

HealthTech Programme

Diagnostics Advisory Committee (DAC)

HTE10086 Software for electroencephalogram (EEG) interpretation to support diagnosing epilepsy

– 1st meeting

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The following documents are made available to the Committee:

1. Cover sheet [NO CON]
2. Final Scope [PUB]
3. External assessment report overview (ARO) [REDACTED]
4. Patient group, professional group and NHS organisation submissions:
 - 4a. Young Epilepsy [REDACTED]
 - 4b. Association of British Neurologists [REDACTED]
 - 4c. Association of Neurophysiological Scientists [REDACTED]
5. External assessment report (EAR) dated 30 April 2026 [REDACTED]
6. Company comments and EAG responses on the External Assessment Report and model (EAR) [REDACTED]
7. Register of interests – as of 8 May 2026 [PUB]
8. Combined PEQs for appointed professional experts [PUB]

**NATIONAL INSTITUTE FOR HEALTH AND CARE
EXCELLENCE**

HealthTech Programme

**GID-HTE10086 Software for
electroencephalography (EEG)
interpretation to support diagnosing
epilepsy**

Final scope

1. Introduction

The technologies included in this NICE HealthTech evaluation are software for electroencephalography (EEG) interpretation to support diagnosis of epilepsy.

The technologies are assessed for early use. Early use assessment considers HealthTech products that could address a national NHS unmet need. It rapidly assesses products early in the lifecycle (but that have appropriate regulatory approval for use in the UK) or that have limited use in the NHS and need further evidence to support wider use. Technologies considered for early use can be conditionally recommended for use while further evidence is generated during the evidence generation period. This enables early access to promising new technologies for patients. Conditional recommendations are for a fixed period of time and the technologies will be reassessed for routine use using the evidence generated.

This scope document describes the context and the scope of the assessment. The methods and process for the assessment follow the [NICE HealthTech programme manual](#).

2. The condition

In England and Wales, about 533,000 people, including 112,000 children and young people, have epilepsy ([NICE epilepsy guideline \[NG217\]](#)). According to

the [International League Against Epilepsy \(ILAE\)](#), epilepsy is a disease of the brain defined by any of the following conditions:

- at least 2 unprovoked (or reflex) seizures occurring more than 24 hours apart
- 1 unprovoked (or reflex) seizure and a probability of further seizures similar to the general recurrence risk (at least 60%) after two unprovoked seizures, occurring over the next 10 years
- diagnosis of an epilepsy syndrome.

Some people have epilepsy for just a period in their life while others live with it for many years or all their life.

People with epilepsy have repeated bursts of abnormal electrical activity in the brain that lead to epileptic seizures. Usually, a seizure lasts for a few seconds or minutes and then brain activity returns to normal. Epileptic seizures can take different forms. Some involve movements that the person cannot control, such as jerking or twitching, going stiff, or falling to the floor and shaking (generalised seizures). Others involve becoming confused or having unusual sensations (focal seizures). Some people lose awareness while others remain aware of what is happening [NICE epilepsy guideline \[NG217\]](#).

Epilepsy is a common cause of people attending accident and emergency departments. It is estimated that there are about 100,000 epilepsy-related A&E admissions per year ([Epilepsy Research Institute](#)). Epileptic seizures can result in injury and are associated with an increased risk of premature death, for example, because of sudden unexpected death in epilepsy (SUDEP).

3. Current practice

In the NHS, the referral, diagnosis and management of epilepsy and the use of electroencephalogram (EEG) within this care pathway follow:

- [British Society for Clinical Neurophysiology \(BSCN\) and Association of Neurophysiological Scientists \(ANS\) guidance on referral for neurophysiological testing \(2025\)](#)

- [BSCN guidance on practice of electroencephalography](#)
- [NICE epilepsy guideline \(NG217\)](#)
- [NICE epilepsy quality standard \(QS175\)](#)
- [NICE recognition and referral of suspected neurological conditions guideline \(NG127\)](#)
- [NICE transient loss of consciousness \('blackouts'\) guideline \(CG109\)](#).

3.1 Referral for a specialist assessment

After a first suspected seizure or when people have a seizure recurrence after a period of remission, [NICE epilepsy guideline \(NG217\)](#) recommends making an urgent referral (for an appointment within 2 weeks) for a specialist assessment. Experts advise that in current practice in the NHS, the referral is usually done after 2 suspected seizures. The specialist assessment is usually by a consultant neurologist or a consultant paediatric neurologist in secondary care.

3.2 Specialist assessment and diagnosis

The specialist assessment aims to find out if the seizure was caused by epilepsy. The assessment includes:

- clinical history, including what happened around and during the seizure, and a physical examination
- assessment and consideration of alternative causes such as cardiac-related conditions (assessment by a 12-lead ECG) or metabolic disturbances
- if these suggest epilepsy, requesting an electroencephalogram (EEG) is considered (if requested after a first seizure, the routine EEG should be done as soon as possible, ideally within 72 hours after the seizure)

Electroencephalogram (EEG)

An EEG, is a recording of the electrical activity of the brain.

[NICE epilepsy guideline \(NG217\)](#) recommends to consider:

- a routine EEG while awake (20 to 40 minutes recording)

Final scope –Software for electroencephalography (EEG) interpretation to support diagnosing epilepsy

Issue date: January 2026

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3 of 17

If the routine EEG is normal, consider:

- a sleep-deprived EEG while asleep (40 minutes to 1 hour recording)

If the routine and sleep-deprived EEG results are normal, and diagnostic uncertainty persists, consider:

- a longer-term ambulatory EEG (24 to 48 hours recording).

If requested after first seizure, the routine EEG should be done as soon as possible, ideally within 72 hours after the seizure. In current practice, some NHS trusts provide sleep-deprived EEG as the first test.

To record the EEG, a clinical physiologist or scientist places several small electrodes on the head of the person having the test (this takes about 20 minutes). The electrodes are connected to the recording machine and computer, and the EEG is recorded. During the routine EEG or at the beginning of the sleep-deprived EEG, provoking manoeuvres such as deep breathing (hyperventilation) and flashing lights (photic stimulation) are often included. To sleep during the sleep-deprived EEG, people sleep less the night before or are offered melatonin at the hospital before the test. During the test, heart rate, often a video and sometimes muscle activity of the person having the test is also recorded.

The routine and sleep-deprived EEG are done at the hospital. The person having the test will usually either rest in a chair or bed. For the longer-term ambulatory test, people wear a portable EEG machine. They can leave the hospital after the electrodes have been placed and carry on their usual routine during the recording.

Interpreting the EEG

After the test, the EEG recording is reviewed. In shorter tests, the review looks for evidence of epilepsy-related electrical brain activity that may appear between seizures, also called interictal epileptiform discharges or activity, such as spikes and sharp waves. In the longer-term tests, aimed to capture seizures, they also look for evidence of seizures.

First, the clinical physiologist who conducted the test reviews the test recording and writes a factual report describing what happened during the test and an initial interpretation of what the EEG data shows. A consultant clinical neurophysiologist then reads the factual report, reviews the EEG data and writes a clinical report including an interpretation of the test results and clinical conclusions. This report goes back to the neurologist or paediatric neurologist who requested the test for decision making on whether further tests are needed.

The diagnosis of epilepsy is made based on the entire specialist assessment that includes clinical history and assessment of alternative causes of seizures. The EEG can support the diagnosis but not exclude it. Epilepsy can be diagnosed, and the treatment can start without an EEG.

3.3 Further tests

Further investigations to help inform prognosis and to plan management of diagnosed epilepsy may include:

- MRI for people with suspected structural cause of epilepsy (if contraindicated, a CT scan is considered)
- Genetic testing for people with a suspected genetic cause of epilepsy
- Antibody testing for people with a new-onset epilepsy and a suspected autoimmune encephalitis

3.4 Treatment

The main treatment for epilepsy is anti-seizure medicine. These medicines prevent seizures in about 60% to 70% of people with epilepsy. The type of medicine recommended depends on the seizure type, epilepsy syndrome and other factors such as age, sex, plans to have children, other health conditions and medications, and usual or planned activities in life ([NICE epilepsy guideline \(NG217\)](#)). Clinical experts estimate that the most prescribed medicines include lamotrigine, levetiracetam, and carbamazepine. Sodium valproate may also be among the most common medications in children.

People can ask for a review of their care if they have concerns, need support or their care needs change. Regular treatment reviews should be provided to groups that are less suited to a self-initiated approach. After a person has been seizure-free for 2 years, ([NICE epilepsy guideline \(NG217\)](#)) recommends an individualised assessment to determine if antiseizure medications can be stopped.

For epilepsy with seizures that are not controlled by medication or where other treatment options may be appropriate, other treatment options may include resective epilepsy surgery, vagus nerve stimulation, and ketogenic diet therapies.

4. Unmet need

Conducting and interpreting EEGs needs to be done by specially trained clinicians. The test generates large amounts of results data and interpreting this takes time. The specialist capacity available to conduct and interpret EEGs varies in different parts of the country and so the waiting time for a routine EEG can range from a few weeks to more than 6 months. There is a need for faster access to EEG.

5. The technologies

This section describes the properties of the technologies based on information provided to NICE by manufacturers and experts, and publicly available information. NICE has not done an independent evaluation of these descriptions.

This evaluation includes 2 types of software technologies that help clinicians interpret electroencephalograms (EEGs) recorded using scalp electrodes:

- software that assists reviewing and interpreting EEGs, by automatically detecting and marking interictal spikes, or spikes and seizures in EEG data
- software that assists diagnosing epilepsy, by classifying EEG recordings without visual epileptiform activity based on how supportive they are of epilepsy diagnosis

The software may also provide other information or have other features to assist the review and interpretation.

Epilepsy diagnosis in the NHS most often involves short recordings in an outpatient setting. So software that only detect and mark seizures but not interictal spikes in the EEG data are out of scope.

Sections 5.1 to 5.5 and table 1 briefly describe the 5 included technologies. All the 5 technologies intend to support clinician review and decision making, not replace it. None of the included technologies have restrictions on use based on the type of epilepsy. At the time of writing this scope, all the included technologies were available to the NHS.

5.1 BioEP (Neuronostics)

BioEP is a UKCA-marked (currently class 1 medical device, EU MDR class 2a submission is planned for 2027) software. It analyses digital biomarkers based and classifies the EEG on a 5-point scale from very unsupportive to very supportive of diagnosis of epilepsy. The software is intended to be used for clinically inconclusive EEGs (the neurophysiologist's clinical report concludes that the EEG does not indicate epilepsy). The clinician inputs patient details in the BioEP platform, uploads EEG data via a secure web portal for analysis and downloads the BioEP report. The process from upload to report generation takes less than 10 minutes. If the clinician's initial suspicion of epilepsy is high, and the BioEP score aligns, this might stimulate the clinician to finalise their epilepsy diagnosis. If the initial suspicion is high, but BioEP score is low, the clinician might consider further investigating alternative causes for the seizure. If the initial suspicion is low but the BioEP score is high, the clinician might consider a sleep-deprived or ambulatory EEG. BioEP works with at least 15 minutes of awake, resting-state sections of EEG without seizure or interictal epileptiform activity, ideally recorded with eyes closed. It is suitable for use in people aged 18 or over. Expansion to paediatric population (aged 2 to 18) is planned for 2026. The software is not suitable for use with structural brain abnormalities, skull breaches, or intracranial metal or plastic implants. It does not analyse sleep, hyperventilation or photic stimulation

sections, which should be excluded. The software works with any EEG recording platform that produces files in EDF format. The platform includes a mandatory, about 5-minute-long training video that guides users through the process of uploading EEG data and interpreting the report.

5.2 encevis (AIT - Austrian Institute of Technology GmbH)

encevis is a CE-marked (class 2b medical device) software. It has a spike detection module for the automatic marking of areas in the EEG that could correspond to spikes or spike-waves. The seizure detection component automatically detects areas in EEG recordings that may correspond to electroencephalographical recognisable epileptic seizures and displays these markings for review. encevis is suitable for use in people aged 18 or over. The software integrates with existing EEG systems and many different files formats. It supports the DICOM standard for neurophysiology data. The company expects that users would benefit from a brief initial user training focused on system operation, interpretation of automated results, and the use of artefact-reduction tools. Onsite and online training is available.

5.3 NeuroCenter EEG (Clinical Science Systems)

NeuroCenter EEG is a software (currently class 1 medical device, CE-mark class 2a expected in early 2026). The technology is designed to provide detection of interictal epileptiform discharges in routine, sleep-deprived and ambulatory EEG recordings. It highlights EEG segments with a high likelihood of containing IEDs. These flagged segments are displayed in the EEG viewer, where clinicians can review, confirm, or dismiss the marked events. The software works with any EEG recording platform that produces files in EDF+ format. NeuroCenter EEG is suitable for use in people aged 6 years and over. The company expects that users do not need extensive training. Onsite and online training is available.

5.4 NeuroWorks (Natus Medical)

The NeuroWorks EEG software includes autoSCORE, a CE-marked (class 2a medical device) software product. It is intended to assist the user when

Final scope –Software for electroencephalography (EEG) interpretation to support diagnosing epilepsy

Issue date: January 2026

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8 of 17

reviewing EEG recordings by assessing the probability that the previously acquired sections of EEG recordings contain abnormalities and classifying these into pre-defined types of abnormality. autoSCORE sends this information to the EEG software to indicate where markers indicating abnormality are to be placed in the EEG. The spike detection component of autoSCORE is intended to mark previously acquired sections of the patient's EEG recordings that may correspond to spikes. autoSCORE works with EEG sections from 14 minutes to 4 hours. autoSCORE does not detect or classify seizures. The spike detection component is suitable for use in people aged 3 months or over for EEGs of shorter than 4 hours and people aged 2 years or over for EEGs over 4 hours. The company expects that users familiar with NeuroWorks without autoSCORE do not need extensive training for using NeuroWorks with autoSCORE.

