position is based on the necessity of transparent reporting of authors' use of AI technologies, in the interest of fairness to editors and readers. If AI technologies were used to create, edit, or revise any part of a manuscript, authors should disclose this in the Acknowledgements section, providing detailed information about the tool used and the scope of its application to specific parts of the work. Furthermore, authors

must confirm that they take full responsibility for the integrity of the generated content.

The guidance emphasises that this does not apply to basic tools used for checking grammar and spelling or for generating reference lists. By contrast, if AI technologies are employed during the design and conduct of a scientific project, researchers should follow the relevant guidelines for the selected study design (e.g., CONSORT-AI, SPIRIT-AI). In such cases, sensitive patient-identifying data must not be introduced in text, tables, or figures. Authors must also be aware of intellectual property compliance regarding AI-generated content, for example, in the case of images, and indicate the rights or permissions to publish such AI-modified material.

In the Methods section, detailed descriptions should be provided regarding the use of AI in specific stages of the research study. Authors are also encouraged to describe methods and analyses with reference to AI-related bias in methodology and results. In the Results and Discussion sections, attention should additionally be given to identified potential AI-related biases, inaccuracies of AI-generated content, and similar issues [48].

### **International Committee of Medical Journal Editors (ICMJE)**

The ICMJE has updated its Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals to address issues related to the use of AI tools. The use of AI technologies to support manuscript preparation should be disclosed in the Acknowledgements section and described in detail in the cover letter at the time of submission. AI cannot be listed as a co-author because it does not meet all four required authorship criteria. Only humans can take full responsibility for the accuracy, integrity, and originality of the work, including content generated with AI-based tools. Authors are obliged to carefully review AI-generated material, as it may be incorrect or incomplete. Moreover, content produced by AI may infringe copyright and constitute plagiarism and verifying this also falls under the authors' responsibility. The same applies to checking the validity and accuracy of references suggested by AI.

About confidentiality, editors must be cautious and aware that the use of AI in manuscript processing may violate authors' rights. Similar-

ly, during the peer review process, reviewers are bound to respect the confidentiality of the manuscripts they assess. Uploading files to AI tools by reviewers exposes authors to the risk of their research results being disclosed before publication. Journals must clearly define policies for reviewers that either prohibit or regulate the use of AI technologies in this process. Reviewers must also remain aware that AI-generated professional-sounding comments may be incomplete, biased, or contain errors.

Authors using AI technologies to conduct research are required to provide a detailed description of the tools employed, including prompts, in the Methods section so that other researchers can replicate these procedures [49].

### **World Association of Medical Editors (WAME)**

WAME warns that chatbots retain the content entered into them and may use it in future responses. Therefore, to preserve confidentiality in the processing of articles, caution should be exercised when using AI technologies, whether as an author, editor, or reviewer. In addition, WAME highlights three main areas of AI tool use: simple editorial tasks (e.g., grammar correction), text generation, and scientific research. Five key recommendations have been developed.

The first reaffirms, in line with ICMJE guidelines, that AI tools cannot be listed as co-authors of publications, since they cannot provide final approval, understand conflicts of interest, or sign required statements—the next two recommendations concern authors' obligations. Authors must provide detailed information about the types of AI tools used and the scope of their application. In cases of writing assistance, such use of AI should be specified in the Acknowledgements section. If AI is responsible for the analytical part of a study and for reporting results in tables or figures, then authors should describe this in the abstract and Methods section, presenting the tool and full prompts to ensure replication by other researchers. Moreover, authors are fully responsible for all material generated by AI tools, including accuracy, content correctness, and the avoidance of plagiarism. They must also verify the validity of references cited to support claims generated with AI technologies.

The final two recommendations concern others involved in the publication process – editors and

reviewers. Neither group should use AI to evaluate manuscripts, write reviews, or draft correspondence. If they do, such use should be disclosed and justified. Editors and reviewers remain responsible for chatbot-generated content and for any risks of violating manuscript confidentiality when uploading it into chatbots. Furthermore, editors should have appropriate tools for detecting AI-generated or AI-modified content. Especially in medical journals, such tools should be widely accessible to strengthen the integrity of medical information and prevent unnecessary health complications [50].

### **European Association of Science Editors (EASE)**

EASE has developed recommendations for editors, journals, publishers, authors, and reviewers. The main recommendation concerns the creation, publication, and monitoring of an AI policy by journals, so that it is accessible to all participants in the publication process. In parallel, separate statements should be developed and collected regarding the declaration of AI use.

An AI policy for scholarly publications should address several key issues. AI tools cannot be listed as co-authors on a paper (as they do not meet the ICMJE criteria for authorship). All references suggested by AI must be verified by authors and reviewers, as they may be fabricated or inaccurate. The use of AI tools for data collection, analysis, or interpretation must be described in detail to ensure reproducibility. A similar requirement applies to the use of AI technologies to create visualisations included in the manuscript.

The AI policy should also clearly state whether the use of AI tools for language, grammar, or style editing should be acknowledged in the Acknowledgements section, or whether it is treated similarly to spell-checking software and thus does not need to be declared. Regarding peer review, clear guidelines should be established on whether reviewers may use AI tools to assist with the process. Additionally, editorial offices should inform authors and reviewers whether they employ screening tools to detect AI use in manuscript preparation or review reports. However, it should be noted that such tools are not perfect and may fail to distinguish between an entirely AI-generated text and one that AI has merely edited. For this reason, there must be procedures in place to appeal allegations of violating permitted AI-use policies.

