

# Artificial intelligence can now predict long-term risks of heart attack and cardiac death

December 19 2019

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A new study in *Cardiovascular Research* finds that machine learning, the patterns and inferences computers use to learn to perform tasks, can predict the long-term risk of heart attack and cardiac death. Indeed,

machine learning appears to be better at predicting heart attacks and cardiac deaths than the standard clinical risk assessment used by cardiologists.

Researchers here studied subjects from the imaging arm of a prospective, randomized research trial, who underwent coronary artery calcium scoring with available cardiac CT scans and long-term follow-up. Participants here were asymptomatic, middle-aged subjects, with [cardiovascular risk factors](#), but no known coronary artery disease.

Researchers used machine learning to assess the risk of myocardial infarction and [cardiac death](#) in the subjects, and then compared the predictions with the actual experiences of the subjects over fifteen years. Subjects here answered a questionnaire to identify cardiovascular risk factors and to describe their diets, exercise and marital status.

The final study consisted of 1,912 subjects, fifteen years after they were first studied. 76 subjects presented an event of myocardial infarction and/or cardiac death during this follow-up time. The [subjects'](#) predicted machine learning scores aligned accurately with the actual distribution of observed events. The atherosclerotic cardiovascular disease risk score, the standard clinical risk assessment used by cardiologists, overestimated the risk of events in the higher risk categories. Machine learning did not. In unadjusted analysis, high predicted machine learning risk was significantly associated with a higher risk of a cardiac event.

"Our study showed that machine learning integration of clinical risk factors and imaging measures can accurately personalize the patient's risk of suffering an adverse event such as [heart attack](#) or cardiac death," said While machine learning models are sometimes regarded as "[black boxes](#)", we have also tried to demystify [machine learning](#); in this manuscript, we describe individual predictions for two patients as examples. When applied after the scan, such individualized predictions

can help guide recommendations for the patient, to decrease their risk of suffering an adverse cardiac event. "

**More information:** Frederic Commandeur et al, Machine learning to predict the long-term risk of myocardial infarction and cardiac death based on clinical risk, coronary calcium, and epicardial adipose tissue: a prospective study, *Cardiovascular Research* (2019). [DOI: 10.1093/cvr/cvz321](https://doi.org/10.1093/cvr/cvz321)

Provided by Oxford University Press

Citation: Artificial intelligence can now predict long-term risks of heart attack and cardiac death (2019, December 19) retrieved 9 April 2024 from <https://medicalxpress.com/news/2019-12-artificial-intelligence-long-term-heart-cardiac.html>

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