

# Should medical writing be adapted to positively influence patients gaining information about diseases in the age of artificial intelligence (AI)?

Susanne Ulm,<sup>a</sup> Eleanor Whitaker,<sup>a,b</sup> Meredith Whitaker<sup>a</sup> and Yaming Wang<sup>a</sup>  
Alphabet Health, New York, NY, USA; <sup>b</sup>Previous Alphabet Health intern; Hillsdale College, Hillsdale, MI, USA

## BACKGROUND

Patients frequently turn to online search tools to investigate their medical symptoms

Chatbots, e.g., ChatGPT and Bing Chat, have been designed to provide accurate AI-powered online search results by user conversational interaction, understanding context and allowing for follow-up questions<sup>1,2</sup>

## OBJECTIVE

We assess Chatbots’ performance in providing medical literature to hypothetical patients seeking information about their medical condition, using ChatGPT<sup>2</sup> and Bing Chat<sup>3</sup>, with Google search<sup>4</sup> also being included for fair balance

## RESEARCH DESIGN AND METHODS

Using the National Health Service condition summary, we randomly selected 7 common (asthma, common cold, concussion, depression, diabetes, heart attack, and stroke) and 7 rare (hepatitis B, measles, mumps, polio, scurvy, tetanus, and whooping cough) diseases and 4 corresponding symptoms for each disease<sup>5</sup>



ChatGPT, Bing Chat and Google were asked the following four separate questions:

- Q1:** Can you help me identifying the medical condition for the following symptoms? Four symptoms were given for each disease
- Q2:** Can you provide [disease] recent clinical trials?
- Q3:** Can you provide [disease] recent scientific publications?
- Q4:** Are there any [disease] scientific publication summaries or infographics for patients with [disease]?

## References

1. Microsoft (2023) Reinventing search with a new AI-powered Microsoft Bing and Edge, your copilot for the web. Available at: <https://blogs.microsoft.com/blog/2023/02/07/reinventing-search-with-a-new-ai-powered-microsoft-bing-and-edge-your-copilot-for-the-web/> Accessed: Oct 2023;  
2. ChatGPT (GPT-3.5): <https://chat.openai.com/>;  
3. Bing Chat: <https://www.bing.com/>;  
4. Google search: <https://www.google.com/>;  
5. National Health Service (NHS) (2023) Health A to Z. Available at: <https://www.nhs.uk/conditions/> Accessed: Oct 2023.  
AI, artificial intelligence; Q, question; WHO, World Health Organization