5.5 Persyst 15 (Persyst)

Persyst 15 is a UKCA-marked (class 2a medical device) software. It has a Spike Detection component that is intended to mark sections of the EEG recordings that may correspond to spikes. The Seizure Detection and Seizure Probability component, and the Neonatal Seizure Detection component, are intended to mark sections of EEG recordings that may correspond to electrographic seizures. The Spike Detection -component is suitable for use in people aged 1 month and over. The Seizure Detection and Seizure Probability -component is suitable for use in people aged 18 or over. The Neonatal Seizure Detection component is suitable for use in neonates with conceptional age between 36 and 44 weeks and chronologic age less than 2 weeks. Persyst integrates with existing EEG systems and many different files formats. The company provides user training as part of implementation.

Table 1 Summary of the included technologies

Technology (manufacturer) regulatory status	Software category	Intended age group
BioEP (Neuronostics) UKCA class 1, EU MDR class 2a submission planned for 2027	Assists diagnosing epilepsy, by classifying EEG recordings without visual epileptiform activity based on how supportive they are of epilepsy diagnosis	18 years and over
Encevis (AIT - Austrian Institute of Technology GmbH) CE class 2b	Assists reviewing and interpreting EEGs, by automatically detecting and marking in EEG data: • interictal spikes • seizures	18 years and over
NeuroCenter EEG (Clinical Science Systems) CE class 1, class 2a expected in 2026	Assists reviewing and interpreting EEGs, by automatically detecting and marking in EEG data: • interictal spikes • seizures	6 years and over
NeuroWorks (Natus Medical) CE class 2a	Assists reviewing and interpreting EEGs, by automatically detecting and marking in EEG data: • interictal spikes	• 3 months or over for EEGs of shorter than 4 hours • 2 years or over for EEGs over 4 hours
Persyst 15 (Persyst) UKCA class 2a	Assists reviewing and interpreting EEGs, by automatically detecting and marking in EEG data: • interictal spikes • seizures	• 1 month and over for spike detection • Neonates (conceptional age between 36 and 44 weeks and chronologic age less than 2 weeks) and 18 years or over for seizure detection

5.6 The place of technologies in the care pathway

The software that assists reviewing and interpreting EEGs, by automatically detecting and marking interictal spikes, or spikes and seizures in EEG data, will be assessed for use alongside clinical physiologist's and consultant clinical neurophysiologist's review of the EEG. This type of software may have an effect on the clinician interpretation and report about the EEG. Through the report it may also have an effect on the consultant neurologist's or consultant paediatric neurologist's diagnosis of epilepsy.

The software that assists diagnosing epilepsy, by classifying EEG recordings without visual epileptiform activity based on how supportive they are of epilepsy diagnosis, will be assessed for use as additional information for the specialist assessment for suspected epilepsy together with clinical history, assessment of alternative causes of seizures and the clinical report about the EEG (the EEG does not have visual epileptiform activity). This type of software may have an effect directly on the consultant neurologist's or consultant paediatric neurologist's diagnosis of epilepsy.

5.7 Innovative aspects

The software in this assessment uses AI-derived algorithms to automatically detect and mark epilepsy-related abnormalities on EEG recordings or to calculate digital biomarkers from the EEG recordings that are not visible to the human eye.

6. Comparators

The comparators are:

- Clinician interpretation of EEG without the software that assists reviewing and interpreting EEGs, by automatically detecting and marking interictal spikes, or spikes and seizures in EEG data
- Clinician diagnosis of epilepsy without the software that assists diagnosing epilepsy, by classifying EEG recordings without visual epileptiform activity based on how supportive they are of epilepsy diagnosis.

7. Patient issues and preferences

Getting an epilepsy diagnosis may take time. People without diagnosis may feel worried about not knowing what caused the first seizure, or about having another seizure and the risk of injury and death associated with having an epileptic seizure. Incorrect diagnosis causes harm. While epilepsy diagnosis is not based only on the EEG results, false-positive EEG interpretation can contribute to unnecessary treatment and anxiety, whereas false-negative EEG interpretation can contribute to epilepsy remaining undiagnosed and untreated. People may have concerns over the reliability and accuracy of AI-derived algorithms. But it is important to people that investigations done to diagnose epilepsy provide as much information about the epilepsy and its type as possible to help start or refine the treatment as early as possible.

8. Potential equality issues

NICE is committed to promoting equality of opportunity, eliminating unlawful discrimination and fostering good relations between people with protected characteristics (Equality Act 2010) and others.

8.1 Equality issues related to the condition

- Epilepsy is a disability protected by the Equality Act 2010
- People in the most deprived areas of the UK are more than 30% more likely to have epilepsy than people in the least deprived areas ([Wigglesworth et al. 2023](#), [Bush et al. 2024](#))
- Epilepsy can start at any age but it often starts in young children and people over 50 ([NHS conditions: epilepsy](#))
- 50% of people diagnosed with epilepsy have co-existing health conditions ([Epilepsy Research Institute](#))
- Conditions more common in people with epilepsy than in the general population include for example:
 - Neurodevelopmental conditions such as a learning disability, ADHD, autism or cerebral palsy
 - Dementia (in older people)

- Mental health conditions such as depression and anxiety.

8.2 Equality issues related to the technology

- There is geographical variation in the capacity of epilepsy specialised healthcare professionals such as the clinical neurophysiologists who interpret EEGs – people who live in areas of less availability may have less access or wait longer for services
- EEGs from children may be particularly challenging to interpret because the electrical activity in the brain and so what normal activity looks like changes with the developing brain
- EEGs from older people have different characteristics compared to the EEGs from younger people
- EEGs from people with some neurodevelopmental conditions or neuropsychiatric disorders or having certain medications may be more difficult to interpret because what some electrical brain activity related to these conditions may look like the activity related to epilepsy or the EEG may not show typical epileptiform activity
- People with conditions such as a neurodevelopmental conditions or dementia may find it more challenging to rest during the EEG recording and the movement during the test causes artefacts that may make interpreting the EEG data more challenging
- If the software has been developed and validated in populations in which people with conditions that may make EEG data more challenging to interpret have been underrepresented, it may perform differently in these groups than data suggests.

9. Guidance type

Software for electroencephalography (EEG) interpretation to support diagnosis of epilepsy will be assessed for early use. This is because:

- the assessed technologies have limited or no current use in the NHS
- limited evidence is available for all technologies

- the technologies have the potential to address a high unmet need in the NHS
- the technologies have recent, ongoing or upcoming appropriate regulatory approval for use in the UK.

10. Decision problem

The key decision questions for this assessment are:

- Does using software assisted EEG interpretation to support diagnosing epilepsy have the potential to be clinically and cost-effective use of NHS resources?
- Are there gaps in the evidence base and what are the key gaps?

Table 2: Decision problem

Assessment type	Early use
Population	People having an EEG to support diagnosing epilepsy If the evidence allows, the following subgroups may be considered: • People with conditions that may make it more difficult to interpret the EEG (such as neurodevelopmental conditions, neuropsychiatric disorders, cognitive impairment or medication that could influence the electrical activity in the brain) • Neonates, children, adults
Interventions	Clinician interpretation of EEG using one of the following software: • encevis • NeuroCenter EEG • NeuroWorks • Persyst 15 Clinician diagnosis of epilepsy using the additional information provided about EEGs without visual epileptiform activity by the software: • BioEP The technologies will not be assessed outside of their indicated use.

Comparators	• Clinician interpretation of EEG without the software that assists reviewing and interpreting EEGs, by automatically detecting and marking interictal spikes, or spikes and seizures in EEG data • Clinician diagnosis of epilepsy without the software that assists diagnosing epilepsy, by classifying EEG recordings without visual epileptiform activity based on how supportive they are of epilepsy diagnosis.
Setting	Secondary or tertiary care services
Outcomes and costs (may include but are not limited to)	Intermediate outcomes: • diagnostic accuracy • technical failure rate to analyse EEG • lifetime number of EEGs • number of people with diagnosed epilepsy • clinician EEG review and report turnaround time • impact of software result on clinical decision-making • clinician acceptability and experience • time to diagnosis and treatment Clinical outcomes: • morbidity (including adverse events caused by assessment or treatment) • mortality (including sudden unexpected death in epilepsy [SUDEP]) Patient-reported outcomes: • health-related quality of life • ability to participate in the community (for example having a driver's license or employment) • acceptability, views, experience and satisfaction Costs and resource use: • cost of technology • cost of training • cost of further testing • cost of treatment and management • health service use and cost at different settings
Economic analysis	A health economic model will be developed comprising a cost utility or cost-comparison analysis. Costs will be considered from an NHS and Personal Social Services perspective. Sensitivity and scenario analysis should be undertaken to address the relative effect of parameter or structural uncertainty on results.

	The time horizon should be long enough to reflect all important differences in costs or outcomes between the technologies being compared.

11. Other issues for consideration

11.1 Potential implementation issues

Some software may not work with all types of EEG data or file formats, or may add steps to the current workflow. These issues may get solved or improved when further versions of the software are developed. Some of the existing IT infrastructure may need some modifications or upgrading to accommodate new software. NHS England's Digital Technology Assessment Criteria (DTAC) and the early involvement of IT and other relevant stakeholders will help identify needs and feasible solutions.

11.2 Health economic models for epilepsy treatment

[NICE epilepsy guideline \(NG217\)](#) includes health economic models for antiseizure medication and epilepsy surgery treatment. These may be helpful for informing a potential treatment part of any health economic model in this assessment.

11.3 Software development and validation data

The assessment should collate information from the manufacturers on the datasets the software has been trained and validated in.

11.4 Additional innovative aspects and future considerations

Some of the included technologies may also help prioritisation of EEG recordings for review. The effect of using the software to prioritise EEG recordings for review could be explored.

In the future, the technologies may have additional value propositions to address the unmet need. It may be considered that some of the technologies could be used to assist less experienced or specialised clinicians to review EEGs, or to do a first review of the EEG. This could shift the care pathway towards longer EEGs.

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Early-use assessment

HTE10086 Software for electroencephalography (EEG) interpretation to support diagnosing epilepsy

Assessment report overview

This overview summarises key information from the assessment and sets out points for discussion in the committee meeting. It should be read together with the [final scope](#), the external assessment report. List of abbreviations used in this overview is in [appendix A](#).

1. The technologies

This evaluation includes 2 types of software technologies that help clinicians interpret electroencephalograms (EEGs) recorded using scalp electrodes:

- software that assists reviewing and interpreting EEGs, by automatically detecting and marking interictal spikes, or spikes and seizures in EEG data
- software that assists diagnosing epilepsy, by classifying EEG recordings without visual epileptiform activity (EEGs considered inconclusive for epilepsy) based on how supportive they are of epilepsy diagnosis

The software may also provide other information or have other features to assist the review and interpretation. None of the included technologies have restrictions on use based on the type of epilepsy.

Table 1 Features of each technology

Technology (manufacturer)	Software type	Intended age group

regulatory status		
BioEP (Neuronostics) UKCA class I (EU MDR class IIa submission planned for 2027)	Assists diagnosing epilepsy, by classifying EEG recordings without visual epileptiform activity based on how supportive they are of epilepsy diagnosis	18 years and over
Encevis (AIT - Austrian Institute of Technology GmbH) CE class IIb	Assists reviewing and interpreting EEGs, by automatically detecting and marking in EEG data: • interictal spikes • seizures	18 years and over
NeuroCentre EEG (Clinical Science Systems) CE class I (EU MDR class IIa expected in 2026)	Assists reviewing and interpreting EEGs, by automatically detecting and marking in EEG data: • interictal spikes • seizures	6 years and over
NeuroWorks (Natus Medical) CE class IIa	Assists reviewing and interpreting EEGs, by automatically detecting and marking in EEG data: • interictal spikes	• 3 months or over for EEGs of shorter than 4 hours • 2 years or over for EEGs over 4 hours
Persyst 15 (Persyst) UKCA class IIa	Assists reviewing and interpreting EEGs, by automatically detecting and marking in EEG data: • interictal spikes • seizures	• 1 month and over for spike detection • Neonates (conceptional age between 36 and 44 weeks and chronologic age less than 2 weeks) and 18 years or over for seizure detection

2. The condition

In England and Wales, about 533,000 people, including 112,000 children and young people, have epilepsy ([NICE epilepsy guideline \[NG217\]](#)). According to the [International League Against Epilepsy \(ILAE\)](#), epilepsy is a disease of the brain defined by any of the following conditions:

- at least 2 unprovoked (or reflex) seizures occurring more than 24 hours apart
- 1 unprovoked (or reflex) seizure and a probability of further seizures similar to the general recurrence risk (at least 60%) after two unprovoked seizures, occurring over the next 10 years
- diagnosis of an epilepsy syndrome.

Some people have epilepsy for just a period in their life while others live with it for many years or all their life.

Epilepsy is a common cause of people attending accident and emergency departments (A&E). It is estimated that there are about 100,000 epilepsy-related A&E admissions per year ([Epilepsy Research Institute](#)). Epileptic seizures can result in injury and are associated with an increased risk of premature death, for example, because of sudden unexpected death in epilepsy.

3. Current practice

After suspected seizures, people are referred for a specialist assessment by a consultant neurologist or a consultant paediatric neurologist. The specialist assessment aims to find out if the seizure was caused by epilepsy. The assessment includes:

- clinical history, including what happened around and during the seizure, and a physical examination
- assessment and consideration of alternative causes such as cardiac-related conditions (assessment by a 12-lead ECG) or metabolic disturbances
- if these suggest epilepsy, requesting an electroencephalogram (EEG) is considered (if requested after a first seizure, the routine EEG should be done as soon as possible, ideally within 72 hours after the seizure)

After the EEG, the EEG data and in some cases also video recording is reviewed for evidence of seizures or epilepsy-related electrical brain activity that may appear between seizures, called interictal epileptiform discharges.

