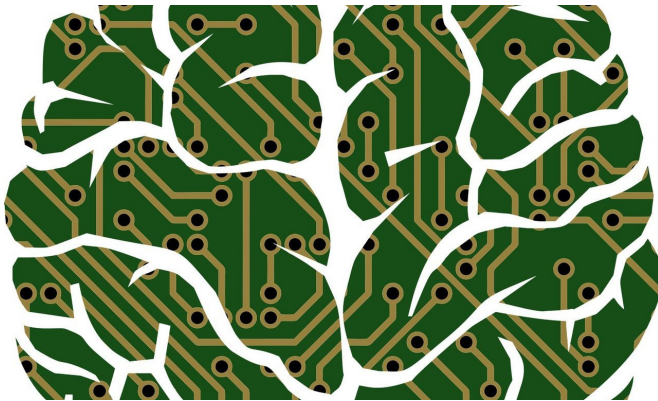


Machine learning can be used to predict which patients require emergency admission

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Machine learning—a field of artificial intelligence that uses statistical techniques to enable computer systems to 'learn' from data—can be used to analyse electronic health records and predict the risk of emergency hospital admissions, a new study from The George Institute for Global Health at the University of Oxford has found.

The research, published in the journal *PLOS Medicine*, suggests that using these techniques could help health practitioners accurately monitor the risks faced by patients and put in place measures to avoid unplanned admissions, which are a major source of healthcare spending.

"There were over 5.9 million recorded emergency hospital admissions in the UK in 2017, and a large proportion of them were avoidable," said Fatemeh Rahimian, former data scientist at The George Institute UK, who led the research.

"We wanted to provide a tool that would enable healthcare workers to accurately monitor the risks faced by their patients, and as a result make better

decisions around patient screening and proactive care that could help reduce the burden of emergency admissions."

The study, of 4.6 million [patients](#) from 1985 to 2015, was conducted using linked [electronic health records](#) from the UK's Clinical Practice Research Datalink. A wide range of factors was taken into account, including age, sex, ethnicity, [socioeconomic status](#), [family history](#), lifestyle factors, comorbidities, medication and [marital status](#), as well as the time since first diagnosis, last use of the health system and latest laboratory tests.

Using more variables combined with information about their timing, machine learning models were found to provide a more robust prediction of the risk of emergency hospital admission than any models used previously.

"Our findings show that with large datasets which contain rich information about individuals, machine learning models outperform one of the best conventional statistical models," Rahimian said. "We think this is because machine learning models automatically capture and 'learn' from interactions between the data that we were not previously aware of."

Whether machine learning models can lead to similarly strong improvements in risk prediction in other areas of medicine requires further research.

More information: *PLOS Medicine* (2018). [journals.plos.org/plosmedicine ... journal.pmed.1002695](https://journals.plos.org/plosmedicine...journal.pmed.1002695)

Provided by University of Oxford

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