Can Voice Assistances (VA) Help Guide Hepatitis B Vaccination and Liver Disease Screening for the General Population?

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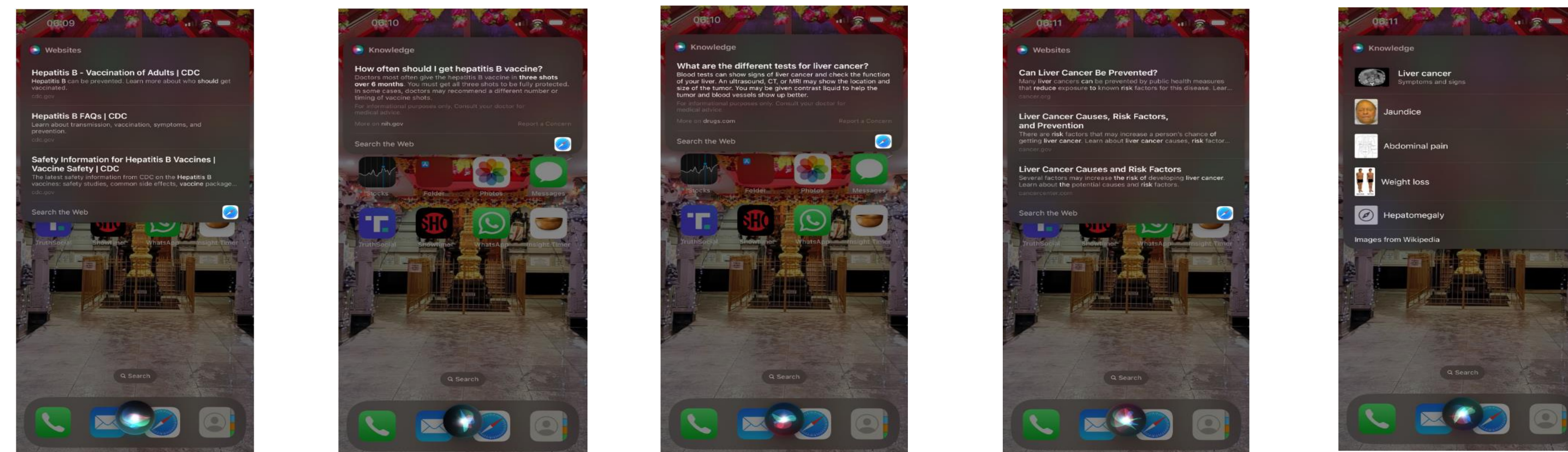Nassau University Medical Center, East Meadow, New York,

Introduction

- Engaging in behaviors that promote individual and population wellness continues to be a public health challenge; this pressing societal need requires innovative solutions.
- As the market for voice assistants (Amazon Alexa, Google Assistant, and Apple Siri) grows and people increasingly use them to assist in their daily tasks, there is a pressing need to explore how voice assistant (VA) technology can improve health-related behavior. Hepatitis B virus (HBV) infection is a major global cause of morbidity and mortality.
- Hepatitis B vaccines are highly effective in preventing infection and subsequent disease transmission and are safe.
- We did this study to determine if VAs provide clinically appropriate advice regarding Hepatitis B Vaccination and Hepatitis B virus
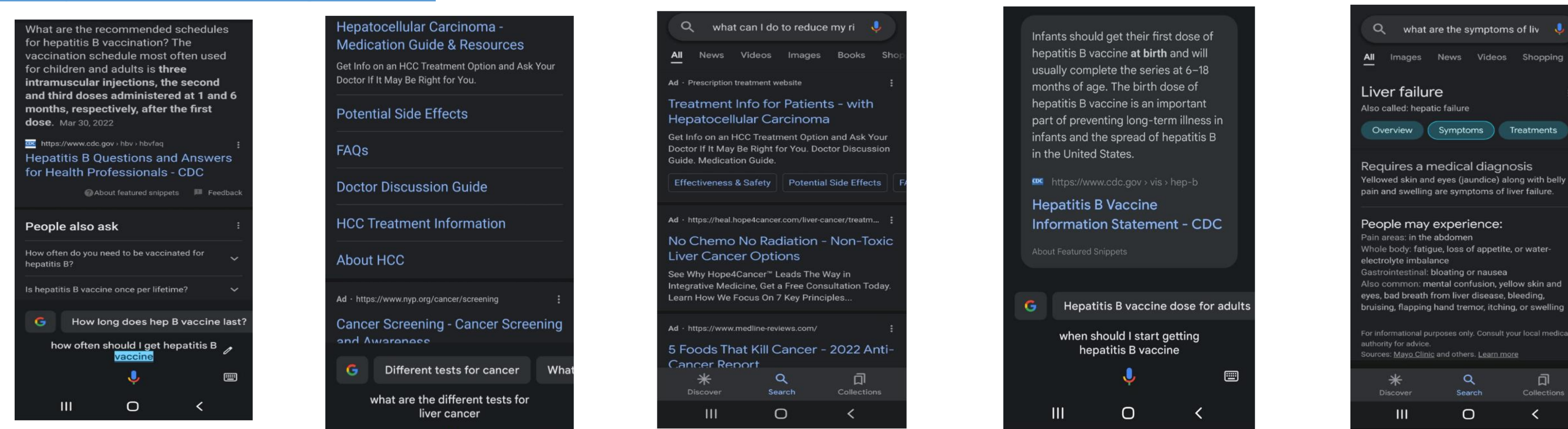
Methods and Materials