Assessment report overview – Software for electroencephalography (EEG) interpretation to support diagnosing epilepsy

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First, a clinical physiologist who conducted the test reviews the test recording and writes a factual report describing what happened during the test and an initial interpretation of what the EEG data shows. A consultant clinical neurophysiologist then reads the factual report, reviews the EEG data and writes a clinical report including an interpretation of the test results and clinical conclusions. This report goes back to the neurologist or paediatric neurologist who requested the test for decision making on diagnosis and whether further tests are needed.

The diagnosis of epilepsy is made based on the entire specialist assessment, not just the conclusion on the EEG. The EEG result can support epilepsy diagnosis, but an inconclusive EEG cannot exclude it. Epilepsy can be diagnosed, and the treatment can start without an EEG.

4. Unmet need

Conducting and interpreting EEGs needs to be done by specially trained clinicians. The test generates large amounts of results data and interpreting this takes time. The specialist capacity available to conduct and interpret EEGs varies in different parts of the country and so the waiting time for a routine EEG can range from a few weeks to 12 months. There is a need for faster access to EEG.

5. Innovative aspects

The software in this assessment uses AI-derived algorithms to automatically detect and mark epilepsy-related abnormalities on EEG recordings or to calculate digital biomarkers from the EEG recordings that are not visible to the human eye.

Further details, including descriptions of the interventions, comparators, care pathway and outcomes, are in the [final scope](#).

6. Clinical effectiveness evidence

The EAG did literature searches to identify relevant clinical evidence. The search and selection methods are in 4.1 of the external assessment report (EAR).

6.1 Overview of key studies

The EAG identified a total of 17 studies on the 5 technologies. Some of the studies included more than 1 of the included technologies.

Table 2 provides an overview of the identified evidence base. Overall, 7 studies used the technologies as intended: to assist the clinician to either review the EEG or diagnose epilepsy. The rest of the studies used the technologies fully automated, to review or diagnose alone. Most studies were done outside the UK. Most study participants were adults. No studies included sleep-deprived EEGs.

Study characteristics are in table 4 in section 4.2 of the EAR.

Table 2. Overview of the identified evidence base

Technology	Identified evidence
BioEP	3 studies (2 studies used technology to assist clinician)
encevis	8 studies (3 studies used technology to assist clinician)
NeuroCenter EEG	1 study (which used technology to assist clinician)
NeuroWorks	2 studies
Persyst 15	1 study on Persyst 15 plus 7 studies on earlier versions of Persyst (4 of these 7 studies used technology to assist clinician)

Study quality

The sample size and unit of reporting in the studies varied (some reported result per person, per EEG or per EEG segment). Some studies on encevis and Persyst used older versions of the software. The role and expertise of the reviewing clinician in the studies done outside of the UK varied or was not described. This may limit the generalisability of the study results to the NHS.

Only 1 of the included studies was a prospective study using the technology to assist the clinician.

6.2 Study results for technologies that assist EEG review: encevis, NeuroCenter EEG, NeuroWorks and Persyst 15

Accuracy to detect interictal epileptiform discharges and seizures

Table 3 shows the results of the 5 studies that reported on the accuracy of clinicians using the technology to assist their review to detect interictal epileptiform discharges or seizures.

Of these studies, 2 studies compared the accuracy of both the clinician review with and without one or more of the included technologies to a reference standard. In Kural et al. (2022), specificity to detect interictal epileptiform discharges with both encevis and Persyst either improved or stayed the same than the specificity of clinician review without the technologies. Sensitivity with encevis stayed the same but reduced with Persyst compared with clinician review without the technologies. Reus et al. (2022a) reported similar sensitivity to detect seizures with or without encevis or Persyst.

Additionally, there were 11 studies reporting on the accuracy of the technologies alone (not used as intended). One of these studies was a large validation study (3 datasets: n=100, n=9785, n=60 EEGs, Tveit et al. 2023) of SCORE-AI, the interictal epileptiform discharge detection software product in NeuroWorks. The accuracy of SCORE-AI on its own was similar to the accuracy of experts on their own compared with an expert panel. Overall, EAG noted that the amount of false positive findings in the studies of the software alone was high and could affect time to review if checking these findings was time consuming. Sensitivity and specificity varied between EEG type, use settings and different versions of the same technology.

More detail on the studies reporting accuracy to detect interictal epileptiform discharges and seizures are in section 5.2.1 of the EAR.

Table 3. Accuracy to detect interictal epileptiform discharges and seizures (EEG-level results)

Study, country	Technology	Type of EEG	Study size	Detection target	Reference standard	Sensitivity with technology	Sensitivity without technology	Specificity with technology	Specificity without technology
Kural et al. (2022), Denmark	encevis (DeepSpike) Persyst (13)	Routine EEG (20 minutes)	60	Interictal epileptiform discharges	2 experts (using also video recorded during EEG)	93% (78% to 99%) 77% (58% to 90%)	93% (78% to 99%)	93% (78% to 99%) 97% (83% to 100%)	73% (55% to 88%)
da Silva Lourenço et al. (2023), Netherlands	NeuroCenter EEG	Ambulatory EEG	100	Interictal epileptiform discharges	Expert (original EEG report)	93%	Not measured	100%	Not measured
Koren et al. (2018), Austria	encevis (NeuroTrend)	Continuous EEG in critical care	80 EEGs from 20 people	Seizures	2 experts	Mean 87% (range 68% to 97%, between 4 reviewers)	Not measured	Mean 82% (range 68% to 92%, between 4 reviewers)	Not measured
Reus et al. (2022a), Netherlands	encevis Persyst (14)	Ambulatory EEG	286 EEGs from 283 people	Seizures	Clinical report plus tech-flagged seizures judged true by 2 experts	95% (86-99%) 98% (90-100%)	100% (93-100%) 100% (93-100%)	Not reported	Not reported
Duckworth et al. (2024), UK	Persyst (14)	Continuous EEG in critical care	98	Seizures	Expert	80%	Not reported	98%	Not reported

Failure to analyse EEG

Two studies reported a technical failure to analyse EEGs. In Koren et al. (2018) using encevis (older NeuroTrend version), 4 of 80 continuous EEG segments and in Koren et al. (2025) using encevis (2.0) and Persyst (14), 1 in 81 video EEGs were excluded from analysis because of technical issues or low data quality.

EEG review and reporting time

Table 4 shows the results of the studies reporting on the time to review and report EEGs. Of these 3 studies, 1 study compared the time of clinician review with and without the technology. This study, Kural et al. (2022), showed time saving in routine EEG review with both encevis (mean saving 0.7 minutes) and Persyst (mean saving 1.7 minutes) per EEG.

Detail on 3 studies reporting on EEG review time by the technologies alone are in section 5.2.1 of the EAR.

Table 4. EEG review and reporting time

Study, country	Technology	Type of EEG	Study size	Time with software per EEG	Time without software
Kural et al. (2022), Denmark	encevis (DeepSpike) Persyst (13)	Routine EEG (20 minutes)	60	Mean 2 minutes (standard deviation [SD] 1.7 to 22 minutes) Mean 1 minute (SD 0.8 to 1.1 minutes)	Mean 2.7 minutes (SD 2.4 to 2.9 minutes)
da Silva Lourenço et al. (2023), Netherlands	NeuroCenter EEG	Ambulatory EEG (mean 20.6 hours)	100	On average 1.5 minutes (max 8.4 minutes) for normal EEG to on average 3.0 minutes (max 17.5 minutes) for an EEG with interictal epileptiform discharges	Not reported
Koren et al. (2018), Austria	encevis (NeuroTrend)	Continuous EEG in critical care (24 hours)	80 EEGs from 20 people	Mean 12 minutes (SD 5.3 minutes)	Not reported

Clinician acceptability and experience

One qualitative study, Sharpe et al. (2019) reported on 9 neurologists' view on Persyst in real-time review in a neonatal unit. All found the technology useful for seizure detection. Many of the 9 neurologists found it had fairly high sensitivity. But false positive results were common and it could not be relied on without human review. Instant messaging alert function was used by 2 neurologists. Others found alerts with false positive results too disruptive.

6.3 Study results for technology that assists diagnosing epilepsy: BioEP

Accuracy to identify epilepsy

Table 5 shows the results of the 1 study that reported on the accuracy of BioEP on its own to identify epilepsy in people who had an inconclusive routine EEG result. The EAG noted that the BioEP result is intended to support clinical decision-making, not to make the diagnosis.

Table 5. Accuracy to identify epilepsy

Study, country	Technology	Type of EEG	Study size	Reference standard	Sensitivity	Specificity
Tait et al. (2024), UK	BioEP	Routine EEG (20 minutes)	281	Established clinical diagnosis	61%	75%

Diagnostic yield

One study, Charles et al. (2026), reported on the diagnostic yield when using BioEP scores to prioritise the ordering of follow-up EEGs for 40 people with suspected epilepsy. When half of the follow-up EEGs were done, 10% more people had received epilepsy diagnosis compared with when follow-up EEGs were done without prioritising the order. Assuming 54% sensitivity for a

second-line EEG, this corresponded to a 5% (95% CI 5% to 10%) increase in diagnostic yield.

Effect of technology result on clinical decision making

One study, Tittensor et al. (2024; pre-print), reported on the impact of BioEP score on 2 reviewers' beliefs on how likely people with suspected epilepsy are to have a second seizure. The reviewers were a consultant nurse and clinician. When in addition to clinical history and routine EEG results, the reviewers had BioEP score, one increased their likelihood rating for 15 and decreased it for 10 people and the other increased it for 21 and decreased it for 37 people. The study did not collect data on final clinical diagnosis.

6.4 Ongoing studies

The EAG identified 8 ongoing studies: 6 studies on BioEP, 1 on NeuroCenter EEG and 1 on NeuroWorks. A summary of these studies is in section 8.1 of the EAR.

7. Health economic evidence

The external assessment group (EAG) did a review to identify suitable health economic models. There were no models on the included technologies or directly relevant to the decision problem.

During the factual accuracy check of the external assessment report (EAR), the manufacturer of BioEP, Neuronostics, shared an executable preliminary economic model and description of this analysis determining the cost-effectiveness of BioEP in an NHS setting. The [REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED] EAG's rapid review of Neuronostics'

economic model is in the EAR Appendix B5.

7.1 Health economic model

The EAG developed a simple early exploratory decision tree model. The model for the technologies assisting EEG review focused on staff time spent reviewing and reporting on EEGs. For BioEP, the EAG also considered the potential downstream impact of BioEP, in terms of reduced need for subsequent EEGs.

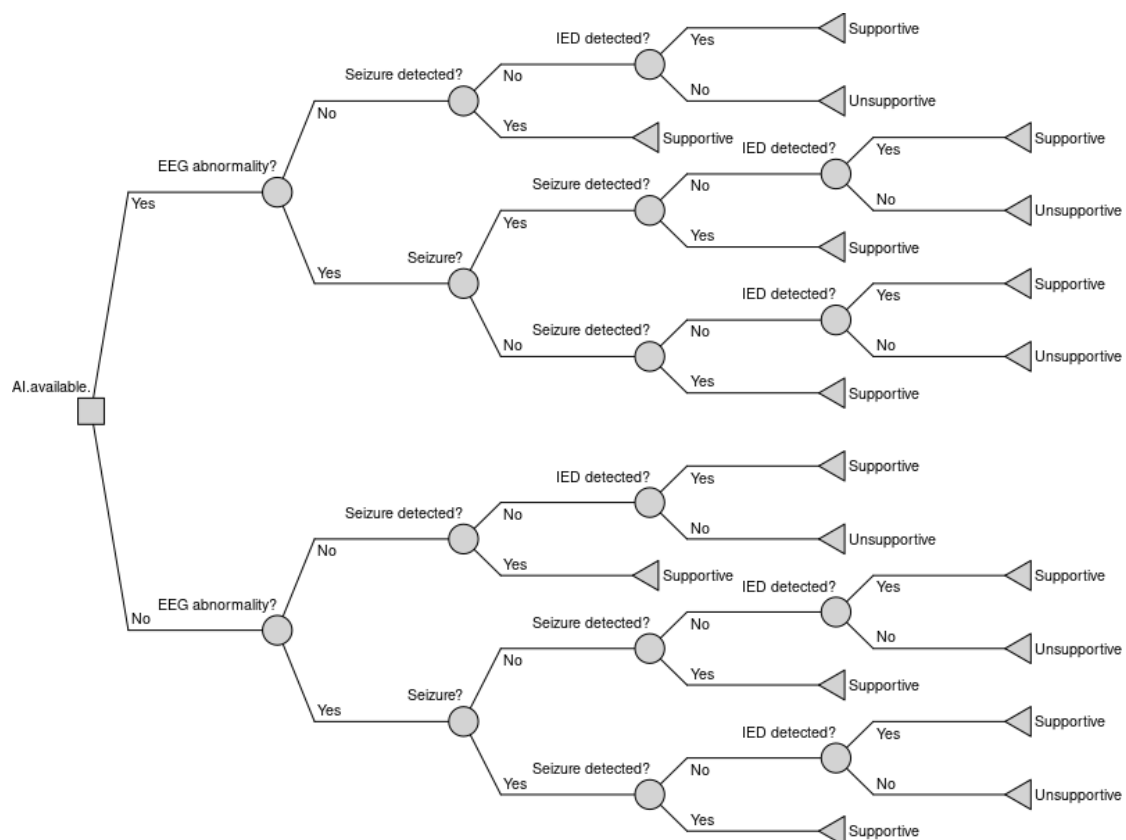
The time horizon of the decision tree included:

- Doing an EEG (routine, sleep-deprived, ambulatory or telemetry)
- Reviewing and reporting of the EEG

Model structure for the technologies assisting EEG review

Figure 1 presents the model structure for exploring the effects of the technologies assisting physiologist and neurophysiologist EEG review (encevis, NeuroCenter EEG, NeuroWorks, Persyst 15). At the left of the figure, people entering the model split into those having their EEG reviewed for interictal epileptiform discharges or seizures by a physiologist and results interpreted by a consultant neurophysiologist without and with one of the technologies. Some people's EEGs have interictal epileptiform discharges or seizures, and other people's EEG's do not. These are either correctly detected, missed or falsely detected. The detection of abnormalities on the EEG, whether true or false, results in a conclusion of the EEG being 'supportive of diagnosis of epilepsy'. Correctly identifying no abnormalities or missing abnormalities results in a conclusion of the EEG being 'unsupportive of diagnosis of epilepsy'.

