# The comparative sufficiency of ChatGPT, Google Bard, and Bing AI in answering diagnosis, treatment, and prognosis questions about common dermatological diagnoses

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# The comparative sufficiency of ChatGPT, Google Bard, and Bing AI in answering diagnosis, treatment, and prognosis questions about common dermatological diagnoses

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## *Abstract*

Our team explored the utility of unpaid versions of three artificial intelligence chatbots in offering patient-facing responses to questions about five common dermatological diagnosis, and highlights the strengths and limitations of different AI chatbots, while demonstrating how chatbots present the most potential in tandem with a dermatologist's diagnosis.

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# Original Manuscript

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**Keywords:** artificial intelligence, ChatGPT, atopic dermatitis, acne vulgaris, cyst, actinic keratosis, rosacea

## Introduction

Artificial intelligence (AI) chatbots, such as ChatGPT, offer a platform for patients to ask medical questions, particularly when access to care is limited.[1] Studies have assessed the utility of ChatGPT in dermatology; however, fewer studies have compared performance between chatbots.[2] This study compares the clinical utility of ChatGPT 3.5, Google Bard, and Bing AI in generating patient-facing responses to questions about five common dermatological diagnoses (atopic dermatitis, acne vulgaris, actinic keratosis, cyst, and rosacea).[3] Only unpaid versions of chatbots were used, as these are most accessible to patients.

## Methods

For each condition, two diagnosis, two treatment, and one prognosis question were devised. Diagnosis questions requested a diagnosis and presented a patient history including age, sex, symptoms (duration/location), treatments tried and outcomes, and medical history. 19 questions were modeled from questions on Reddit forums (“r/AskDocs” and “r/dermatology”). For topics with insufficient Reddit questions, the co-authors devised prompts reflecting common questions in their experience (6 questions).

Questions were inputted into each chatbot (Supplementary Table 1). Three board-certified dermatologists scored the responses on appropriateness for a patient-facing platform (Yes/No), sufficiency for clinical practice (Yes/No: not specific/No: not concise/No: inaccurate information), accuracy from 1 (completely inaccurate) to 6 (completely accurate), and overall from 1 (worst possible answer) to 10 (best possible answer).[4] The Wilcoxon signed-rank test was used for pairwise comparisons (Table 1). P-values were adjusted using the Bonferroni correction.

**Table 1.** Descriptive statistics of scores between ChatGPT 3.5, Google Bard, and Bing AI.

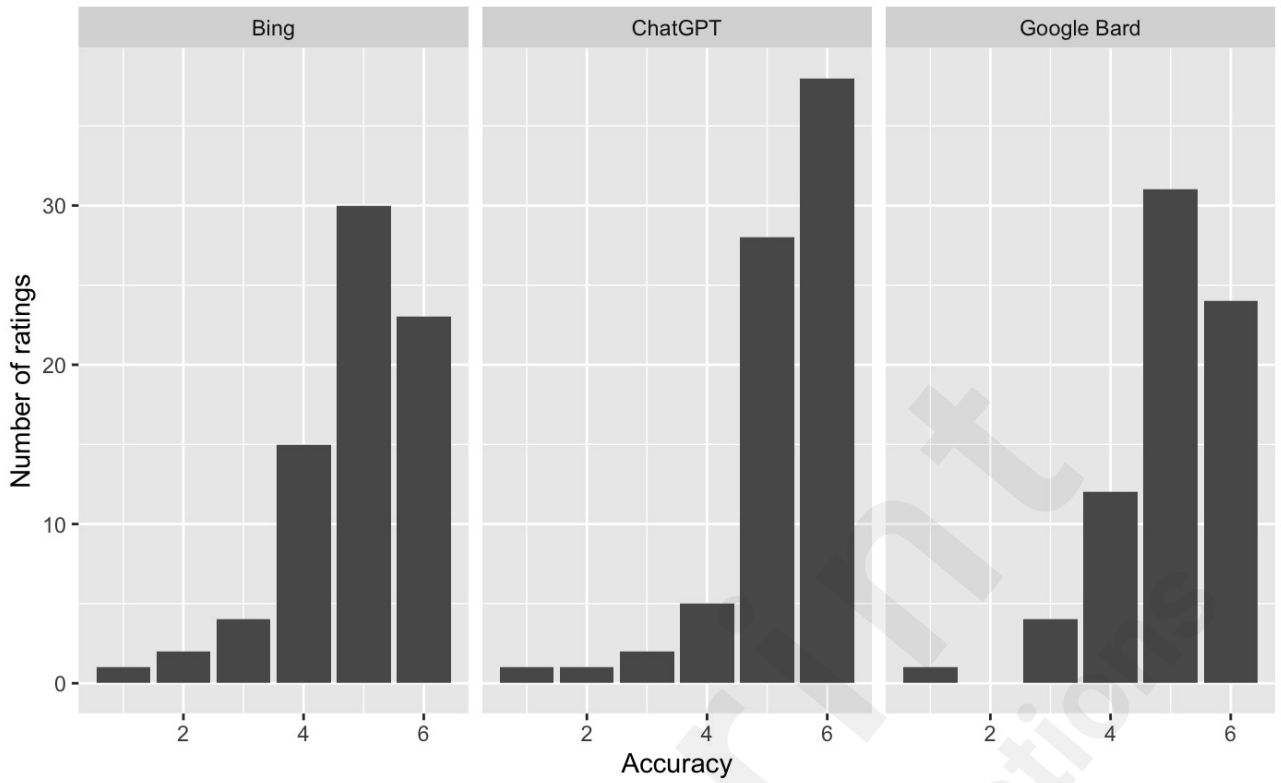
| | **ChatGPT 3.5 (n=75)** | **Google Bard (n=72)** | **Bing AI (n=75)** |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Mean Flesch Reading Ease Score (SD) | 33.90 (8.12) | 49.72 (15.42) | 46.53 (9.67) |
| Mean accuracy (SD) | 5.29 (0.97) | 5.00 (0.98) | 4.87 (1.08) |
| Mean overall rating (SD) | 8.37 (1.81) | 7.94 (1.85) | 7.41 (2.13) |
| Number of responses appropriate for a patient-facing platform (%) | 71 (94.67) | 65 (90.28) | 65 (86.67) |
| Sufficiency for clinical practice | | | |
| Yes (%) | 41 (54.67) | 35 (48.61) | 35 (46.67) |
| No: not specific enough (%) | 14 (18.67) | 15 (20.83) | 23 (30.67) |
| No: inaccurate information (%) | 20 (26.67) | 20 (27.78) | 17 (22.67) |
| No: not concise (%) | 0 | 2 (2.78) | 0 |

