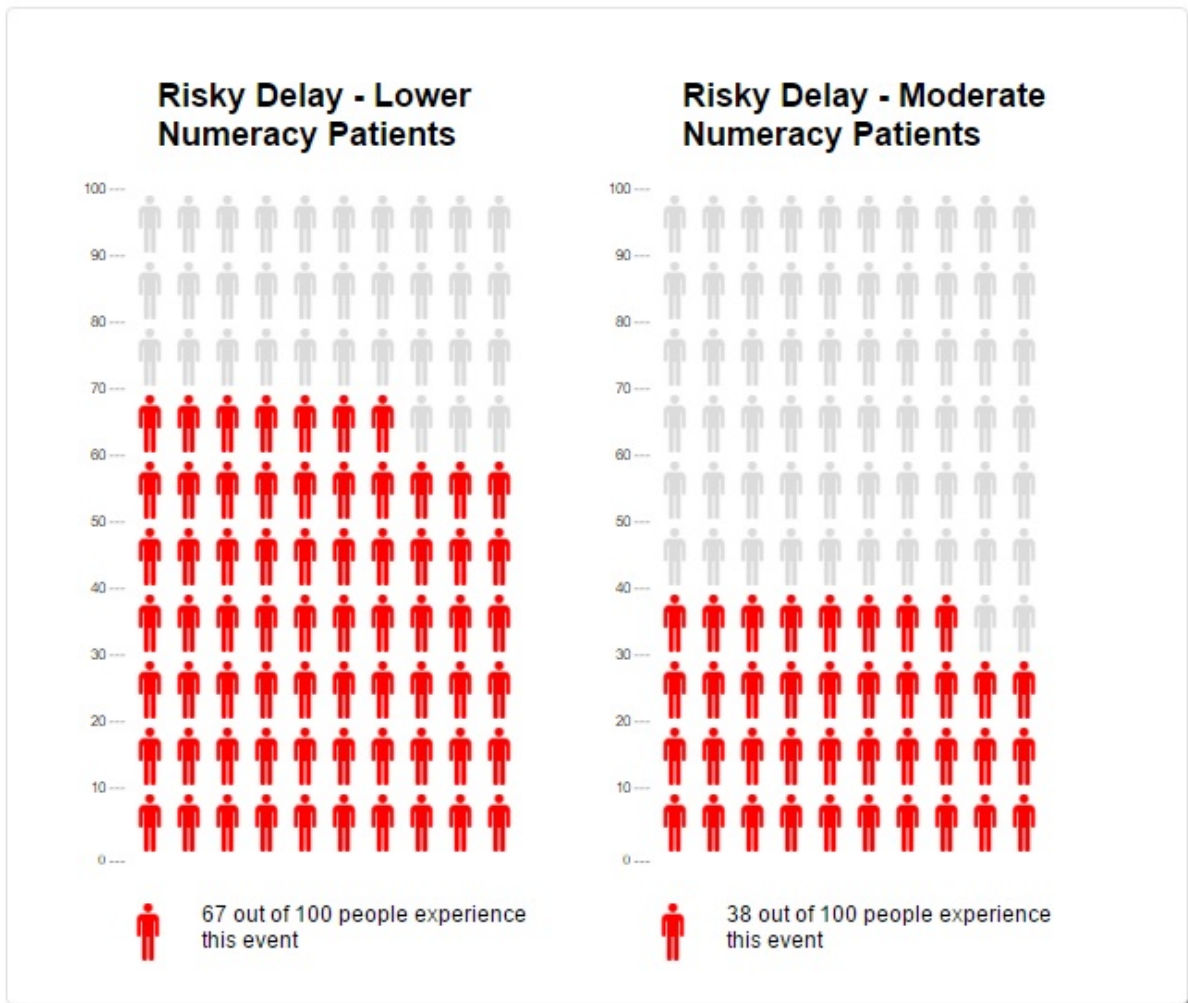


# Study clarifies risky decision making during a heart attack

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A patient with high versus low numeracy is about four times more likely to seek medical attention within the critical first hour after experiencing acute coronary syndrome. Credit: University of Oklahoma