Figure 1. Model structure for the technologies assisting EEG review (encevis, NeuroCenter EEG, NeuroWorks, Persyst 15)



Model structure for technology that assists diagnosing epilepsy

Figure 2 presents the model structure for exploring the effects of the technology that assists diagnosing epilepsy (BioEP) by further analysing EEGs concluded unsupportive of epilepsy diagnosis. In this structure, people with an EEG concluded unsupportive of epilepsy diagnosis based on physiologist and consultant neurophysiologist review have their EEG further analysed using the technology. This analysis results in the EEG being either supportive or unsupportive of epilepsy diagnosis or 'inconclusive'. The EAG noted that in practice, BioEP places EEGs into 5 categories ('very supportive', 'supportive', 'neutral', 'unsupportive', 'very unsupportive'). But because there was no evidence on how the results would be used in practice, for this early model the EAG used the simplified approach.

The flowchart starts with a decision node 'AI available.'. If 'No', it leads to a 'Seizure detected?' node. If 'Yes', it leads to an 'EEG abnormality?' node. Both paths lead to a 'Seizure?' node. From 'Seizure?', if 'No', it leads to a 'Seizure detected?' node. If 'Yes', it leads to a 'Seizure detected?' node. Both paths lead to a 'Seizure detected?' node. From 'Seizure detected?', if 'No', it leads to an 'IED detected?' node. If 'Yes', it leads to a 'BioEP result' node. Both paths lead to a 'BioEP result' node. From 'BioEP result', if 'Inconclusive', it leads to an 'Inconclusive' node. If 'Supportive', it leads to a 'Supportive' node. If 'Unsupportive', it leads to an 'Unsupportive' node.

The early exploratory model did not include further steps in the diagnostic pathway (such as other diagnostic testing or diagnosis) or all potential consequences of for example unidentified epilepsy (such as further seizures resulting in A&E attendance or injury). But to explore some potential benefits and harms of the technologies, the model assumed that people with an EEG concluded supportive of epilepsy diagnosis (correctly or incorrectly) receive a diagnosis of epilepsy and included 1 year of antiseizure treatment. People with an EEG concluded unsupportive of epilepsy diagnosis or 'inconclusive' (correctly or incorrectly) did not receive epilepsy diagnosis and treatment.

The EAG highlighted that this complete match between EEG conclusion and epilepsy diagnosis and treatment in the model was an assumption that does not fully reflect current practice. For this early model, no data was available on how the EEG conclusion with or without either type of technologies affects the diagnostic decision making or what proportion of people may receive treatment already before having an EEG.

Further details of the economic modelling are in section 6.2 of the EAR. A presentation of a more complex longer-term Markov model that could in the future with more data available explore a more complete diagnostic pathway and treatment, and so a combination of all the value propositions in scope (including reduced waiting time for EEG, time to diagnosis and treatment), is in section 6.5 of the EAR.

Population

People in the model were adults and children (costs in the model were a weighted average where NHS activities were available separately for adults and children) with suspected epilepsy having an EEG. The size of the cohort was 1,000 people.

Comparator

For the technologies assisting the EEG review, the comparator in the model was physiologist and neurophysiologist EEG review of interictal epileptiform discharges and seizures without the technologies.

For the technology that assists diagnosing epilepsy (BioEP) by further analysing EEGs concluded unsupportive of epilepsy diagnosis, comparator in the model was no further analysis of EEGs after the physiologist and neurophysiologist review and conclusion on the EEG without the technologies.

Model inputs

Because there was very limited clinical evidence, most of the model inputs were assumed by the EAG or advised by clinical experts.

Accuracy to detect epileptic abnormalities

Table 6 shows the accuracy of physiologist and neurophysiologist EEG review to detect interictal epileptic discharges and seizures without one of the assisting technologies.

In the base case, the EAG assumed that there was a small increase in sensitivity (0.1%) but no change in specificity when the review was supported by technology. In the base case, because there was no comparative evidence on the accuracy of BioEP, the model assumed it to have the same sensitivity in detecting likelihood of epilepsy ('supportive' result) as the other technologies in detecting interictal epileptiform discharges and seizures.

The EAG explored the sensitivity and specificity estimates reported in the evidence for encephalogram and Persyst (older versions), and BioEP in the sensitivity analysis.

Table 6. Diagnostic accuracy of a clinician to detect epileptic abnormalities on EEG without technology

Type of EEG	Sensitivity, interictal epileptiform discharges	Specificity, interictal epileptiform discharges	Sensitivity, epileptic seizures	Specificity, epileptic seizures
Routine EEG	97%	75%	95%	90%
Sleep-deprived EEG	97%	75%	95%	90%
Ambulatory EEG or telemetry	95%	75%	95%	90%

Prevalence of epileptic abnormalities on EEG

Table 7 shows what proportion of people in the model had epileptic abnormalities on EEG. The EAG felt that clinical expert advice could be more reflective of features seen in NHS practice than data from the populations in the studies on the technologies. So the seizure prevalence was based on expert opinion and the prevalence of interictal epileptiform discharges on EAG assumption, queried with experts.

Table 7. Prevalence of epileptic abnormalities on EEG

Type of EEG	Prevalence of an epileptic abnormality on EEG (interictal epileptiform discharges or seizures)	Prevalence of an epileptic seizure
Routine EEG	35%	1%
Sleep-deprived EEG	60%	3%
Ambulatory EEG	75%	10%
Telemetry	77.5%	20%

Time to review and report EEG

Table 8 shows the time to review and report EEG with and without one of the technologies to assist the review. The base case assumed the time to review and report EEG was shorter when technology was used to assist the review. The time estimates were based on expert opinion. In the base case, the model assumed no added time was needed to use any of the 4 software for review or BioEP for further analysis of EEG.

Table 8. Time to review and report EEG with and without technology support the review (encevis, NeuroCenter EEG, NeuroWorks, Persyst 15)

Type of EEG	Physiologist time	Physiologist time with software	Consultant neuro-physiologist time	Consultant neuro-physiologist time with software
Routine EEG	30 minutes	10 minutes	20 minutes	10 minutes
Sleep-deprived EEG	40 minutes	15 minutes	30 minutes	15 minutes
Ambulatory EEG, telemetry	360 minutes	120 minutes	120 minutes	60 minutes

Failure rate

The base case did not include technology failures. It assumed that the EEG review and analysis would be done as usual without the software if technology did not work. Estimates from evidence on failures of specific technologies were explored in the sensitivity analysis.

Costs

Software costs

Table 9 shows the per person software costs. The pricing structure for the technologies varied. To apply a consistent approach, the EAG assumed that separate licenses were needed for every 5 computers and technologies with a capital purchase option lasted for 5 years.

Details of the technology costs and per person cost calculations are in table 20 in section 6.2.4 of the EAR.

Table 9. Technology costs

Technology	Cost per person (assuming 1000 people a year have an EEG)
BioEP	£100 to £200 (depending on how many EEGs are concluded unsupportive of epilepsy diagnosis after the earlier review of the interictal epileptiform discharges and seizures)
encevis	£8.88
NeuroCenter EEG	£10.75
NeuroWorks	£13.75
Persyst 15	£7.04 in year 1, £13.60 from year 2 onwards

Costs related to EEG and epilepsy treatment

Other costs in the model included:

- Cost of EEG
- An additional outpatient appointment before and after EEG
- EEG review and reporting by a band 5 (routine or sleep-deprived EEG) or a band 7 (ambulatory or home video telemetry) physiologist

- EEG review and reporting by a consultant neurophysiologist
- Treatment of epilepsy with carbamazepine for 1 year.

Details of costs related to EEG and epilepsy treatment are in table 18 in section 6.2.4 of the EAR.

Health-related quality of life

Table 10 shows the health-related quality of life parameters in the model. The EAG noted that in real life the EEG result does not always have a direct link to diagnosis and treatment, and so also not to the health-related quality of life.

Details of utility calculations are in section 6.2.5 of the EAR.

Table 10. Health-related quality of life

Group	Utility value	Brief notes
People with true positive EEG results	0.805	NG217, greater than 50% seizure reduction on medication (originally Marson 2007)
People with false positive EEG results	0.895	Arbitrary utility decrement to reflect possible harm while on inappropriate treatment
People with true negative results	0.905	Assumed people without epilepsy have utilities equivalent to the general population
People with false negative results	0.623	NG217, not seizure free (originally Marson 2007)

Mortality

The model did not include mortality. Because diagnosis of epilepsy is not based on the EEG in isolation and can also be made without or regardless of an EEG result, any effect of the technologies on mortality would be small.

7.2 Model results

Base case

Table 11 shows the base case results for using a technology to assist the physiologist and consultant neurophysiologist EEG review (encevis, NeuroCentre, NeuroWorks, Persyst 15). In the base case of the exploratory model, at 1-year, the addition of the technologies to EEG review was associated with a very small incremental utility (between 0.000057 and 0.000112) and an incremental cost saving of between £26 and £414 depending on the technology and the type of EEG modelled. Because the technologies both improved health and saved cost, they were considered dominant over standard care. The EAG calculated that the time saved using the technologies in 1,000 EEGs could in theory be used to do and review around 330 to over 570 EEGs (depending on the type of EEG). Over a year, this could mean 1 or 2 additional EEGs being recorded each working day.

Table 12 shows the base case results for using technology that assists diagnosing epilepsy by further analysing EEGs concluded unsupportive of epilepsy diagnosis (BioEP). In the base case of the exploratory model, at 1-year, the addition of the technology to standard care was associated with a very small incremental utility (between 0.00037 and 0.003227) and an incremental cost of between £131 and £155 depending on the type of EEG modelled. The ICERs were very large ranging from £40,671 to over £400,000 per QALY gained. The model did not include further steps in the diagnostic pathway or all the potential benefits and harms that may follow. But the EAG calculated that to offset the cost of the technology in a centre doing 1,000 EEGs, between 16 to 72 follow-up EEGs (depending on the type of EEG) would need to be avoided.

The full base case results are in section 6.3.1 of the EAR.

Table 11. Exploratory modelling: base case results at 1 year for using technology to assist EEG review (encevis, NeuroCentre, NeuroWorks, Persyst 15) compared with standard EEG review

Type of EEG	Total EEG review time saved per 1000 EEGs using technology to assist the review	Incremental QALYs per person for technology-assisted EEG review	Incremental cost per person for technology-assisted EEG review	ICER for technology assisted EEG review	Number of additional EEGs that could in theory be done with the time saved, estimates using physiologist time only
Routine	333 hours	0.000057	-£27 to -£33 (depending on technology)	Dominant	333 routine 60-minute or 500 routine 40-minute EEGs (including review and report)
Sleep-deprived	417 hours	0.000096	-£43 to -£50 (depending on technology)	Dominant	333 sleep-deprived EEGs (75 minutes including review and report)
Ambulatory	4,000 hours	0.000112	-£407 to -£414 (depending on technology)	Dominant	571 ambulatory EEGs (1 hour to set up and 6 hours to review and report)
Telemetry	4,000 hours	0.000104	-£407 to -£414 (depending on technology)	Dominant	571 telemetry EEGs (1 hour to set up and 6 hours to review and report)

Table 12. Exploratory modelling: base case results at 1 year for using technology that assists diagnosing epilepsy (BioEP) compared with no further analysis of EEG after standard EEG review

Type of EEG	Number of people with BioEP result supportive of epilepsy diagnosis	Incremental QALYs standard EEG review plus BioEP EEG analysis	Incremental cost standard EEG review plus BioEP EEG analysis	ICER for standard EEG review plus BioEP EEG analysis	Number of follow-up EEGs to avoid to offset the cost of BioEP
Routine	True positives: 6 False positives: 73	0.00037	£155	£418,832	72 routine or sleep-deprived, 54 ambulatory, or 42 telemetry EEGs
Sleep-deprived	True positives: 10 False positives: 45	0.001397	£147	£105,071	44 routine or sleep-deprived, 33 ambulatory, or 26 telemetry EEGs
Ambulatory	True positives: 19 False positives: 28	0.003227	£131	£40,671	28 routine or sleep-deprived, 21 ambulatory, or 16 telemetry EEGs
Telemetry	True positives: 18 False positives: 25	0.002994	£144	£48,115	28 routine or sleep-deprived, 21 ambulatory, or 16 telemetry EEGs

Sensitivity and scenario analysis

To determine the key drivers from the economic modelling and to inform future data collection, the EAG did univariate sensitivity analysis.

The exploratory model results for the technologies assisting physiologist and consultant neurophysiologist EEG review were most sensitive to changes in:

- EEG review time
- utility for true positive results (correctly identified interictal epileptiform discharges or seizures, in the model resulting in diagnosis of epilepsy and treatment)

Because the diagnosis of epilepsy is based on other clinical factors (and not the EEG alone), the EAG considered that the reduction in review time was the most plausible to have an effect in practice. Like in the base case, the technologies dominated compared with standard care in many scenarios assuming reduction in review time. Assuming the EEG review was as accurate with or without the assistive technologies, the reduction in review time needed to offset the cost of using the technology was between 1.8% and 64% (depending on the technology and type of EEG).