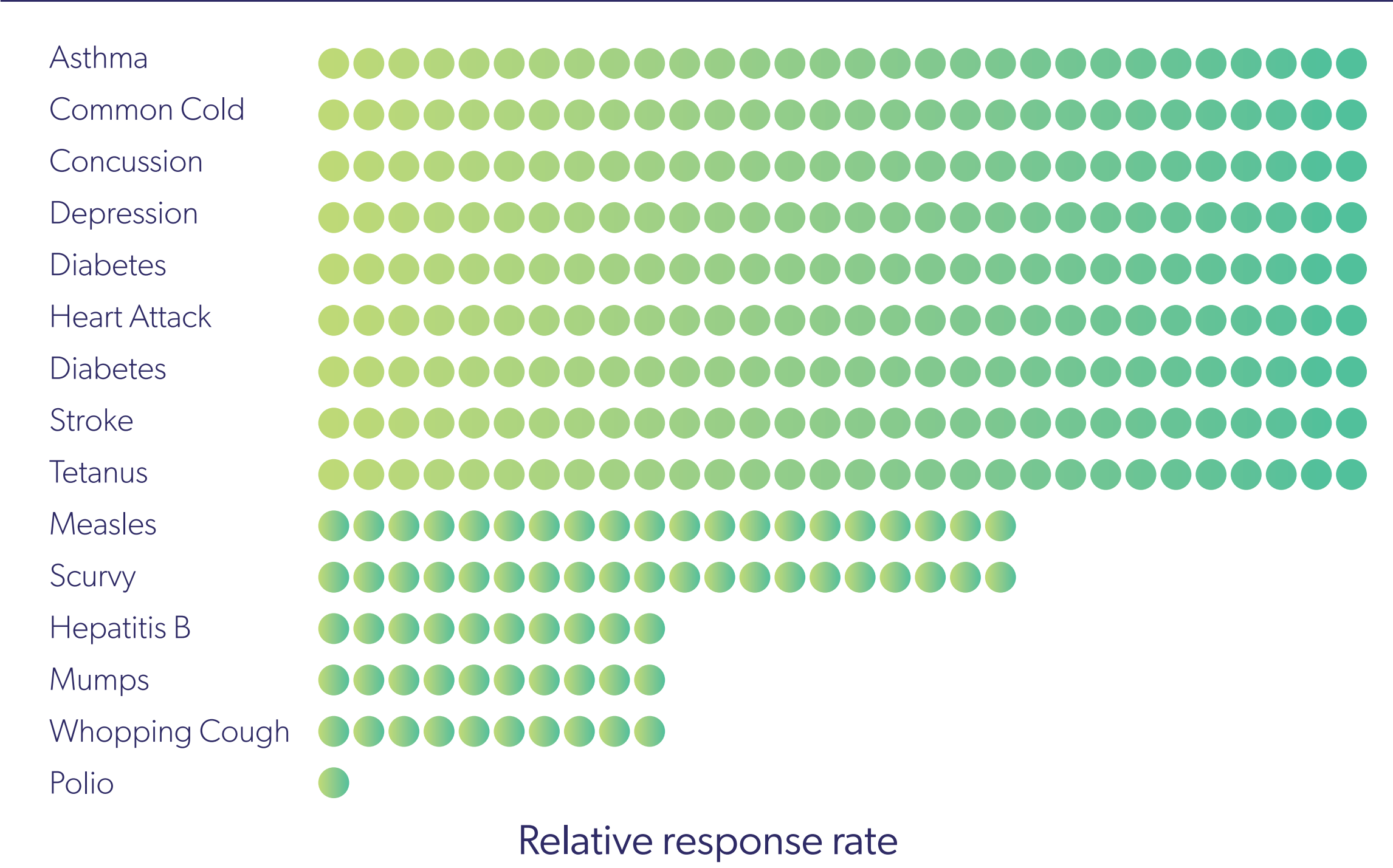


## RESULTS

### Q1: Identification of rare diseases more difficult

ChatGPT, Bing Chat and Google suggested common diseases correctly; however, were less accurate with rare diseases, e.g., mumps and hepatitis B, with polio not being proposed at all (Figure 1)

