

# World-first study predicts epilepsy seizures in humans

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A small device implanted in the brain has accurately predicted epilepsy seizures in humans in a world-first study led by Professor Mark Cook, Chair of Medicine at the University of Melbourne and Director of Neurology at St Vincent's Hospital.

"Knowing when a seizure might happen could dramatically improve the quality of life and independence of people with epilepsy," said Professor Cook, whose research was today published in the international medical journal, *Lancet Neurology*.

Professor Cook and his team, with Professors Terry O'Brien and Sam Berkovic, worked with researchers at Seattle-based company, NeuroVista, who developed a device which could be implanted between the skull and [brain surface](#) to monitor long-term [electrical signals](#) in the brain (EEG data).

They worked together to develop a second device implanted under the chest, which transmitted [electrodes](#) recorded in the brain to a hand-held device, providing a series of lights warning patients of the high (red), moderate (white), or low (blue), likelihood of having a seizure in the hours ahead.

The two year study included 15 people with epilepsy aged between 20 and 62 years, who experienced between two and 12 [seizures](#) per month and had not had their seizures controlled with existing treatments.

For the first month of the trial the system was set purely to record EEG data, which allowed Professor Cook and his team to construct individual algorithms of seizure prediction for each patient.

The system correctly predicted seizures with a high warning, 65 percent of the time, and worked to a level better than 50 percent in 11 of the 15 patients. Eight of the 11 patients had their seizures accurately predicted between 56 and 100 percent of the time.

Epilepsy is the second most common neurological disease after stroke, affecting over 60 million people worldwide. Up to 40 percent of people are unable to control their seizures with existing treatments.

"One to two percent of the population have chronic epilepsy and up to 10 percent of people will have a seizure at some point in their lives, so it's very common. It's debilitating because it affects young people predominantly and it affects them often across their entire lifespan," Professor Cook said.

"The problem is that people with epilepsy are, for the most part, otherwise extremely well. So their activities are limited entirely by this condition, which might affect only a few minutes of every year of their life, and yet have catastrophic consequences like falls, burns and drowning."

Professor Cook hopes to replicate the findings of the study in larger clinical trials, and is optimistic the technology will lead to improved management strategies for [epilepsy](#) in the future.

Provided by University of Melbourne

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