The exploratory model results for the technology that assists diagnosing epilepsy by further analysing EEGs concluded unsupportive of epilepsy diagnosis were most sensitive to changes in:

- annual volume of EEGs
- prevalence of EEG abnormalities
- diagnostic accuracy of interictal epileptic discharge detection or epilepsy diagnosis in standard care
- proportion of 'inconclusive' results after further EEG analysis

The scenario analyses suggested that using BioEP may be cost-effective if the accuracy of diagnosing epilepsy in standard care without BioEP was lower than estimated by clinical experts in the base case. For example, reducing the

sensitivity of diagnosing epilepsy without BioEP to 44.5% and specificity to 79.6% based on the pooled adult and child population from a systematic review of accuracy of epilepsy diagnosis by Bouma et al. (2016), resulted in BioEP having an incremental cost of £194.65, incremental QALYs of 0.021902, and ICER of £8,887 per QALY gained. For this, the EAG adapted the model structure to evaluate the overall diagnostic accuracy of EEG with and without BioEP (model structure branches to identify seizures and IEDs separately were switched off to do this). The EAG noted that the systematic review pooled studies from multiple countries dating back to 1978 which may not reflect current NHS practice. Further reducing BioEP's sensitivity to 61% and specificity to 75% based on the Tait et al. (2024), resulted in an ICER of £14,055. The limitation of this study was that BioEP's accuracy was evaluated when used alone, not supporting the clinician making the diagnosis.

Full sensitivity and threshold analysis results are in section 6.3.2 of the EAR.

8. Equality considerations

The [final scope](#) and the [scoping equality impact assessment](#) describe equality considerations for this assessment.

Of the 7 studies using technologies to assist clinician, 3 studies included children (1 of these was exclusively in children). The key studies did not report subgroup data on people with conditions that make it difficult to interpret the EEG (such as neurodevelopmental conditions, neuropsychiatric disorders, cognitive impairment, learning disabilities or medication that could influence electrical activity in the brain). The EAG noted that these groups appeared underrepresented or not reported in training data.

9. Evidence gaps

No or limited evidence was available on for example the following outcomes:

- health resource use (such as time to review and report EEG)
- diagnostic accuracy

- effect of technology result to clinical decision making (such as diagnosis and follow-up)
- effects of using technology to prioritise EEG review (for example on time to diagnosis and treatment)
- time to diagnosis and treatment
- number of people diagnosed with epilepsy
- annual volume of EEGs and lifetime number of EEGs per person

The full evidence gap analysis is presented in section 8.2 and key areas for evidence generation in section 8.3 of the external assessment report (EAR).

10. Key points and considerations

10.1 Key points

- For detection of interictal epileptiform discharges, 1 study on encevis reported similar sensitivity for clinicians with and without the technology, and 1 study on Persyst (version 13) reported lower sensitivity for clinicians with Persyst than clinicians alone. For seizure detection, one study reported similar sensitivity for clinicians supported by encevis or Persyst (version 14).
- Evidence on clinician EEG review time with and without the technology (1 study on encevis and Persyst) suggests some time saving using the technology
- Evidence on clinician's view on usefulness of EEG review technology from real-time seizure detection use in a neonatal unit (1 study on Persyst) suggests clinicians find it useful but because of false positive findings highlight the importance of using it as indicated to assist the clinician EEG review.
- Evidence on accuracy to identify people with epilepsy using the technology that assists diagnosing epilepsy by analysing EEGs with an inconclusive result suggests relatively low sensitivity and specificity (1 study on BioEP)
- There is limited evidence on diagnostic yield when using BioEP to prioritise follow-up of EEGs with an inconclusive review result

- There is some evidence on the effect of BioEP result on changes in diagnostic belief but no evidence on how the result affects decision making on diagnosis of epilepsy or clinical follow up
- The exploratory modelling considered a variety of scenarios in which, when compared with standard care, all the technologies assisting EEG review (encevis, NeuroCenter EEG, NeuroWorks, Persyst 15) could save money and the technology assisting diagnosing epilepsy (BioEP) could be cost effective. Further comparative data is needed to reduce uncertainties associated with these results.
- The available clinical data was very limited, so most model inputs were based on EAG assumption or advised by clinical experts. The model assumed that the results of the EEG analysis matched the epilepsy diagnosis which may not always be the case in real life.
- With the limited data available, the early model focused on the beginning of the diagnostic pathway, not a complete pathway including further steps such as other diagnostic testing or the diagnosis. A future model could include more potential consequences of unidentified epilepsy (such as further seizures resulting in A&E attendance or injury) and explore the effect of using the technologies to prioritise EEGs on time to diagnosis.

10.2 Potential benefits and risks

Table 13. Potential benefits

Potential benefit	Evidence
Technology saves clinician EEG review time and may reduce EEG waiting times in the NHS	• Some comparative evidence on clinician EEG review time with and without the encevis or Persyst suggests some time saving using the technology • Exploratory modelling suggests BioEP may reduce the number of follow-up EEGs needed (there is not yet evidence on this) • Although it is uncertain whether time saved on EEG review would translate into freeing up EEG slots and reducing EEG waiting times in the NHS, it indicates potential for it
Sensitivity to detect epileptic	• Some comparative evidence using an older version of encevis suggests similar sensitivity to detect interictal epileptiform discharges with or without the technology

abnormalities on EEG is similar	Some comparative evidence using an older version of Persyst suggests similar sensitivity to detect seizures with or without the technology
Clinicians find the technologies useful	Some evidence on clinicians' views on usefulness of Persyst from real-time seizure detection use in a neonatal unit suggests clinicians find it useful but because of false positive findings highlight the importance of using it as indicated to assist the clinician EEG review
Using the technologies saves NHS money or is cost effective	The EAG identified a variety of scenarios in which, when compared with standard care, all the technologies assisting EEG review (encevis, NeuroCenter EEG, NeuroWorks, Persyst 15) could save money and the technology assisting diagnosing epilepsy (BioEP) could be cost effective

Table 14. Potential risks

Potential risks	Notes and ways to mitigate risks
Using the technology takes time	- Some software may not yet integrate smoothly enough with existing EEG related systems and already using the technology could take extra time - This risk could be mitigated by noting in the guidance that centres should consider with input from clinicians whether they think the integration is smooth enough for them to allow for any time savings in the review
Technology does not save time, money, or clinicians do not find it useful	- Evidence on time to review and report EEGs is limited - To find out if the technologies do save time and money and whether clinicians find it useful would ideally need real-world data on review and reporting time with and without the technologies - As most of the technologies are software with license cost instead of large capital investment upfront, it could be relatively easy to contain spend during the evidence generation period if they were found not to save time or money or clinicians would not find them useful
Sensitivity to detect epileptic abnormalities on EEG or diagnose epilepsy is worse	- Evidence on comparative accuracy of the technologies is limited - It is uncertain how clinicians would use the BioEP result in practice - Some evidence using an older version of Persyst suggests sensitivity to detect interictal epileptiform discharges is somewhat lower compared to clinicians EEG review without the technology - An inconclusive EEG result cannot rule out epilepsy, the diagnosis is made based on multiple factors and treatment can start without an EEG but an inconclusive EEG result could lead to a follow-up EEG

	• The proportion of follow-up EEGs could be monitored and in the worst case, the evidence generation stopped if it becomes clear during the evidence generation period that this is leading to a negative resource outcome in terms of resource outcomes

10.3 Considerations for committee:

- Do the technologies have the potential to address the unmet need? Do the studies suggest that the technologies have the potential to be clinically effective?
- Is the evidence of potential benefit sufficient to support the use of the technologies in an evidence generation context?
- Are there any implementation and adoption issues to consider?
- Are the early economic model structure, assumptions and clinical and cost parameters suitable to answer the decision question (see final scope) for this assessment?
- Do the model results suggest that the technologies have the potential to offer value for money? Are there plausible scenarios where the technologies are cost effective?
- Is there any risk of harm to patients and NHS services with any of the technologies? Are the potential risks for use in an evidence generation context acceptable, considering the unmet need and potential benefits? Do any of these risks need to be, and can be, mitigated in the evidence generation plan?
- What are the evidence gaps and key drivers of decision uncertainty that need to be addressed by in an evidence generation plan or research recommendation?

HealthTech Programme

HTE10086 AI software for electroencephalogram (EEG) interpretation in epilepsy (provisional title)

Patient organisation submission

Thank you for agreeing to give us your organisation's views on this technology and its possible use in the NHS.

You can provide a unique perspective on patient experience of using the technology in the context of current clinical practice that is not typically available from the published literature.

To help you give your views, please use this questionnaire. You do not have to answer every question – they are prompts to guide you. The text boxes will expand as you type.

Information on completing this submission

- Please do not embed documents (such as a PDF) in a submission because this may lead to the information being mislaid or make the submission unreadable
- We are committed to meeting the requirements of copyright legislation. If you intend to include **journal articles** in your submission you must have copyright clearance for these articles. We can accept journal articles in NICE Docs.
- Your response should not be longer than 10 pages.

Information about your organisation	
Organisation name	Young Epilepsy
Contact person's name	[REDACTED]
[REDACTED]	[REDACTED]
Email	[REDACTED]
Telephone	[REDACTED]
Brief description of the organisation: Young Epilepsy is a charity supporting children and young people with epilepsy across the UK. Details of our funding can be found in our annual accounts.	

Declarations

Do you have any conflicts of interest? Please let us know if you have a question on the [NICE policy on declaring and managing interests](#).

Young Epilepsy has received the following amounts from these organisations over the past 12 months:

Persyst: £3,000 for event sponsorship

Neuraxpharm: £3,000 for event sponsorship and £6,000 grant for our Youth Voice Roadshow events

Neuronostics: £10,551 for PPIE on research to define and validate a digital biomarker of epilepsy in children. A further payment of £10,551 for this work will be received later this year.

Kelly St. Pier (Consultant Clinical Scientist, Diagnostic Suite Manager at Young Epilepsy) is Chief Investigator for this study.

Young Epilepsy was a co-participating site with Maidstone and Tunbridge Wells NHS Trust and contributed 109 EEG data sets to the trial, with MTW providing the metadata.

How did you gather information about the experiences of patients and carers to include in your submission?

Ongoing engagement with young people in our Youth Voice Network, as well as feedback from families accessing our diagnostic services.

Are you willing for this submission to be shared on our website?

Yes

We may invite you to a scoping meeting and/or committee meeting where this technology is to be discussed. Would a member of your organisation be willing to join such a meeting (this may be in person or virtually)?	Yes
Does the organisation have any direct or indirect links with, or funding from, the tobacco industry?	No

Impact of the symptoms, condition or disease on patients and / or family and carers

1. What is it like to live with the condition? What do carers experience when caring for someone with the condition?

Epilepsy is one of the most common long-term conditions for children and young people. It can affect everyone differently and there are many different seizure types. Living with the condition can result in a loss of a sense of safety – not knowing when and where a seizure will happen, who will be there and whether they will be hurt. Many young people with epilepsy experience difficulties with their mental health and isolation from their friends. Epilepsy can have a significant impact on learning and behaviour, affecting children and young people's education.

Children and young people can experience significant diagnostic delays when routine EEGs are normal, inconclusive, or difficult to interpret. Many have subtle, nocturnal, or focal seizures that are easily missed in short recordings. These delays affect safety, education, independence, and mental health. Families describe repeated EEGs, long waits for appointments, and uncertainty about whether episodes are caused by epilepsy. Technologies that improve detection, reduce repeat testing, or accelerate diagnosis address a substantial unmet need in paediatric epilepsy care.

Young Epilepsy's work with children and young people has highlighted the following themes in relation to diagnostic testing:

- Fear of missed seizures - Families want reassurance that subtle or nocturnal seizures will be detected even when staff are stretched or monitoring is brief.
- Desire for fewer tests and faster answers.
- Need for clear communication - Young people are open to using new technology, but parents want clarity that clinicians remain responsible for decisions.
- Reducing stress during EEG procedures - Tools that shorten appointments, reduce the need for sedation, or allow remote review are valued.

Experiences and availability of current health technologies

2. How do the existing health technologies play a role in managing the condition, and what are their advantages and disadvantages? What new technologies do you know of that you could tell NICE about?

Existing EEG diagnostics may or may not already incorporate some of the health technologies in this evaluation. These new technologies and other emerging tools play a crucial role in:

- Improving the quality and speed of quantifying seizures and detecting spikes
- Supporting stretched neurophysiology services, for example in relation to extended EEGs

Some neurophysiology settings use sophisticated data analysis tools including:

- Matlab
- Brainstorm
- BESA
- Python

Young Epilepsy is leading a collaborative research programme using OPM-MEG which is a child-centred, high-resolution localisation tool for complex epilepsy.

There are also a number of wearable seizure detection and monitoring apps that extend monitoring into daily life and support self-management.

For children and young people, “improvement” must be defined broadly: not only better diagnostic accuracy, but also reduced delays, fewer invasive tests, and more equitable access across the UK. An accurate diagnosis is essential for finding the most effective treatment for young people’s seizures. Uncontrolled seizures have a significant impact on young people’s physical and mental health, as well as their wider wellbeing and inclusion.

About the health technology being assessed

3. What are the potential benefits of the health technology/technologies being assessed?

Potential benefits of the technologies under evaluation include:

- Improved detection of epileptiform activity and seizures
- Reduced diagnostic delay
- Support for non-specialists in settings with limited neurophysiology expertise
- Standardisation of reporting across networks
- Reduced need for repeat EEGs
- Enhanced safety in ICU and long-term monitoring

For children, these benefits can translate into earlier treatment, fewer hospital visits, and reduced uncertainty for families.