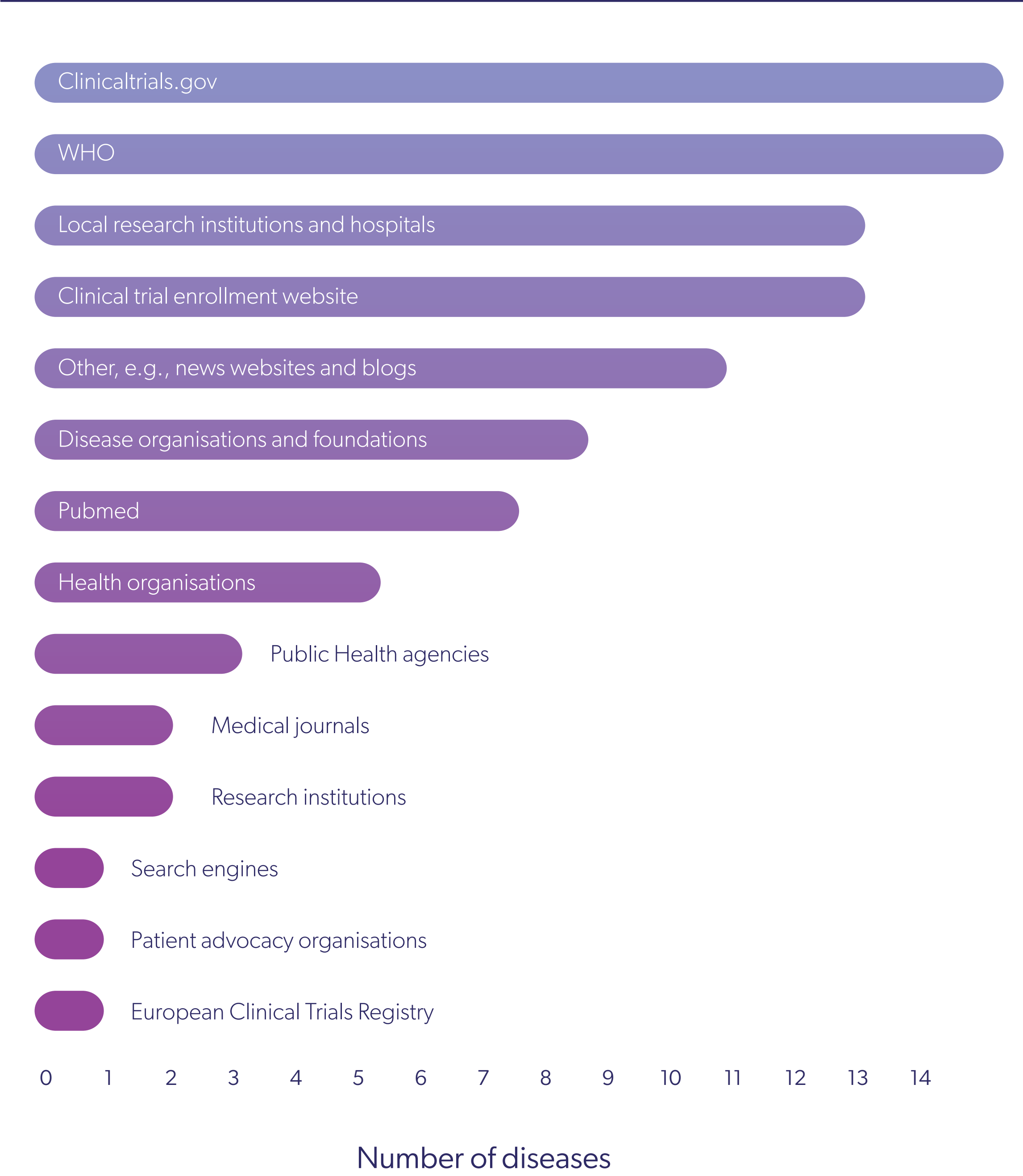
Figure 1: Can ChatGPT, Bing Chat and Google identify 14 common and rare disease (based on 4 symptoms for each disease)?



### Q2: ChatGPT suggested most appropriate resources for finding clinical trials

- While ChatGPT could not provide direct weblinks, it suggested Clinicaltrials.gov, WHO, and local research institutions/hospitals as the top three most frequent resources for finding recent clinical trials about a given disease (Figure 2)
- Bing Chat and Google failed to provide links to Clinicaltrials.gov and mostly suggested clinical trial enrolment and other non-research websites, e.g., news and blogs (Figure 2)

Figure 2: Do ChatGPT, Bing Chat and Google suggest appropriate resources for finding clinical trials for 14 diseases?



### Q3: Medical/research journals are infrequently suggested

Overall, 22.2%–75.0% of provided citations per disease were research/medical publications or journals, including a mix of open-access and behind-paywall publications (Figure 3)

- Simpler disease descriptions (e.g., heart attack vs myocardial infarction) resulted in fewer suggestions to research/medical journals, with Bing Chat referencing two predatory journals
- ChatGPT suggested Pubmed, Google Scholar, research journals, medical conferences, and university/research institutions as resources

Figure 3: Do Bing Chat and Google suggest recent medical/research publications or journals?



