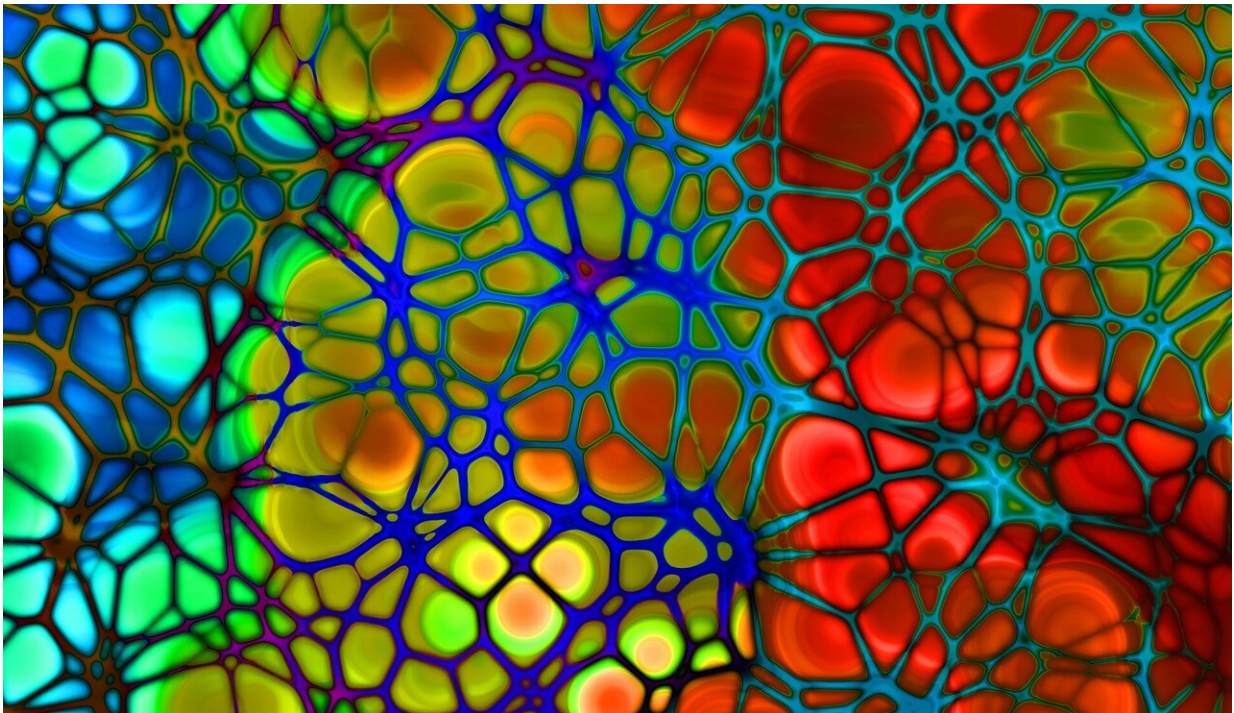


# AI model predicts death, complications for patients undergoing angioplasty, stents

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When a person has one or more blocked arteries, providers may choose to conduct a minimally invasive procedure known as percutaneous coronary intervention, or PCI. By inflating a balloon and potentially placing a stent, they can help blood flow more freely from the heart.

Despite carrying less risk than open surgery, stenting and [balloon angioplasty](#) can result in complications like bleeding and kidney injury.

However, researchers at Michigan Medicine have now developed an AI-driven algorithm that accurately predicts death and complications after PCI—which could emerge as a tool for clinicians as they determine treatment for blocked heart arteries.

The results are published in *European Heart Journal*.

"The risks for patients undergoing [percutaneous coronary intervention](#) vary greatly depending on the individual patient, and both patients and clinicians have historically both over and underestimated the harms associated with PCI," said lead David E. Hamilton, M.D., a cardiology-critical care fellow at Michigan Medicine.

"Precise risk prediction is critical to treatment selection and the shared decision-making process. Our tool can recognize a wide array of outcomes after PCI and can be used by care providers and patients together to decide the best course of treatment."

While other risk stratification tools have been created to identify risk after PCI, researchers say, many have modest accuracy and were made without involving a key party: patients.

The Michigan Medicine team collected data from all [adult patients](#) who underwent PCI between April 2018 and the end of 2021 using the Blue Cross Blue Shield of Michigan Cardiovascular Consortium, or BMC2, registry.

The consortium is comprised of hospitals across the state of Michigan that use data they collect to inform quality projects, and improve care and patient outcomes.

Researchers used that data—including more than 20 pre-procedural characteristics, such as age, [blood pressure](#) and total cholesterol—to create a risk prediction model with the [machine learning](#) software "XGBoost."

The AI-driven model showed high levels of accuracy at predicting death, major bleeding events and the need for blood transfusion. It outperformed other models that used the same pre-procedural characteristics.

"We combined the predictive model with patient feedback from the PCI Patient Advisory Council to transform machine learning into this patient-centered, individualized risk prediction tool," said senior author Hitinder Gurm, MBBS, interim chief medical officer at U-M Health.

"In the age of widespread smartphones and [electronic medical records](#), this computerized risk score could be integrated into electronic health systems and made easy to use at the bedside. It would not only help relay complex information to the provider quickly, but it could also be used to enhance patient education on the risks related to PCI."

The innovative technology has been harnessed into a computer and phone [application](#) to allow for free and widespread use.

**More information:** David E Hamilton et al, Merging Machine Learning and Patient Preference: A Novel Tool for Risk Prediction of Percutaneous Coronary Interventions, *European Heart Journal* (2023). [DOI: 10.1093/eurheartj/ehad836](https://doi.org/10.1093/eurheartj/ehad836)

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