These technologies may have an indirect benefit related to the wider impact of epilepsy:

- Cognition and education - Earlier, more confident diagnosis can reduce prolonged uncontrolled seizures and associated cognitive impact, supporting educational attainment.
- Mental health - Reducing diagnostic uncertainty and repeated inconclusive tests may reduce the emotional burden on young people and families.
- Sleep and behaviour - Better understanding of nocturnal seizures and epileptic encephalopathies helps healthcare teams to support children and young people with issues related to sleep and behaviour.

4. What are the potential disadvantages of the health technology/technologies being assessed?

False positives can increase workload, while false negatives risk missed diagnoses. Over-reliance on automated outputs may erode clinical confidence or lead to misinterpretation by non-experts. Tools must be transparent, auditable and be embedded within clear governance frameworks.

AI trained primarily on adult datasets may misinterpret EEGs for children and young people with learning disabilities, rare epilepsies, or complex neurodevelopmental conditions.

There are distinct challenges related to EEG for children and young people:

- Developmental variability - EEG patterns change significantly across infancy, childhood and adolescence.
- High artefact burden - Movement, behavioural challenges, and sensory sensitivities increase artefact, making automated detection more complex.
- Complex developmental epileptic encephalopathies (DEE) - Children with DEEs often have atypical or evolving EEG patterns that may not be represented in adult-trained models.
- Shorter or fragmented recordings - Some paediatric EEGs may end up being shorter than adult studies, reducing the data available for AI algorithms.

The technologies need to be validated in paediatric cohorts and provide transparent, interpretable outputs that support clinical decision-making.

Paediatric EEG provision in the UK is fragmented. Many children are seen in district general hospitals with limited neurophysiology capacity. Workforce shortages lead to long waits for routine and long-term EEG. AI tools that support scientist/physiologist triage, remote review, and standardised reporting could reduce inequity if deployed across networks. However, if only tertiary centres can afford or implement these tools, inequity may worsen.

This evaluation should therefore consider:

- Affordability for smaller services
- Interoperability with existing EEG systems
- Suitability for regional network models
- The risk of widening disparities if implementation is uneven
- The need for clear escalation pathways in ICU or emergency settings

Equality issues

5. Are there any groups of people who might benefit more or less from the technology than others?

The evaluation should consider whether there is sufficient evidence for use of the technologies in all age groups and for all epilepsy types. Consideration should be given to the systems within which the technologies have been trialled.

There is a risk that neonates and those with developmental epileptic encephalopathies (DEE) may benefit less from these technologies.

Training of professionals in the use of AI software for EEG interpretation is essential to ensure equity of access for children and young people with epilepsy.

6. Are there any groups of people that might need further consideration in using the technologies (for example, because they have higher levels of ill health, poorer outcomes, problems accessing or using treatments or procedures)?

Across the UK there are inequalities of access to new technologies that support epilepsy diagnoses. These technologies should be made available to all, including through community diagnostic hubs, to enable early diagnosis and effective treatment. This would have a significant impact for children and young people living with epilepsy.

7. Are there any potential [equality](#) or [health inequality](#) issues that should be taken into account when considering this condition and the technology?

The evaluation should consider the lifespan benefit of accurate diagnosis and treatment. This is particularly important for epilepsy that begins in early childhood, as most complex epilepsies start under the age of 2. Consideration should be given to the evidence supporting the use of these technologies in early childhood. Current algorithms may not be able to identify these types of seizures, for example those associated with infantile spasms.

Additional information

8. Please include any additional information you believe would be helpful in assessing the value of the technologies.

Key messages

In up to 5 bullet points, please summarise the key messages of your submission.

- Children and young people with epilepsy currently face significant diagnostic delays, impacting their quality of life.
- AI tools offering additional insight for non-contributory routine EEGs could avoid repeat testing, reduce waiting times, accelerate diagnosis and reduce uncertainty about whether episodes are caused by epilepsy.
- AI software for EEG interpretation could speed up diagnosis by improving detection of seizure-related activity and supporting overstretched services, particularly in prolonged recordings.
- The evaluation must consider whether the evidence supports the use of these technologies for children and those with complex epilepsies.
- Equitable access to new diagnostic technologies is essential, otherwise health inequalities may increase.

Thank you for your time. Please return your completed submission to Diagnostics@nice.org.uk

If you haven't already, please register as a stakeholder by completing the [stakeholder registration form](#) and returning it to Diagnostics@nice.org.uk

Did you know NICE meetings are held in public? You can [register on the NICE website](#) to attend a meeting up to 20 working days before it takes place. Registration will usually close 10 days before the meeting takes place.

HealthTech Programme

HTE10086 AI software for electroencephalogram (EEG) interpretation in epilepsy (provisional title)

Professional organisation submission

Thank you for agreeing to give us your organisation's views on this technology or procedure and its possible use in the NHS.

You can provide a unique perspective on the technology or procedure in the context of current clinical practice that is not typically available from the published literature.

To help you give your views, please use this questionnaire. You do not have to answer every question – they are prompts to guide you. The text boxes will expand as you type.

Information on completing this submission

Please do not embed documents (such as a PDF) in a submission because this may lead to the information being mislaid or make the submission unreadable

We are committed to meeting the requirements of copyright legislation. If you intend to include **journal articles** in your submission you must have copyright clearance for these articles. We can accept journal articles in NICE Docs.

Your response should not be longer than 10 pages.

About the organisation

Organisation name	Association British Neurologists
Contact person's name	██ (ABN Epilepsy and Data/Devices Advisory Groups)
Role or job title	Consultant Neurologists
Are you (please highlight Yes or No):	An employee or representative of a healthcare professional organisation that represents clinicians? Yes A specialist in the treatment of people with this condition? Yes A specialist in the clinical evidence base for this condition or technology? Yes Other (please specify):
Please provide a brief description of the organisation (including where funding comes from)	The aim of the Association of British Neurologists is to promote excellent standards of care and champion high-quality education and world-class research in neurology. The ABN's principal objectives are to: • Encourage nationwide availability of excellent and equitable neurological services regardless of age, gender, ethnicity and geographic site. • Promote equality of opportunity for all neurologists and neurological trainees • Support neurologists and neurological trainees in their clinical practice • Support neurologists and neurological trainees in their research and academic activities • Increase knowledge of the nervous system and its disorders • Ensure the continuing professional development of its members. • Promote the education of neurological trainees and support learning of neurology throughout medical training • Collaborate with the Royal College of Physicians (London, Edinburgh and Glasgow). • Foster communication with patient interest groups. • Maintain contacts with neurologists in developed and in developing countries. • Provide guidance when required for matters relating to neurology.

Has the organisation received any funding from any company with a technology related to the evaluation in the last 12 months? If so, please state the name of company, amount, and purpose of funding	No
Does the organisation have any direct or indirect links with, or funding from, the tobacco industry?	No

Current care pathway and unmet need

1. Please describe the current standard of care that is used in the NHS. Please note any clinical guidelines used in the NHS which are relevant to the care pathway. What setting would this technology be used in (primary care, general hospitals, specialist centres for example).	In the NHS, the diagnosis of epilepsy is predominantly clinical and based on careful history taking, in line with NICE epilepsy guidance. EEG is used as an adjunct to support diagnosis, characterise epilepsy syndromes, evaluate new seizure types, guide antiseizure medication decisions, support management of status epilepticus, and inform decisions around medication withdrawal. EEG recording is performed by trained Clinical Physiologists or Clinical Scientists within secondary or tertiary care neurology services, with interpretation undertaken by Consultant Neurophysiologists or epilepsy specialists. Prolonged video-EEG telemetry is available in selected centres, typically over several days, and requires integration of EEG signals with video and clinical context. Access to EEG and, in particular, timely expert reporting is variable across the UK. EEG is rarely accessible in primary care and remains concentrated in specialist centres. Reporting is labour-intensive and dependent on limited specialist workforce capacity, contributing to delays in diagnosis and management.

2. Where would the technologies or procedure fit in the care pathway?	AI software for EEG interpretation would sit between EEG data acquisition and final clinical reporting. Its most realistic role is as an assistive tool to support reporting rather than replace expert interpretation. Potential uses include automated flagging of potentially abnormal EEGs, triaging recordings for priority review, and identifying candidate epileptiform discharges or seizures within long-duration or continuous recordings. In prolonged telemetry and intensive care settings, AI tools may augment event detection currently reliant on physiologist flagging. AI would not replace EEG acquisition, which depends on manual technical procedures and clinical context, nor would it replace the need for expert clinical interpretation of EEG findings in conjunction with patient history and examination.
3. Is there an unmet need for patients with the condition or disease, or healthcare professionals managing the condition or disease?	There is a clear unmet need related to access to timely EEG reporting. Workforce shortages in neurophysiology contribute to long waiting times for both EEG investigations and formal reports, which may delay diagnosis and treatment. Routine EEG has limited sensitivity for detecting epileptiform abnormalities, estimated at approximately 20–50%, often necessitating repeated or prolonged studies with associated cost and delay. Interpretation is also subject to significant inter- and intra-observer variability. The increasing use of prolonged and ambulatory EEG generates very large datasets that exceed what can be comprehensively reviewed within routine clinical workflows, further amplifying pressure on specialist services.

The technology

4. What are the potential benefits for patients and healthcare professionals from this technology (consider the potential clinical benefits, cost benefits, benefits to quality of life, and any wider benefits)?	AI-assisted EEG interpretation could improve efficiency and speed of reporting by reducing the time required for physiologists and neurophysiologists to review extended recordings. Automated event detection may help prioritise abnormal EEGs over normal studies, enabling more effective allocation of specialist time. Potential clinical benefits include earlier diagnosis following first seizure, earlier initiation of antiseizure medication, and improved management of status epilepticus through more rapid identification of ongoing epileptiform activity. In prolonged telemetry, faster identification of diagnostic events could reduce inpatient length of stay. System-level benefits may include reduced need for repeated EEG investigations, improved standardisation of EEG interpretation across NHS Trusts, and potential cost efficiencies if reporting time is meaningfully reduced. All such benefits would require robust evidence to support claims of effectiveness and safety.
5. Are there any groups of patients who would particularly benefit from this procedure/technology? Are there any groups in which the technology would be less effective or would be less likely to benefit?	Patients most likely to benefit include adults undergoing prolonged or ambulatory EEG, those requiring continuous EEG monitoring in intensive care for suspected non-convulsive status epilepticus, and patients whose recordings contain infrequent but clinically important epileptiform events. Patients less likely to benefit include those with EEGs heavily contaminated by artefact, individuals with rare or complex epilepsy syndromes that are poorly represented in AI training datasets, and patients undergoing telemetry for surgical planning following medication withdrawal where patterns may be atypical.

	There is particular concern regarding performance in patients with learning disabilities, medically refractory epilepsy, non-epileptic attack disorder, and complex focal epilepsies. Current evidence is largely derived from adult populations, and significant further validation would be required before use in paediatric or neonatal settings.
6. How would use of the technology affect healthcare resource use?	AI-assisted reporting could reduce reporting times and, in some settings, shorten inpatient stays for video-EEG telemetry if diagnostic events are identified more rapidly. Improved access to timely reports may increase the clinical use of EEG. However, increased EEG utilisation may require additional technical staff to acquire recordings, and reductions in reporting time are unlikely to be sufficient to reduce overall staffing requirements without substantial efficiency gains. Resource impact will depend on software cost, performance, and the extent to which expert supervision remains necessary.

7. If applicable, describe any system changes that would be needed if the NHS were to adopt the technology. Are there any potential barriers to the adoption of the technology or any changes that may be needed to enable implementation of the technology in the NHS?	Adoption would require significant system-level changes, including integration with existing EEG hardware, reporting software, hospital IT infrastructure, and electronic health records. Variability in EEG equipment across NHS sites presents a challenge for standardisation and model performance. Key barriers include data security and governance requirements under GDPR, concerns about algorithmic transparency and “black box” decision-making, clinician scepticism, and the need for robust validation data including sensitivity, specificity, and false-positive and false-negative rates. Clear regulatory approval (including MHRA clearance), defined clinical responsibility, and updated local protocols would be required. EEG technicians and clinicians would require training in the appropriate supervised use of AI tools.
8. Are there any side effects or adverse effects associated with the technology?	AI software itself has no direct physical adverse effects; however, diagnostic errors pose significant risk. False positive results may lead to over-diagnosis of epilepsy, unnecessary long-term antiseizure medication (including drugs with pregnancy-related risks), driving restrictions, and social or occupational consequences. False negative results could delay diagnosis and treatment, increasing the risk of seizure-related harm. There is also concern that over time clinicians may place excessive reliance on AI outputs, reducing critical scrutiny of results.

Equality considerations

9. Are there any equality issues that should be considered for this assessment?	Access to EEG services is already unequal across the UK, and AI tools would initially benefit only services with existing EEG infrastructure. Algorithmic bias is a further concern if training datasets do not adequately represent the diversity of NHS populations, potentially reducing accuracy in under-represented groups.
10. Could the technologies reduce or increase health inequalities? How?	AI-assisted EEG interpretation could reduce inequalities if it improves access to timely reporting in under-resourced centres. Conversely, it could exacerbate inequalities if benefits accrue mainly to well-resourced centres or patient groups well represented in training datasets, or if performance is poorer in complex or atypical populations.

Key messages

In up to 5 bullet points, please summarise the key messages of your submission	● EEG interpretation is specialist-dependent, labour-intensive, and subject to workforce constraints and reporting delays ● AI tools may assist with triage and event detection but cannot replace expert clinical interpretation ● Potential benefits include faster reporting and improved management of prolonged and continuous EEG recordings ● There are significant risks of misdiagnosis, particularly in complex, atypical, or under-represented patient groups ● Robust validation, regulatory approval, and cautious supervised implementation are essential

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HealthTech Programme

HTE10086 AI software for electroencephalogram (EEG) interpretation in epilepsy (provisional title)

Professional organisation submission

Thank you for agreeing to give us your organisation's views on this technology or procedure and its possible use in the NHS.

