

Smartphone alerts may lead to faster response to in-hospital cardiac arrest, 'code blue'

October 31 2022



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Sixty seconds can make or break the outcome of a hospital "code blue" or cardiac arrest response. New research found a hospital code response

team rushing to a patient in cardiac arrest may arrive at least one minute quicker and may also lead to better patient outcomes with the use of a smartphone emergency code notification system that activates the team through text messages. The findings are preliminary research to be presented at the American Heart Association's [Resuscitation Science Symposium 2022](#). The 2022 meeting will be held in person in Chicago, November 5-6, 2022, and will feature the most recent advances related to treating cardiopulmonary arrest and life-threatening traumatic injury.

Cardiac arrest is a condition in which the heart's electrical system malfunctions and stops beating. Previous studies looking at ways to reduce the rate of in-hospital cardiac arrest have focused on earlier treatment, including defibrillation and epinephrine administration to improve patient outcomes.

Most hospitals have a code team consisting of specifically trained and designated [health professionals](#) who resuscitate patients when they are in cardiac arrest. Activating the code team typically starts with a call to the hospital operator who sends out a page to the code [team members](#) and a hospital-wide overhead page sometimes calls a "code blue." Often a delay occurs from the time someone recognizes a patient has no pulse until team members receive the code blue page. Code team members typically are different from the medical team primarily caring for the patient and they may not know the patient or have information about their health conditions or treatments.

In this study, researchers at the University of Maryland Medical Center in Baltimore explored how to improve outcomes and target patient treatments by accelerating notification of the code care team. They electronically mapped code blue buttons present behind each patient bed to a secure smartphone texting system that also connected with the hospital's electronic medical records. Pressing the button sent important patient data, such as the admitting diagnosis and laboratory details, to

code team members' smartphones. At the same time, the code blue button contacted the hospital operator who activated the code team through traditional methods, including overhead pages and pager alerts. Researchers then compared differences in the smart phone text message activation to the more traditional overhead page announcement of the code and how long it took with each method to administer epinephrine to the patient and the rate of patient survival to hospital discharge.

In this analysis of 35 cardiac arrest events during a three-year period, from November 2019 to May 2022, using the smartphone notification system, the code team activations were nearly instantaneous with notifications coming through immediately via text message.

Conventional methods of code team activation took an average of 78 seconds, meaning the smartphone activation cut notification by over one minute.

"Our study shows that technology may be used to speed up our communication processes and that innovations to improve our systems of care are still possible," said the study's lead author Cody Couperus, M.D., a [resident physician](#) in the [emergency medicine](#) and internal medicine program at University of Maryland Medical Center in Baltimore.

"Improving the notification processes can get code teams to the patient faster, equipped with knowledge about the patient that may lead to targeted treatments that more efficiently revive the patient," he said.

"Time is of the essence, and the sooner a patient is treated for an underlying cause, the more likely they are to survive without serious brain injury. In the future, we hope to show that code teams arrive faster using this smartphone code blue notification system and that more patients survive without severe brain injury."

Other results included:

- The smartphone code blue notification was the primary mode of code team activation for more than one-third of the cardiac arrest events during the 3-year study period.
- The average time to documented epinephrine administration for notifications was 3 minutes after the code team arrival with the smartphone activation vs. 4 minutes with the standard notification system.
- Survival to hospital discharge was 25% for the cardiac arrest events for notifications activated with the smartphone activation, compared to around 17% when the [code](#) team was activated by the standard [notification](#) system.

Among the limitations, the researchers noted the small number of patients in the study makes it hard to derive statistically significant conclusions about the effects of the [smartphone](#) activation system on [patient outcomes](#), and more studies involving larger participant groups are necessary to assess the effect.

"Health care professionals need to be strong advocates for quality initiatives to improve the rapid resuscitation of patients experiencing [cardiac arrest](#) in our hospitals," Couperus said. "Outcomes following loss of pulse in the hospital have remained largely stable and poor over the years, and these results indicate technological innovations might help us do better."

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Provided by American Heart Association

Citation: Smartphone alerts may lead to faster response to in-hospital cardiac arrest, 'code blue'

(2022, October 31) retrieved 6 May 2024 from

<https://medicalxpress.com/news/2022-10-smartphone-faster-response-in-hospital-cardiac.html>

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