

## Researchers secure funding to study how ‘game-changing’ technology can improve epilepsy treatment and care

*£1.8 Million National Institute for Health & Care Research (NIHR) Invention for Innovation (i4i) Challenge Award grant awarded to study how the first ever ultra-long term seizure recorder could help improve outcomes and reduce significant risk of harm for the 33% of patients with epilepsy whose condition cannot presently be controlled with medication.*

A new study launching today will use revolutionary long term seizure tracking technology to monitor and potentially predict patterns in epileptic seizures using continuous, reliable, and objective data collection of brain activity in people with drug-resistant epilepsy.

Epilepsy can dramatically affect a person’s day-to-day life and a third of people with epilepsy cannot be managed with medication. The Real World Testing and Cost-effectiveness Analysis of Subcutaneous EEG (REAL-ASE) trial, which is being led by the Institute of Psychiatry, Psychology & Neuroscience (IoPPN) at King’s College London and funded by the NIHR, hopes to establish if the use of a small implant that records brain activity can improve outcomes for treatment and care.

While seizures can occur in predictable patterns, it is difficult to accurately track how often seizures occur as it relies on the person affected manually documenting their attacks in a diary. As seizures can have an amnesic effect, and can happen while a person is asleep, accurately recording these events is often not possible.

Subcutaneous implanted EEG is a new technology. Conventional EEG technology either requires the person to be admitted to hospital or be tested at home, using EEG electrodes glued to their scalp, which can be undertaken for only a few days. NHS waiting lists for these tests can vary from months to years. Subcutaneous implanted EEG, the technology being trialled in this study, enables researchers to continuously record EEG in an unobtrusive way, for up to 15 months, while the person lives their life completely normally.

The trial will recruit 33 people with drug resistant epilepsy and implant a miniaturised electroencephalogram (EEG) device just under their scalp during a minimally invasive, twenty-minute procedure that is performed under local anaesthetic. Researchers will then monitor each person’s brainwaves over six months. By tracking the brainwaves, researchers can accurately count the person’s seizures, which enables them to provide reliable information to clinicians, as an alternative to unreliable seizure diaries.

The study’s Principal Investigator, Professor Mark Richardson, Head of the School of Neuroscience and Paul Getty III Professor of Epilepsy at King’s IoPPN said, “This technology is a game-changer for epilepsy therapy as it enables us to detect and count a person’s seizures with accuracy. Clinicians treating people with epilepsy frequently make changes to therapy in the hope of improving the lives of the third of people whose seizures have not yet responded to treatment. We don’t know whether a change in treatment has been helpful without a very accurate count of seizures. Unfortunately, seizure diaries are often not accurate enough to judge whether treatment has led to any improvement.

“What the use of ultra long-term EEG opens up, is the possibility, in future, of very accurately judging the effect of a change in treatment. We also anticipate that ultra long-term EEG will allow us to quickly identify that someone’s epilepsy is deteriorating so that we can immediately step-up their care. This has the potential to be truly revolutionary for people living with a difficult illness.”

Dr Jonas Duun-Henriksen, Director of Epilepsy Science at the Danish company that developed the ultra long-term EEG solution, UNEEG medical <https://www.uneeg.com>, said that the purpose of the Real World Testing and Cost-effectiveness Analysis of Subcutaneous EEG (REAL-ASE) trial is to examine what are the costs of introducing subcutaneous EEG into the current NHS workflow, and what are the advantages.

“Our unique device is the first technology to reach the market allowing ultra long-term EEG recording. It speaks directly to the NHS goals of improving patient outcomes via patient-friendly, at-home, data collection and evidence-based, individualised, patient-focused medicine. Our goal is to provide clear evidence of device accuracy and acceptability for patients and professionals, and health economics modelling of the impact on the NHS. If clinicians are measuring outcomes better, seizure control is reached for more people, and clinicians can detect disease deterioration to avoid people being admitted to hospital.

“At the end of the study, we hope to have information that we can then take to the National Institute for Health & Care Excellence (NICE) and commissioners, to demonstrate that it should be routinely funded.”

Alison Fuller, Director of Health Improvement and Influencing at Epilepsy Action, said: “This is a really promising and exciting departure from traditional seizure monitoring methods towards helping people with epilepsy to better understand, and therefore manage, their seizures. Seizure diaries only offer a snapshot of true activity, while continuous monitoring could identify more subtle patterns and provide a much more accurate picture of what is happening.

“This new technology also has the advantage of overcoming some of the limitations or disruption people experience with more conventional EEGs. These often require extended hospital stays or the need for sleep deprivation, which can have a knock-on negative impact on seizures.

“Having better evidence and knowledge will undoubtedly improve outcomes in safety and quality of care, which could ultimately help to reduce epilepsy-related deaths. Epilepsy Action is proud to be supporting the study and we look forward to watching how it changes the landscape in current treatment methods for people with epilepsy.”

The study will take place in London with support from NHS trial centres in Newcastle, Cardiff, and Manchester.

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## Editors' Notes

### About UNEEG medical

UNEEG medical is an entrepreneurial, ambitious company specialising in ultra long-term subcutaneous EEG for remote monitoring of brain activity in a real-life setting. Ultra long-term, objective seizure tracking represents a new way forward for epilepsy care and complements the tools currently available.

The Danish company was founded in 2005 followed by a UK subsidiary being established in 2020, as well as others in Germany and the US. In addition, active study sites have been initiated with leading epilepsy researchers and institutions in the UK, Ireland, Germany the Netherlands, the US and more.

UNEEG medical currently employs more than 100 people, with more being onboarded every month as continued international growth and clinical use expand across Europe.

UNEEG medical is a family-owned company with long traditions within high-tech electronics and health care devices. The hearing aid company, WS Audiology, employs more than 12,000 staff and is one of the families sister companies to UNEEG medical, bringing a robust foundation for future investments both within clinical advantages, market introductions, novel and cutting edge technologies.

### About King's College London and the Institute of Psychiatry, Psychology & Neuroscience

King's College London is one of the top 35 UK universities in the world and one of the top 10 in Europe (QS World University Rankings, 2020/21) and among the oldest in England. King's has more than 31,000 students (including more than 12,800 postgraduates) from some 150 countries worldwide, and 8,500 staff. King's has an outstanding reputation for world-class teaching and cutting-edge research. The Institute of Psychiatry, Psychology & Neuroscience (IoPPN) at King's is the premier centre for mental health and neurosciences research in Europe. It produces more highly cited outputs (top 1% citations) on mental health than any other centre (SciVal 2019) and on this metric we have risen from 16th (2014) to 4th (2019) in the world for highly cited neuroscience outputs. World-leading research from the IoPPN has made, and continues to make, an impact on how we understand, prevent and treat mental illness, neurological conditions, and other conditions that affect the brain.

[www.kcl.ac.uk/ioppn](http://www.kcl.ac.uk/ioppn) @KingsIoPPN

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- Partnering with patients, service users, carers and communities, improving the relevance, quality and impact of our research;
- Attracting, training and supporting the best researchers to tackle complex health and social care challenges;
- Collaborating with other public funders, charities and industry to help shape a cohesive and globally competitive research system;
- Funding applied global health research and training to meet the needs of the poorest people in low and middle income countries.