You can provide a unique perspective on the technology or procedure in the context of current clinical practice that is not typically available from the published literature.

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- Your response should not be longer than 10 pages.

About the organisation

Organisation name	Association of Neurophysiological Scientist (ANS)
Contact person's name	██████████
Role or job title	██████████ Consultant Clinical Scientist
Are you (please highlight Yes or No):	An employee or representative of a healthcare professional organisation that represents clinicians? Yes A specialist in the treatment of people with this condition? Yes A specialist in the clinical evidence base for this condition or technology? Yes Other (please specify): Professional body
Please provide a brief description of the organisation (including where funding comes from)	Stakeholder Statement for NICE AI Software for Electroencephalogram (EEG) Interpretation in Epilepsy Submitted by: Association of Neurophysiological Scientists (ANS)
	Organisation Summary The Association of Neurophysiological Scientists (ANS) is the national professional body for Neurophysiological Healthcare Scientists in the United Kingdom. Our members perform, analyse, and interpret electroencephalogram (EEG) recordings that are vital in the diagnosis and management of neurological disorders, including epilepsy.

	We provide training, education, and professional assessments for Healthcare Scientists in neurophysiology, supporting the highest standards of practice and workforce development. The ANS works to promote excellence, consistency, and professional recognition within clinical neurophysiology, ensuring that patients receive safe and effective care delivered by skilled practitioners.
	Stakeholder Statement The Association of Neurophysiological Scientists (ANS) welcomes the opportunity to contribute to NICE's evaluation of AI software for EEG interpretation in epilepsy. ANS is the representative professional body for those who perform and interpret EEGs in clinical practice; and as such is uniquely positioned to provide expert insight into the clinical, technical, educational, and ethical implications of introducing AI-assisted EEG analysis within NHS neurophysiology services. We believe that meaningful engagement with professional scientists who deliver EEG services daily is essential to ensure that AI technologies are evaluated and implemented in a way that: • Maintains clinical accuracy and patient safety, • Supports rather than replaces professional expertise, • Addresses training and competency requirements, • And aligns with existing national standards and governance frameworks for neurophysiological practice.

	Our mission is to foster a modern, resilient workforce that works to the highest potential to deliver the best care—today and for the future. Participation in this NICE evaluation aligns with that mission and reflects our commitment to ensuring innovation is applied responsibly and effectively in patient care. The organisation is non-profit and there is no income. Membership fees are collected.
Has the organisation received any funding from any company with a technology related to the evaluation in the last 12 months? If so, please state the name of company, amount, and purpose of funding	No
Does the organisation have any direct or indirect links with, or funding from, the tobacco industry?	No

Current care pathway and unmet need

1. Please describe the current standard of care that is used in the NHS. Please note any clinical guidelines used in the NHS which are relevant to the care pathway. What setting	The current use of EEG is in the diagnosis of neurological diseases, including epilepsy and some sleep disorders, and in the intensive care setting for all age groups, neonates to geriatric. EEG is available in specialist hospitals, tertiary care and some secondary care settings. A referral to the EEG department is made by an appropriately qualified clinician. The referral arrives either electronically or by post. The referral is triaged an appointment is made. The patient travels to the department, and

would this technology be used in (primary care, general hospitals, specialist centres for example).	has the test. The test generates large amounts of data to interpret. The duration of an EEG may be between 20 minutes or up to 10 days duration of continuous data. The data is reviewed and a technical report is written. The EEG and technical report is reviewed by the reporting clinician, most often a medical colleague. The clinical report is sent to the referring clinician. Conducting and interpreting EEGs needs to be done by specially trained clinicians, often working in partnership with medical colleagues. The specialist capacity available to conduct and interpret EEGs varies across the country; the waiting time for a routine EEG can range from weeks to more than 6 months. There is a need for a faster access to EEG.
2. Where would the technologies or procedure fit in the care pathway?	AI software to help triage referrals is available. AI can remove interference from the EEG, significantly speed up review, automatically detect abnormalities and detect EEG biomarkers not easily seen in a traditional visual review. An AI report can be generated to be checked by a qualified clinician.
3. Is there an unmet need for patients with the condition or disease, or healthcare professionals managing the condition or disease?	There is national variation in the provision of EEG services, with respect to patient access and time to reporting. This is due to the small numbers of healthcare scientists and medical support. EEG diagnostic provision is not currently reported to NHS England via DM01.

The technology

4. What are the potential benefits for patients and healthcare professionals from this technology (consider the potential clinical benefits, cost benefits, benefits to quality of life, and any wider benefits)?	Patients would benefit from a quicker diagnostic process, and may avoid repeat testing. With a faster reporting process, the expectation is that AI may increase department capacity. Patient groups would benefit with improved access. Staff would benefit from increased digital skill acquisition. be able to develop skills in AI application and audit of AI outcomes.
5. Are there any groups of patients who would particularly benefit from this procedure/technology? Are there any groups in which the technology would be less effective or would be less likely to benefit?	Patients with epilepsy. Patients with Functional Neurological Disorders. Patients in intensive care, for example following cardiac arrest. New-born preterm neonates in intensive care. Patients with Sleep disorders

6. How would use of the technology affect healthcare resource use?	The technology could release admin staff from triage duties. AI will significantly reduce the amount of time for staff to review EEGs. AI will not replace human clinicians, it will support it them.

7. If applicable, describe any system changes that would be needed if the NHS were to adopt the technology. Are there any potential barriers to the adoption of the technology or any changes that may be needed to enable implementation of the technology in the NHS?	Hospitals will need to ensure each new software system have: Data Protection Impact Assessments, Data Protection Protocol, and Medical Devices Committee approval. On-going support from Information Governance, Information Technology infrastructure and support. Software will be continuously assessed for diagnostic accuracy and will follow standards and follow Standards for Reporting of Diagnostic Accuracy (STARD) or other similar guidelines for reporting diagnostic accuracy. On-going infrastructure support and clinician training will be required to maintain AI use. A barrier could be some clinician bias against AI implementation
8. Are there any side effects or adverse effects associated with the technology?	No direct side effects. AI is not a substitute for expert diagnostics.

Equality considerations

9. Are there any equality issues that should be considered for this assessment?	Ethical training practices should include efforts to ensure representation from historically disadvantaged or underrepresented patient populations.
10. Could the technologies reduce or increase health inequalities? How?	The technology will be applied for all patient groups. No inequality impact is expected. We would be aware that department that could implement AI may have improved access times for patients, introducing an unequal service to those that don't. If the AI is trained on non-representative data, it may perform poorly for minority or marginalized groups, leading to misdiagnoses or unequal treatment.

Key messages

In up to 5 bullet points, please summarise the key messages of your submission	• ANS are well positioned to support this stakeholder process • Patients of all ages with neurological disorders will benefit from AI use. • AI use must prioritise patients by improving outcomes • AI should support clinical expertise and is not a replacement where resources are limited, and must be clearly labelled when used • AI use must meet the highest standards, follow the evidence base and be subject to on-going quality control and audit, using STARD guidelines

Thank you for completing the submission.

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GID-HTE10086 Software for electroencephalogram (EEG) interpretation to support diagnosing epilepsy: early use assessment

External assessment report

Produced by: **Newcastle External Assessment Group**

Authors: **Kim Keltie**, EAG Director, Newcastle upon Tyne Hospitals (NuTH);

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Correspondence to: [REDACTED]
[REDACTED]
[REDACTED]

Date completed: First draft submitted 10 March; Second draft 12 March; Third draft 16 March; Final report 24 March; Updated report following company factual accuracy consultation 30 April 2026

Contains confidential information: Yes

Number of attached appendices: 4 (Appendix A-D)

Purpose of the early use assessment report

The purpose of this external assessment report (EAR) by an external assessment group (EAG) for early use assessment is to review the evidence currently available for technologies within the decision problem and advise what further evidence should be collected to help inform future decisions on whether the technologies should be widely adopted in the NHS. NICE has commissioned this work and provided the template for the report. The report forms part of the papers considered by the Committee when it is making decisions about the early use assessment.

Declared interests of the authors

Description of any declared interests with related companies, and the matter under consideration. See [NICE's Policy on managing interests for board members and employees](#).

None

Acknowledgements

Dr Emma Campbell, Lay/Patient Expert

Prof Helen Cross, Director, and Professor of Childhood Epilepsy, UCL Great Ormond Street Institute of Child Health

Dr Krishna Das, Consultant Clinical Neurophysiology, Great Ormond Street Hospital for Children, London

Mrs Sarah Eglese, Clinical Physiologist, The Walton Centre

Prof Richard Grunewald, Locum Consultant Neurologist, Sheffield Teaching Hospitals NHS FT

Prof David Holder, Professor of Biophysics and Clinical Neurophysiology, University College London

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Mrs Rebecca Longley, Lay/Patient Expert

Mr Phil Tittensor, Consultant Nurse for the Epilepsies, The Royal Wolverhampton NHS Trust

Mr Peter Walsh, Consultant Clinical Scientist, North Bristol NHS Trust

Mr William Welbank, Lay/Patient Expert

Dr Joel Winston, Senior Lecturer in Neurophysiology and Honorary Consultant in Clinical Neurophysiology, King's College London / King's College Hospital

Thanks also to following patient and professional organisations:

- Young Epilepsy: charity supporting children and young people with epilepsy across the UK
- The Association of British Neurologists: the national professional body for Neurologists in the UK.
- The Association of Neurophysiological Scientists (ANS): the national professional body for Neurophysiological Healthcare Scientists in the UK.

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Responsibility for report

The views expressed in this report are those of the authors and not those of NICE. Any errors are the responsibility of the authors.

This report should be referenced as follows:

Keltie K, Leslie P, Muir D, O'Leary R, Gascoigne S, Blacklock E, Bangel K, Parker R, Kenny R, Inskip A, Wallace S, Vale L. GID-HTE10086 Software for electroencephalogram (EEG) interpretation to support diagnosing epilepsy: early use assessment. External assessment report. Newcastle, UK: Newcastle External Assessment Group, 2026.

Contributions of authors

Kim Keltie led the technology review, *Kim Keltie, Katrin Bangel, David Muir, Elliot Blacklock* all wrote sections of the technology summaries and edited the report.

Kim Keltie led the clinical effectiveness, *Kim Keltie, Paula Leslie, Katrin Bangel, David Muir, Rosalyn Parker* acted as clinical effectiveness reviewers; all wrote sections of the clinical effectiveness assessment and edited the report.

Alex Inskip developed and ran the search strategies, *Sheila Wallace* reviewed the literature search methods, both wrote the search-related sections of the report and edited the report.

Rachel O'Leary led the health economics, *Rachel O'Leary, Kim Keltie and Sarah Gascoigne* wrote sections of the health economics assessment, undertook health economic modelling and edited the report.

Rosalyn Parker, Ryan Kenny acted as reviewers and edited the report.

Sheila Wallace, Luke Vale acted as clinical effectiveness and cost-effectiveness oversight reviewers, wrote sections of the clinical effectiveness and cost-effectiveness assessment and edited the report.

Summary of all confidential information and its source in report

Brief description	AiC/CiC	Page numbers [Section]	Source
Contact details of the EAG	Personal information	1 [Title page]	EAG
Technology summary (encevis) information used in future update	CiC	24 [Table 2; encevis row]	Company RFI follow up
Summary of economic model submitted by company (Neuronostics)	AiC	75 [Section 6.1]	Company factual accuracy consultation
Additional detail of the economic model submitted by company (Neuronostics)	AiC	270 [Appendix B5]	Company factual accuracy consultation
Technology summary (encevis) description of future update	CiC	276 [Appendix C1; endevis row]	Company RFI
Name of clinical experts	Personal information	290 [Appendix D]	Experts

Contents

Abbreviations	8
Executive summary	10
1. Decision problem	17
1.1 Terminology	19
2. Technologies	20
3. Clinical context	25
4. Clinical evidence	40
4.1 Search strategies and study selection	41
4.2 Included and excluded studies	41
5. Clinical evidence review	47
5.1 Quality appraisal of studies	47
5.2 Results from the evidence base	51
5.3 Adverse events and clinical risk	72
5.4 Clinical evidence summary and interpretation	72
6. Economic evidence	74
6.1 Existing economic evidence	74
6.2 Early economic model	76
6.3 Results from the economic modelling	101
6.4 Summary and interpretation of the economic evidence	119
6.5 Future economic modelling	122
7. Integration into the NHS	125
7.1 Existing use in the NHS	125
7.2 Implementation considerations	125
7.3 Training requirements	127
7.4 Preferences and accessibility considerations	127
7.5 Sustainability considerations	128
8. Evidence gap analysis	128
8.1 Ongoing studies	128
8.2 Evidence gaps	131
8.3 Key areas for evidence generation	135
9. References	138
10. Appendices	141
Appendix A – Literature searching	141
Appendix A1: Search strategies	141
Appendix A2: PRISMA diagram: clinical evidence	150
Appendix A3: PRISMA diagram: economic evidence	151
Appendix A4: Study characteristics of included studies (N=17)	152
Appendix A5: Deprioritised studies (N=33)	158
Appendix A6: Excluded studies (N=70)	170
Appendix B – Economic evidence	180
Appendix B1: Summary of economic papers used to support development of a conceptual economic model	180
Appendix B2: EAG Model validation	184
Appendix B3: EAG Model output (terminal node occupancies)	190
Appendix B4: EAG model - Results from sensitivity analysis	241
Appendix B5: Summary of the economic model provided by Neuronostics (BioEP)	270
Appendix C – Supplementary technology details	275
Appendix C1: Technical information	275

