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Peer Review

Review of: "Adverse Environmental and Public Health Effects of Artificial Intelligence: A Comprehensive Review"

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This manuscript presents an ambitious and wide-ranging review of the adverse environmental and public health impacts of artificial intelligence. Overall, it is a **substantial and timely contribution** to the growing interdisciplinary literature on Sustainable AI, planetary health, and environmental responsibility. The author brings together evidence from environmental science, public health, AI ethics, and political economy in a way that is rarely attempted with such breadth.

The paper's central strength lies in its **integrative framing**. Rather than treating AI as a purely digital or informational technology, the review consistently situates it within material infrastructures: energy systems, extractive supply chains, water use, labor markets, and waste streams. This lifecycle perspective, combined with an explicit environmental justice lens, allows the manuscript to illuminate how the costs of AI development and deployment are unevenly distributed across populations and regions. In this respect, the paper moves beyond much of the existing "green AI" literature, which often focuses narrowly on computational efficiency or carbon metrics while overlooking broader social and health consequences.

The environmental analysis is generally thorough and well-supported. The discussion of energy demand, carbon emissions, water use, e-waste, and air pollution reflects a careful engagement with the current evidence base, including recent estimates from the IEA and peer-reviewed life-cycle assessments. Quantitative figures are presented with appropriate contextualization, and the author is generally attentive to variability and uncertainty. Particularly valuable is the emphasis on inference-phase energy use, which remains underappreciated in many public discussions of AI sustainability.

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The sections on public health impacts beyond environmental pathways are also a strong component of this paper. The treatment of algorithmic bias in healthcare is grounded in well-established empirical work, and the links to health inequities are clearly articulated. The discussion of misinformation, mental health, privacy erosion, and occupational displacement appropriately situates AI within broader social determinants of health. Importantly, the manuscript avoids treating these issues as merely ethical concerns, instead framing them as concrete public health risks with population-level implications.

The attention to **vulnerable populations**—including children, older adults, and persons with disabilities—adds further depth and reinforces the public health relevance of the review. Likewise, the global perspective, particularly regarding mineral extraction and e-waste flows affecting the Global South, strengthens the environmental justice argument and avoids a narrow Global North focus.

The policy discussion is measured and pragmatic. The overview of the EU AI Act and the more fragmented U.S. regulatory landscape is accurate, and the proposed mitigation strategies are sensible and appropriately multi-level. Rather than offering purely technical fixes, the manuscript emphasizes transparency, governance, circular economy principles, and social protections, which aligns well with contemporary sustainability thinking.

The author is also commendably explicit about the **limitations of the evidence base**. The discussion of data opacity, reliance on grey literature, rapid technological change, and challenges of causal attribution demonstrates methodological self-awareness and helps temper overly deterministic interpretations of the findings.

There are, however, a few areas where the manuscript could be strengthened.

First, while the narrative review approach is clearly stated, the **methodological description** could benefit from slightly greater transparency. Even a brief indication of approximate numbers of screened and included studies, or clearer criteria for prioritizing certain quantitative estimates, would improve reproducibility and reader confidence without requiring a full systematic review framework.

Second, the manuscript is intentionally focused on adverse impacts, which is legitimate given its aims. Nonetheless, in some passages—particularly in the conclusions—the tone approaches a degree of normative certainty that may invite pushback. A brief acknowledgment that certain AI applications, under strict governance and appropriate scale, may yield net environmental or health benefits would enhance analytical balance while leaving the core argument intact.

Third, in the discussion of misinformation, mental health, and labor displacement, clearer distinctions between **association, amplification, and causation** would strengthen epidemiological precision. While these nuances are acknowledged in the limitations section, occasional reminders in the main text would help avoid overinterpretation.

Finally, although "AI" is necessarily treated as a broad category, the paper would benefit from more explicit differentiation between **current dominant deployment models** (large-scale, commercial, generative, and platform-based systems) and smaller-scale or public-interest AI uses. Clarifying that the critique targets prevailing trajectories rather than AI as an abstract technology would sharpen the argument conceptually.

Recommendation: accept with minor revisions.

Declarations

Potential competing interests: No potential competing interests to declare.