



# Reply: evaluating text and visual diagnostic capabilities of large language models on questions related to the Breast Imaging Reporting and Data System (BI-RADS) Atlas 5<sup>th</sup> edition

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## KEYWORDS

BI-RADS, breast radiology, ChatGPT, large language models, retrieval-augmented generation

## Dear Editor,

We sincerely thank the author for their insightful comments<sup>1</sup> and valuable suggestions regarding our manuscript titled "Evaluating text and visual diagnostic capabilities of large language models on questions related to the Breast Imaging Reporting and Data System Atlas 5<sup>th</sup> edition."<sup>2</sup> We appreciate the author's interest and the constructive proposal to incorporate retrieval-augmented generation (RAG) methodologies.<sup>1</sup>

We fully agree that employing RAG could enhance the accuracy, contextual relevance, and reliability of responses generated by large language models (LLMs), particularly when addressing complex clinical scenarios such as those encountered in breast radiology.<sup>2</sup> As noted, RAG effectively mitigates limitations inherent in static models, including knowledge gaps and the risk of hallucinations, by dynamically retrieving relevant external information.<sup>3,4</sup>

The examples provided by the author, including the promising results reported by Tozuka et al.<sup>5</sup> in lung cancer tumor, node, metastasis staging using Google's NotebookLM with RAG, clearly demonstrate the considerable potential of this approach in radiological contexts.

Given these compelling points, we agree that incorporating RAG methodologies in future research would be highly valuable. Our current study did not include RAG, as its initial scope was limited to evaluating the inherent capabilities of standalone LLMs compared with radiologists based solely on the models' existing training data. Nonetheless, we acknowledge that future investigations involving retrieval-based augmentation could yield further insights into enhancing LLM performance in clinical radiology decision-making and guideline adherence.<sup>6</sup>

We appreciate the constructive input and believe that combining LLMs with RAG techniques in future work could substantially advance radiology education and clinical practice.

Thank you again for your thoughtful recommendations and contribution to this important discussion.

## Footnotes

## Conflict of interest disclosure

The authors declared no conflicts of interest.

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