**Results**

One response was omitted because Google Bard declined to answer a question. ChatGPT responses had significantly lower Flesch Reading Ease Scores than Google Bard (P<.001) and Bing AI (P<.001), indicating lower comprehensibility. Responses from ChatGPT received significantly higher accuracy (P=.01, Figure 1) and overall (P=.003) ratings than Bing AI. In terms of patient-facing platform appropriateness and clinical practice sufficiency, ChatGPT received the most appropriate (94.67%) and sufficient (54.67%) ratings. Bing AI received the fewest (86.67% and 54.67%, respectively). 45.33%, 48.61%, and 53.33% of ChatGPT, Google Bard, and Bing AI responses, respectively, had inaccurate information or were not specific. For diagnosis prompts, 9/10 of ChatGPT and Bing AI and 7/10 of Google Bard responses included the intended diagnosis. Of the 25 responses from each chatbot, 25 of Bing AI's, 24 of ChatGPT's, and 19 of Google Bard's responses emphasized the importance of consulting a healthcare professional before acting.

**Figure 1.** Distribution of accuracy ratings for each chatbot.




## Discussion

ChatGPT outputs were most accurate and appropriate for patient questions. However, ChatGPT responses had college-level readability, limiting its utility for the public.[5] Only approximately half of the responses were sufficient for clinical practice, primarily due to inaccuracies and lack of specificity. ChatGPT and Bing AI performed best at diagnosis and favorably emphasized the importance of seeking input from a healthcare professional. Google Bard did not perform well in these domains, suggesting that it is less useful for offering patient advice. Despite acceptable diagnostic performance of ChatGPT and Bing AI, an unranked list of conditions with differing treatments is not actionable for patients. Chatbots present more potential in offering advice once a diagnosis has been established.

ChatGPT 3.5 displays the most promise of the chatbots analyzed in this study, consistent with Mu et al. (2024), who compared the chatbots' responses to melanoma questions. However, before AI can be harnessed to address patient concerns, it must be improved by enhancing readability, removing inaccuracies, and improving information specificity. Its utility is most promising in tandem

with a dermatologist’s diagnosis, rather than as an independent entity. As access to AI grows, dermatologists must be aware of the quality of information patients may receive from AI and how it may differ from a dermatologist’s advice.

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# Supplementary Files

# Multimedia Appendixes

Supplementary Table 1. Diagnosis, treatment, and prognosis prompts inputted into chatbots.
URL: http://asset.jmir.pub/assets/6587c219af94a72bf334413d2563ac58.docx