In a recent study to determine why some individuals who experience symptoms for acute coronary syndrome decide to seek medical attention more quickly than others, a University of Oklahoma researcher has identified numeracy—the ability to understand and apply numerical concepts as the primary decision delay risk factor for individuals experiencing the medical condition. Cardiovascular disease, which includes conditions such as acute coronary syndrome, is the number one killer worldwide responsible for about one in three deaths.

Edward Cokely, Presidential Research Professor and associate professor of psychology, OU College of Arts and Sciences and National Institute for Risk & Resilience, and his collaborators followed up with 102 survivors within five days after having experienced ACS. A questionnaire was administered to measure [numeracy](#), decision delay and other relevant factors, such as anxiety, depression, symptom severity, knowledge and demographics. Cokely and collaborators learned that numeracy assessments may predict which patients are at greater risk for life-threatening decision delay, which could support development of risk communications for a diverse range of patients who vary in risk literacy.

"We have better insights as to why people do not go to the hospitals, so now we have to find a way to empower these people. Asking specific questions and creating individualized plans or interventions could reduce a person's risk in the future," said Cokely.

Dafina Petrova and Rocio Garcia-Retamero, researchers from the Mind, Brain and Behavior Research Center at the University of Granada, coordinated the international patient study with collaborators from the Cardiology Department at the University Hospital Virgen de las Nieves in Spain. Eligible patients who agreed to participate in the study were identified by a qualified practicing cardiologist who also extracted

information regarding final diagnosis and angiogram results. Special care was taken to minimize any burden on patients due to fatigue, illness or other difficulties.

"Seeking [medical attention](#) quickly during ACS also reduces the risk for complications that lower quality of life and increase the burden of follow-up care for individuals, families and health systems," said Petrova.

In this study, low patient numeracy was related to longer decision delay, which, in turn, related to higher odds of positive troponin (a protein that indicates heart damage) on arrival at the hospital. A patient with high versus low numeracy was about four times more likely to seek medical attention within the critical first hour after experiencing symptoms. ACS survival rates and outcomes can be improved by up to 50 percent when treatment is administered within one hour of initial symptoms.

A patient's decision to delay treatment can increase the risk for serious complications, major disability and even death. A skill relevant to decision delay is a person's practical ability to solve problems involving probability, which is a predictor of diverse health and medical outcomes. Patients with lower numeracy tend to have more negative perceptions of health. They are more likely to be hospitalized and visit emergency services more frequently.

Numeracy is a predictor of health outcomes because it is closely related to general-decision making skill. In particular, [numeracy skills](#) help people evaluate and understand risk—i.e., risk literacy (see <http://www.RiskLiteracy.org> for an example of a two-minute statistical numeracy test designed for educated adults in industrialized countries). Research shows that numerate people generally deliberate more during decision making, becoming better-informed decision makers who more realistically evaluate decision benefits, risks and tradeoffs. They also spend more time thinking about their own reasoning and feelings, more

precisely integrating available information into an intuitive mental model.

Numeracy is an acquired skill that can be improved through deliberate practice and formal education. Even short training interventions help patients, medical professionals and primary school children solve complex statistical reasoning problems. Well-designed decision aids that help individuals represent relative risks and relationships without requiring mathematical transformations can eliminate large differences in decision quality between more and less numerate individuals.

During ACS, the decision to seek medical attention may involve many skills, such as estimating severity and intensity and identifying and evaluating sources of risk precisely and confidently. Acknowledging symptoms as urgent or serious and association of symptoms to a heart attack are two factors that lead to shorter decision delay times. As numeracy fosters an understanding of the ACS risks and tradeoffs, more numerate people are likely to recognize the potential of and need for immediate action.

Provided by University of Oklahoma

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