Both authors and reviewers should carefully familiarise themselves with the AI policy published on the journal's website and declare any use of AI tools during the publication process [51].

### **Generative Artificial intelligence tools in Medical Research (GAMER)**

The most recent recommendations were issued in 2025 and are summarised under the acronym GAMER (Generative Artificial Intelligence Tools in Medical Research). This statement is based on a checklist consisting of nine questions/topics. The first question essentially determines whether completion of the rest of the questionnaire is required. If authors have used AI tools at any stage of preparing their work, in any way, they must report this in detail in the manuscript for greater transparency, and then proceed with the remaining questions. Tools used solely for text translation do not need to be reported.

In the subsequent items, authors are required to provide the specific type of AI tool used, its version, and the period of use. It is recommended that original prompts and responses be made available – e.g., in supplementary materials – to allow verification during the publication process. If a new AI tool has been developed based on an existing model, all relevant parameters of the underlying model must also be disclosed.

Another key point concerns the detailed description of how AI tools were used at different stages of preparing and editing the manuscript. The statement even recommends reporting the use of AI for language polishing, while emphasising that authors remain fully responsible for the final content. Beyond the stages of manuscript preparation, authors should indicate the specific sections to which AI contributed.

The final items concern transparency, accountability, and awareness of the biases introduced using AI tools. Authors must specify how they verified the authenticity and correctness of AI-generated content. If no human verification was performed (for example, checking whether sentence meaning was preserved), this must be justified. Authors must also describe how they safeguarded the privacy and confidentiality of both authors and study participants, including removing all sensitive data from uploaded materials.

Ultimately, authors bear responsibility for the accuracy and integrity of the entire manuscript.

However, they are also obliged to report AI use as a potential source of bias and to describe how it may have affected the results. In cases of language polishing, if appropriate prompts were used, this risk is considered minimal [52].

### **Comparative Synthesis of Guidelines and Recommendations**

Across the analysed guidelines, a consistent core position is evident: AI tools do not fulfil authorship criteria and therefore cannot be listed as authors. At the same time, full responsibility and accountability for all content remain with human contributors. Most organisations also converge on the principle of transparency, requiring disclosure of AI use, particularly when it contributes to manuscript preparation, data analysis, or visual content generation, and emphasise that AI should remain an assistive tool subject to continuous human oversight. At the same time, meaningful differences are observed in the level of specificity and practical application of these recommendations. Some organisations provide detailed instructions regarding the location, scope, and format of disclosure, whereas others adopt more general statements, resulting in variability in reporting practices across journals. Divergence is also apparent in the regulation of AI use in peer review, ranging from restrictive positions due to confidentiality concerns to conditional acceptance with mandatory disclosure. In addition, inconsistencies persist regarding whether routine language editing constitutes reportable AI use. Importantly, several areas remain insufficiently addressed across guidelines, including standardised reporting frameworks, clear boundaries for AI-assisted data analysis, and mechanisms for verifying and enforcing the disclosed use. Although concerns related to data privacy, intellectual property, and algorithmic bias are widely acknowledged, they are seldom reflected in clear procedural guidance, highlighting the need for more harmonised and enforceable standards.

### **Limitations**

This review has several limitations that should be considered when interpreting its findings. First, because this is a narrative rather than a systematic review, the methodology does not follow

a predefined protocol with formal risk-of-bias assessment or quantitative synthesis, which may introduce selection bias and limit reproducibility. Second, the rapidly evolving nature of AI technologies and related editorial policies means that some recommendations and practices discussed herein may become outdated as new tools, regulations, and institutional guidelines emerge. Third, the included literature is inherently heterogeneous, encompassing empirical studies, narrative reviews, policy statements, and expert opinions, thereby limiting direct comparability and precluding definitive conclusions regarding effectiveness or impact. Moreover, a substantial proportion of the current evidence base consists of editorials, commentaries, and consensus guidelines rather than robust comparative or longitudinal empirical studies, reflecting the early stage of research in this field. Finally, variability in journal- and publisher-specific policies, as well as differences in implementation across disciplines, may affect the generalisability of the conclusions. Taken together, these limitations underscore the need for future systematic investigations and high-quality empirical research to better inform evidence-based guidance on integrating AI into scholarly publishing.

## Conclusions

Generative AI is increasingly integrated into scientific publishing, offering substantial benefits such as improved efficiency, enhanced language quality, and support across multiple stages of the research and editorial workflow, including manuscript preparation and peer review. However, its adoption also raises critical concerns regarding research integrity, transparency, authorship attribution, accountability, and data confidentiality. Despite the growing number of international guidelines, current policies remain heterogeneous, particularly regarding disclosure requirements and permitted uses, highlighting the need for greater harmonisation among publishers and journals.

Future efforts should prioritise developing standardised, universally applicable frameworks for reporting AI use in scientific manuscripts, including clear definitions of acceptable applications and mandatory disclosure of the tool type, version, and scope of use. In parallel, robust

empirical studies are needed to evaluate the effectiveness of existing AI governance policies and their impact on research quality, bias mitigation, and editorial decision-making. Strengthening human oversight, ensuring mandatory verification of AI-generated content, and establishing transparent auditing mechanisms will be essential to safeguard scientific integrity as AI technologies continue to evolve.

## Declarations

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The authors declare no conflict of interest.

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