- Four voice assistants: Apple Siri, Amazon Alexa, Google Assistant, and Microsoft Cortana, were tested.
- Voice recordings were done for 5 commonly asked questions regarding Hepatitis B vaccination and Liver Disease.
- The authors decided if each of the four VAs provided clinically appropriate advice.
- Fisher exact testing was done to compare the results of each VA against each other.

A) Responses from Apple SIRI :

B) Responses from Google Voice:

Number	Question	Clinically relevant reference				P-value
		Apple Siri	Amazon Alexa	Google Assistant	Microsoft Cortana	
1	When should I start getting Hepatitis B Vaccine?	YES	YES	YES	YES	0.45
2	How often should I get Hepatitis B Vaccine?	YES	NO	YES	YES	<0.03
3	What are the different tests for Liver cancer?	YES	YES	YES	NO	<0.01
4	What can I do to reduce my risk of Liver cancer?	YES	NO	YES	NO	<0.02
5	What are the symptoms of Liver failure?	YES	YES	YES	NO	<0.01

Table 1: Assessment of the clinical appropriateness of voice assistance results regarding Hepatitis B and Liver Disease

Results

We found that clinically appropriate advice was provided 100% by Apple Siri, 60% by Amazon Alexa, 80% by Google Assistant, and 40% of the time by Microsoft Cortana.

Conclusions

- The VAs provided accurate advice about when to start Hepatitis B Vaccination, including the May 2021 USPSTF recommendation.
- However, none of the VAs instructed participants to speak to a healthcare provider, which we believe is vital to any medically related search results.
- Most of the VAs performed well in our study, but we believe there is a need for improvement, especially with the technology becoming more ingrained in our everyday lives.

Reference

- Ramesh AN, Kambhampati C, Monson JR, Drew PJ. Artificial intelligence in medicine. Ann R Coll Surg Engl. 2004 Sep;86(5):334-8. DOI: 10.1308/147870804290. PMID: 15333167; PMCID: PMC1964229.
- Hamet P, Tremblay J. Artificial intelligence in medicine. Metabolism. 2017 Apr;69S:S36-S40. doi: 10.1016/j.metabol.2017.01.011. Epub 2017 Jan 11. PMID: 28126242.
- Mintz Y, Brodie R. Introduction to artificial intelligence in medicine. Minim Invasive Ther Allied Technol. 2019 Apr;28(2):73-81. DOI: 10.1080/13645706.2019.1575882. Epub 2019 Feb 27. PMID: 30810430.
- Zhou LQ, Wang JY, Yu SY, Wu GG, Wei Q, Deng YB, Wu XL, Cui XW, Dietrich CF. Artificial intelligence in medical imaging of the liver. World J Gastroenterol. 2019 Feb 14;25(6):672-682. doi: 10.3748/wjg.v25.i6.672. PMID: 30783371; PMCID: PMC6378542.
- Chen M, Decary M. Artificial intelligence in healthcare: An essential guide for health leaders. Healthc Manage Forum. 2020 Jan;33(1):10-18. Doi: 10.1177/0840470419873123. Epub 2019 Sep 24. PMID: 31550922.