



Wanna Chat? A quick study using an AI Chatbot for COVID-19 Screening

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Background: The Mayo Clinic brand is synonymous with world class healthcare guided by its unwavering commitment to patient care, education, and groundbreaking research. The foundation of this commitment is cemented in the culture of patient centric clinical care and innovation. At the onset of the COVID-19 pandemic in 2020, the Centers for Disease Control and Prevention issued guidelines for safety measures with respect to screening high-risk patient populations for exposure. Additionally, healthcare organizations were urged to limit in-person contact when possible to reduce transmission rates.

Objective: The aim of this study was to determine the feasibility of an artificial intelligence (AI) enabled text-based communication system (chatbot) for COVID-19 screening for patients prior to radiology appointments and to describe patient experiences with the chatbot.

Methods: Multiple stakeholders were consulted including Radiology Physicians, Radiology Administrative Leadership, Center for Digital Health Administrative Leadership, Allied Health Staff, and Nursing. A multidisciplinary project team was assembled with champions from Radiology to pilot a HIPAA-approved, IRB-waived study implementing an AI chatbot into the clinical practice from July 6-August 31, 2020. The team partnered with an external vendor to customize a secure AI chatbot to screen patients for COVID-19 symptoms prior to a scheduled radiology exam. The initial pilot group consisted of patients scheduled for ultrasound exams, and then, subsequently, MRI exams in outpatient settings across all regional campuses. The SMS-based AI chatbot routed patients into several pathways depending on response to COVID screening survey.

Patients were first identified from the organization's electronic medical record of scheduled appointment status meeting the criteria. Then, patients were notified about COVID-19 screening via a text message containing a link to access a secure website where they would answer screening questions. Once the link was activated and patients were verified, the software used a decision-tree algorithm capable of routing patients into several pathways depending on their responses to the COVID-19 screening questions. Patients who reported symptoms were then directed via the algorithm to get COVID-19 testing before their appointment at our testing site. Asymptomatic patients were routed to confirm appointments, and patients with questions were identified so that an outbound call to the patient could be made. The text response, appointment confirmation, and escalation rates, as well as overall patient experience with the chatbot are reported. User experience and overall satisfaction was assessed via a questionnaire based on a 5-point Likert scale (1 = poor and 5 = outstanding). Multivariable logistic regression was performed to predict response rate.

Results: The chatbot COVID-19 screening text message was sent to 4,687 patients. Of these patients, 2,722 (58.1%) responded. Of the respondents, 46 (1.7%) reported COVID-19 symptoms; 34 (1.2%) had COVID-19 tests scheduled or pending. Of the 1,965 nonresponders, authentication failed for 174 (8.8%), 1,496 (76.1%) did not engage with the text, and 251 (12.8%) timed out of the survey. The mean rating for the chatbot experience was 4.6. In a multivariable logistic regression model predicting response rate, English written-language preference independently predicted response (odds ratio, 2.71 [95% CI, 1.77-2.77]; $P=.007$). Age ($P=.57$) and sex ($P=.51$) did not predict response rate.

Next Steps:

- Identify other use cases for AI enabled chatbot technology within the clinical practice.
- Pursue integration with the electronic medical record for further expansion of AI enabled chatbot technology
- Share successes and best practices with other specialties to benefit from a similar innovative approach to patient care delivery.

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