Early-warning system for sepsis shown to improve survival rates and cut hospital stays

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Emergency room patients who were flagged by an artificial-intelligence algorithm for possibly having sepsis received antibiotics sooner and had better outcomes, according to a peer-reviewed study conducted by

physician-researchers at Case Western Reserve University and MetroHealth.

Their findings were published in the journal *Critical Care Medicine*.

"We showed that when providers had access to the early warning system, patients had better sepsis-related outcomes," said Yasir Tarabichi, an assistant professor of medicine at the Case Western Reserve School of Medicine and the study's principal investigator. "These patients got their antibiotics faster and had, on average, more days 'alive and out of hospital' than the group that had usual care. Taken together, the increase in survival rates and reduction in hospital stay improved with the implementation of the early warning system."

Over five months in 2019, the study's authors tracked nearly 600 patients who came into the emergency department. MetroHealth implemented an electronic health record-embedded early warning system for sepsis.

Patients 18 and older presenting to the emergency department were randomized to standard care for sepsis versus the pathway augmented by the early warning system.

The early warning system alerted both the physicians and pharmacists. This resulted in the patient who was flagged receiving antibiotics significantly faster than those patients whose alert was hidden, according to the study.

Collectively, those who received early antibiotics were measured to have more days alive and out of the hospital more than those in the standard care group.

"This study adds to the recent national discourse about sepsis early warning systems," Tarabichi said. "Recent studies assessed how that

score worked in isolation, which is not reflective of how it would actually be used in the real world. We envisioned the early warning system's role as supportive to our health care team's response to sepsis. Most importantly, we assessed the utility of the tool with the highest quality approach—a randomized controlled study. In fact, our work stands out as the first published randomized controlled evaluation of a model-based early warning system in the emergency room setting."

MetroHealth Senior Vice President Brook Watts, a professor of medicine at the Case Western Reserve School of Medicine, said the study demonstrates that from an institutional level, MetroHealth is committed to working collaboratively to try new approaches to improve outcomes from patients.

"We rigorously validate and implement new tools that can help our patients," said Watts, also an author of the study. "This was an integrated team-based response to sepsis, with augmentation by artificial intelligence. It demonstrates our focus on quality improvement. We have great providers and information service experts willing and interested in leveraging new technology to improve patient care."

More information: Yasir Tarabichi et al, Improving Timeliness of Antibiotic Administration Using a Provider and Pharmacist Facing Sepsis Early Warning System in the Emergency Department Setting, *Critical Care Medicine* (2021). DOI: 10.1097/CCM.0000000000005267

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