### Q4: ChatGPT, Bing Chat and Google offer a diverse range of material

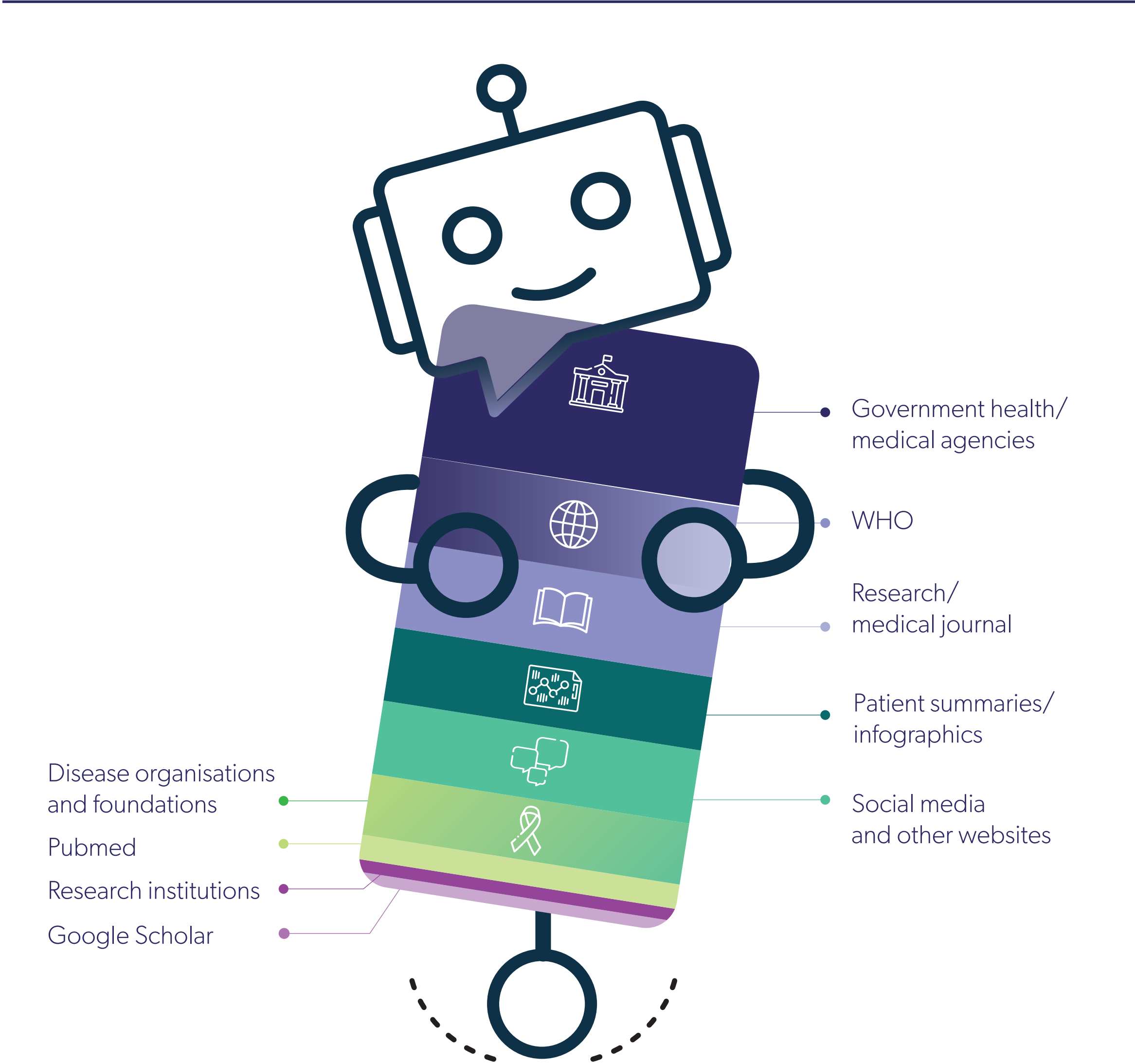
Weblinks to patient summaries or infographics from research/medical publications were provided for

- Four diseases by Bing Chat: concussion, diabetes, stroke, and polio
- Five diseases by Google: asthma, common cold, hepatitis B, mumps and stroke

Overall, ChatGPT, Bing Chat and Google favoured government health/medical agencies and WHO as resources (Figure 4)

- Health organizations specific to the given disease (e.g., American Heart Association for heart attack) and patient advocacy organizations were also frequently suggested
- ChatGPT also suggested “infographic repositories” such as Pinterest

Figure 4: Can ChatGPT, Bing Chat and Google provide publication summaries and infographics for 14 diseases?



## Take-away messages

- For patients hoping to learn about clinical trials, Chatbots can point in the correct direction; however, they would still require adequate knowledge to conduct searches, assess the trustworthiness of journals/individual publications, and deal with potential publication access issues
- No substantial differences were seen between ChatGPT, Bing Chat and Google
- While medical/research journals are infrequently suggested, their presence increases the likelihood that patients may find publication summaries hosted by journals, supporting the need to include such enhancements for publications whenever possible
- This evaluation could be considered as a learning process into the AI world as it provides insights that may help people working within the publication world to become better at providing patients with accessible information