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Evaluating Large Language Models for Accuracy and Misinformation in HPV Vaccine Communication

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INTRODUCTION & AIM

- The HPV vaccine is incredibly effective in preventing persistent HPV infections, which are linked to six different types of cancers and genital warts[1].
- The HPV vaccine is recommended for children starting at age 9 and adolescents and young adults (AYAs) who did not complete the HPV vaccine series by age 26.[2] However, the HPV vaccination rates are disappointingly low.
- Among the several factors that contribute to low HPV vaccination rates is social media misinformation which is a growing concern[3].
- With the advent of generative artificial intelligence (AI), this challenge may be further compounded as they are increasingly used for self-education, symptom checking, and even challenging diagnoses.
- We, therefore, examined responses to HPV vaccine-related questions from two widely used LLMs, ChatGPT (Version 5) and Gemini (version 2.5) to assess the accuracy and presence of misinformation.

METHOD

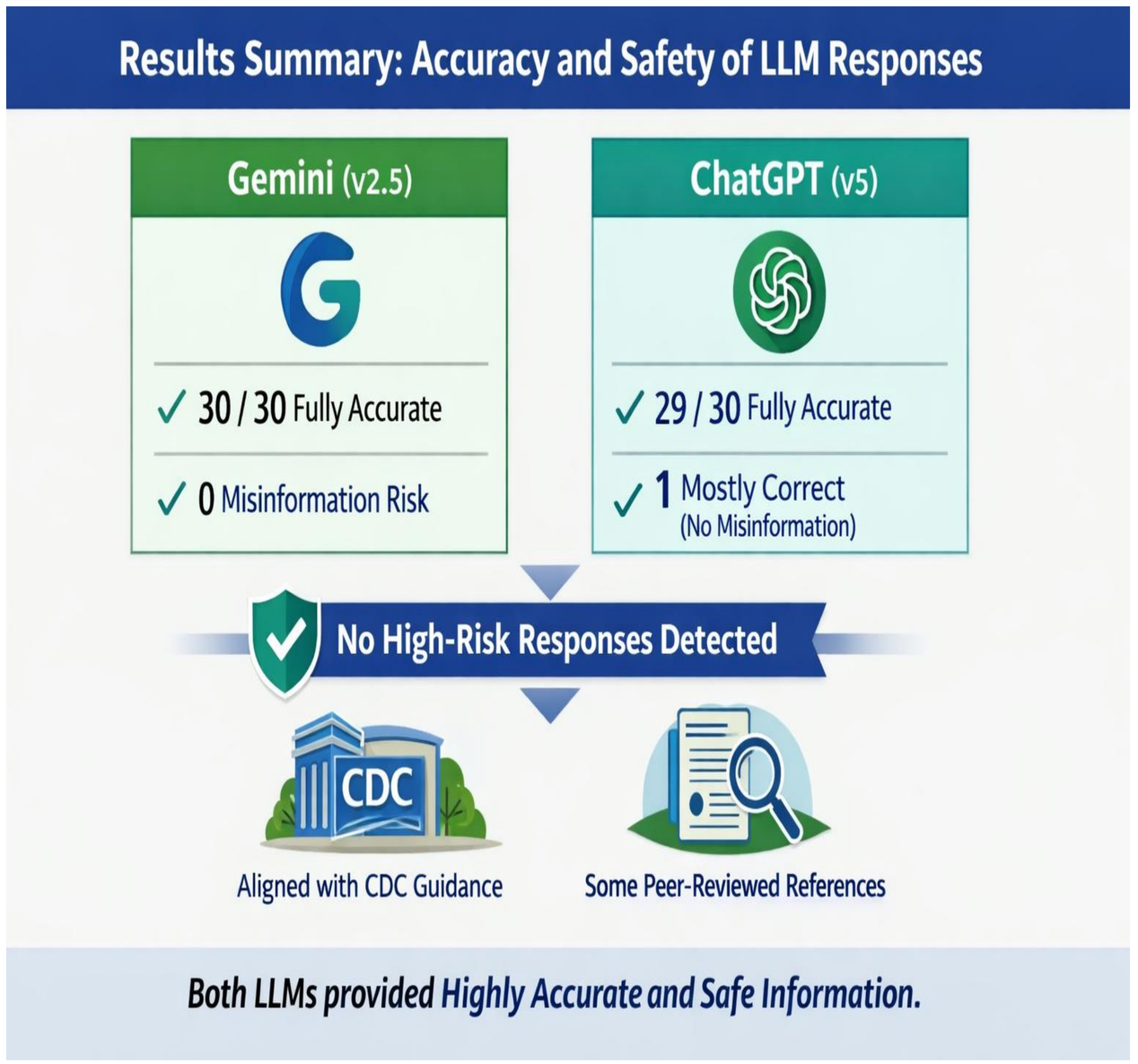
Study Design

- Comparative evaluation of two LLMs ChatGPT (Version 5) and Gemini (version 2.5)

Data Collection

- 30 HPV vaccine questions centering on vaccine safety, effectiveness, dosing schedule, and cost were evaluated
- Following a prompt requesting concise answers, all responses were saved verbatim
- Two independent raters scored responses for accuracy (0 = incorrect to 3 = fully correct) and misinformation risk (0 = none to 2 = strongly misleading)
- Inter-rater reliability was high (0.95)

RESULTS & DISCUSSION



- Findings suggest that widely used LLMs can provide generally reliable HPV vaccine information to the public.
- High accuracy across responses indicates that AI tools may help improve access to basic vaccine information, particularly for individuals seeking quick health guidance online.
- The alignment of responses with guidance from the Centers for Disease Control and Prevention suggests that these models are drawing from established public health knowledge.
- However, the limited citation of peer-reviewed evidence highlights a potential limitation in the transparency and verifiability of AI-generated health information.

CONCLUSION

- Large language models, including ChatGPT and Gemini, demonstrated strong performance in answering HPV vaccine questions.
- These tools may support public access to reliable vaccine information, but should complement, not replace, trusted health sources.
- As AI tools become more commonly used for health inquiries, continued monitoring and evaluation are necessary to ensure accuracy and reduce misinformation risks.

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