Appendix C2: Cost information	282
Appendix D – Correspondence log	284
Appendix D1: Questions to clinical experts (12/02/2026); questions via email ...	284
Appendix D2: Questions to clinical experts (19/02/2026); meeting on Teams	290
Appendix D3: Questions to clinical experts (02/03/2026); questions via email ...	292

List of Figures

Figure 1: Summary of the NHS care pathway for epilepsy diagnosis.....	27
Figure 2: Decision tree used for encephalis, NeuroCenter, NeuroWorks, Persyst	81
Figure 3: Decision tree used for BioEP	82
Figure 4: Future conceptual economic model	124

List of Tables

Table 1: Decision problem of the early use assessment	17
Table 2: Technology Summary	24
Table 3: Summary of waiting and review/report times by electroencephalogram (EEG) type	28
Table 4: Characteristics of included studies (N=17)	44
Table 5: Summary of diagnostic accuracy of technologies in IED detection when alongside clinical expert review	53
Table 6: Summary of diagnostic accuracy of technologies in IED detection when used fully automated [Note that none of the technologies are indicated for this use case].....	55
Table 7: Summary of diagnostic accuracy of technologies in seizure detection alongside clinical expert review	60
Table 8: Summary of diagnostic accuracy of technologies in seizure detection when used fully automated [Note that none of the technologies are indicated for this use case].....	62
Table 9: Summary of diagnostic yield.....	63
Table 10: Summary of diagnostic accuracy of technologies when used fully automated (epilepsy) [Note that none of the technologies are indicated for this use case].....	64
Table 11: Summary of studies reporting technical failure	64
Table 12: Summary of studies reporting EEG and report turnaround time when used alongside clinicians	66
Table 13: Summary of studies reporting EEG and report turnaround time when used fully automated	68
Table 14: Summary of studies reporting impact of software on clinical decision making when used alongside clinical experts.....	69
Table 15: Summary of studies reporting clinician acceptability and experience when used alongside clinical experts.....	70
Table 16: Summary of training	71
Table 17: Economic model: clinical parameters	87
Table 18: Economic model - diagnostic accuracy parameters	89
Table 19: Economic model: Resource use parameters.....	92

Table 20: Staff time related to EEG review with and without the technologies	93
Table 21: Key technology costs (excluding VAT)	93
Table 22: Summary of univariate sensitivity analysis by disease group and population.....	99
Table 23: Base case results (routine, sleep-deprived, ambulatory, video telemetry EEG)	108
Table 24: Summary of univariate sensitivity analysis in the economic model	109
Table 25: Summary of threshold analysis of staff time savings to offset technology cost per EEG	113
Table 26: Ongoing studies and their relevance to the decision problem (N=8)	128
Table 27: Evidence gaps based on available evidence.....	132
Table 28: Evidence generation recommendations	137

Abbreviations

Term	Definition
ABN	Association of British Neurologists
AI	Artificial intelligence
ANS	Association of Neurophysiological Scientists
ASM	Anti-seizure medication
AUROC	Area under the receiver operating characteristic curve
BSCN	British Society for Clinical Neurophysiology
BTCS	Bilateral tonic-clonic seizures
CESS	Children's Epilepsy Surgical Service
CI	Confidence interval
DEE	Developmental epileptic encephalopathies
DHSC	Department of Health and Social Care
DNE	Diffuse non-epileptiform
DTAC	Digital Technology Assessment Criteria
EAG	External Assessment Group
EAR	External assessment report
ECG	electrocardiogram
EEG	electroencephalogram
EMG	electromyogram
EMU	Epilepsy monitoring unit
FB-TCS	Focal to bilateral tonic-clonic
FE	Focal epileptiform
FNE	Focal non-epileptiform
GE	Generalised epileptiform
GIRFT	Getting It Right First Time
GTCS	Generalised tonic-clonic
HES	Hospital Episode Statistics
ICER	Incremental cost effectiveness ratio
ICU	Intensive care unit
IED	Interictal epileptiform discharge
IFU	Instructions for Use
IQR	Interquartile range
MHRA	Medicines & Healthcare products Regulatory Agency
MRI	Magnetic Resonance Imaging
N/A	Not applicable
NEAD	Non-epileptic attack disorder
NICE	The National Institute for Health and Care Excellence
NPV	Negative predictive value
NR	Not reported
PPV	Positive predictive value
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
QALY	Quality adjusted life year
RCT	Randomised controlled trial
RFE	Request for evidence

Term	Definition
RFI	Request for information
SD	Standard deviation
SUDEP	Sudden unexpected death in epilepsy
VNS	Vagus nerve stimulation

Executive summary

Background and aims: Epilepsy affects approximately 533,000 people in England and Wales including 112,000 children and young people. It drives substantial unplanned care (100,000 hospital presentations and 40,000 epilepsy-related admissions in England each year), creating persistent workload and cost pressures for the NHS. Epilepsy is associated with substantial morbidity, recurrent emergency department attendances, unplanned hospital admissions, and avoidable mortality. The original NICE guideline on epilepsy (2004) stated that the annual estimated (direct and indirect) cost of established epilepsy was around £2 billion with ongoing pressure expected as service demand and treatment costs increase (NICE NG217, 2022). Accurate and timely diagnosis is therefore a system priority.

An important component of the diagnostic process is the recording of brain waves, the electrical activity within the brain, using a test called an electroencephalogram (EEG). Conducting and interpreting EEGs needs to be done by specially trained clinicians. The EEG generates large amounts of data and interpreting this takes time. The specialist capacity available to conduct and interpret EEGs varies across the UK with waiting times for an EEG ranging from a few weeks to more than a year. The claimed benefits of the software under consideration when used in NHS hospitals are the potential to reduce EEG reporting times and provide greater standardisation of EEG interpretation. However, it is unclear whether this could lead to shorter waiting times, time to diagnosis or time to treatment due to rate limiting steps at other points in the patient pathway.

The purpose of this early use assessment was to identify and summarise the available evidence for five software technologies available on the NHS to support clinical experts in secondary or tertiary care services in EEG review. The technologies are BioEP, encevis, NeuroCenter, NeuroWorks and Persyst 15. An early economic model was developed to identify key uncertainties for implementation in the NHS. Areas for evidence generation to address uncertainties and the key drivers of the model were identified to direct further research and data collection to inform a future full evaluation.

Technologies: All 5 technologies included in this early use assessment use AI-derived algorithms to support a specialist clinician with the review and interpretation of EEGs used as part of the diagnostic pathway in epilepsy. There are 2 types of software technology considered in this evaluation:

- software that automatically detects and marks potential interictal epileptiform discharges (IEDs) in EEG data (encevis, NeuroCenter, NeuroWorks, Persyst 15) and a subset which also detect seizures.
- software that classifies EEG recordings and provides a score estimating the probability of an epilepsy diagnosis (BioEP).

The technologies are intended to be used to support clinician review and not to be used without human oversight as is stated in all the instructions for use supplied by the companies.

Clinical evidence: The EAG conducted literature searches and reviewed evidence submitted by the companies. The EAG included a total of 17 relevant sources of evidence for the technologies, of which only 7 studies described the use of the technologies alongside a clinical expert reviewer as per their indication for use (3 conducted in the UK), and of these only 3 were comparative in design (comparing against standard care without the technologies).

The technologies used across the 17 studies included: BioEP (N=3 studies), encevis (N=8; evidence from various versions was included: DeepSpike, NeuroTrend, v1.7, v1.9.2, v2.0 or version not reported), NeuroCenter EEG (N=1), NeuroWorks (N=2), Persyst (N=8; evidence from various versions was included: version 15, 14, 13 and version not reported); multiple technologies appeared in 4 studies. The EAG note that the evidence included historical or unspecified versions of the technologies; therefore, the generalisability of results to current versions is unclear. Evidence comprised 14 full publications, 1 pre-print publication and 1 further internal performance testing report provided by the company. Of these studies, 4 (3 full publications, 1 pre-print) were conducted in a UK setting. The evidence (in terms of study design, reporting, results) was heterogeneous.

When considering the 3 comparative studies which were best aligned to the decision problem (comparing clinical experts with and without support from the technologies), one study reported higher specificity in IED detection within routine EEGs in two hospitals in Denmark for two technologies (Persyst 13, encevis) when used alongside clinical experts, however this study also reported increased sensitivity with one (encevis) and decreased sensitivity for the other (Persyst 13). Similar, but numerically lower, sensitivity in seizure detection (per EEG, and per seizure) was reported by another study for two technologies (encevis, Persyst 14) when applied to ambulatory EEGs in a hospital in the Netherlands. However, the EAG note that these two studies were published in 2022, used older versions of the technologies listed in the Final Scope, and were not conducted in a UK setting; therefore, generalisability of results to the NHS is unclear. Additionally, 1 retrospective observational study reported on the use of BioEP to prioritise routine EEGs from 6 UK seizure clinics. When utilising BioEP in the prioritisation of a waiting list of 40 patients, when half of the follow-ups were done, 10% more people had received an epilepsy diagnosis than when the waitlist was in a random order and not prioritised using BioEP score. The authors reported that this corresponded to a 5% increase in the EEG diagnostic yield for epilepsy. This study included only 196 non-contributory (non-diagnostic) initial EEGs collected from 6 NHS sites in England, over an undefined period; therefore, it is unclear how many non-contributory EEGs would be eligible for BioEP analysis at an NHS centre annually (implications on costs). One additional UK study reported that BioEP provided a neutral (inconclusive) output in 33.7% of cases; therefore, the value of this technology remains unclear. No comparative evidence, reporting results of clinical experts with and without the technologies, was reported for NeuroCenter or NeuroWorks technologies.

Nine studies described fully automated use of the technologies which is not their intended purpose (as stated in their instructions for use). Diagnostic accuracy when used fully automated showed high volumes of false positives and false negatives (sensitivity in IED detection as low as 46% and specificity as low as 3%, sensitivity in seizure detection as low as 23% and specificity as low as 48% were reported). Differences in performance across versions and

settings of the technology, types of EEG, types of seizure, seizure durations, seizure onset locations, and patient age groups were also noted when used fully automated. These factors should be considered in future evaluations and when implementing these technologies in an NHS setting.

Economic evidence: The EAG did not identify any published economic evaluations of the technologies included in this early use assessment. The EAG developed an early economic model with short 1-year time horizon which had a structure which could both explore a) the impact of faster time to review, report on, and interpret EEGs, and b) improved diagnostic accuracy when using the technologies alongside standard care. Because of a lack of comparative clinical evidence for the latest versions of the technologies, the EAG populated the economic model using advice from clinical experts and assumed that alongside reduced staff time for reviewing, reporting on, and interpreting the EEG, the technologies may demonstrate slightly higher diagnostic accuracy than standard care. Results from this hypothetical modelling work should not be interpreted as evidence or lack of evidence of cost-effectiveness. Instead, this modelling work (and its accompanying extensive univariate sensitivity analysis) aimed to determine plausibility for cost-effectiveness and determine key evidence gaps and key drivers of differences in costs and utilities compared with standard care, which should be addressed before a definitive evaluation is conducted.

The EAG identified that the economic model was sensitive to univariate changes in staff time (associated with review, reporting and interpretation of the EEG), throughput of EEGs associated with the technologies, reduced diagnostic accuracy and utility associated with true positives; which were consistently observed across all types of EEG and across all technologies. Specifically for BioEP, the model was sensitive to decreasing inconclusive results, and both increasing and decreasing the prevalence of abnormalities on all types of EEG. Early economic modelling conducted by the EAG found that for encephalography, NeuroCenter, NeuroWorks and Persyst 15, the technologies were cost saving and therefore dominant when compared with standard care, across the range of scenarios explored. Further direct comparative evidence

generation (standard care with and without the technologies) would reduce uncertainties associated with cost-effectiveness estimates across all technologies.

The use case of BioEP is different. The EAG used its developed economic model structure to model the diagnostic accuracy of EEG in standard care (that is, switching off branches to not identifying seizures and IEDs separately, but instead applying sensitivity and specificity which could be interpreted as the overall diagnostic accuracy of EEG) with and without BioEP. Using this approach (standard care: 44.5% assuming sensitivity, 79.6% specificity; BioEP: 61% sensitivity, 75% specificity) demonstrated a scenario where BioEP could be considered cost-effective (ICER below £20,000/QALY). Similarly to the other technologies, further direct comparative evidence generation (standard care with and without BioEP) would reduce uncertainties associated with cost-effectiveness estimates. The EAG also considered it plausible that if results from BioEP were used to reduce the number of subsequent EEGs (related to negative initial EEG results), this could result in cost-savings. QALY estimates were speculative and the results are best considered as if from a cost comparison analysis until evidence is available to support exploring the value propositions further.

The EAG also described a Markov model that could be used in the future to test multiple value propositions (such as reduction in waiting times, time to diagnosis, time to treatment and potentially better disease control long-term) if evidence becomes available for those outcomes.

Evidence gap analysis: There is a lack of prospective real-world UK evidence using any of the technologies alongside clinical experts to support IED or seizure detection during EEG reviews in patients with suspected epilepsy. For studies conducted outside of a UK setting, differences in EEG reviewer training may limit the generalisability of results. Comparative diagnostic accuracy (of clinical experts with and without the technologies) in the diagnosis of epilepsy is lacking for BioEP, in IED detection is lacking for NeuroCenter, NeuroWorks (SCORE-AI), lacking for the latest versions of encephalis and Persyst 15, and is lacking in sleep-deprived EEG. Evidence

exclusively in children is limited; training and validation of the technologies in young people, and across different types of epilepsy is also limited.

The EAG considered priorities for future evidence generation based on clinical evidence gaps, clinical expert input and the results of the early economic model combined. The proportion of patients with suspected epilepsy which result in a referral for EEG, and the proportion of those where the EEG is contributory to the final diagnosis are both unclear. There is currently no data available that supports that these technologies could reduce waiting times for EEG, reduce time to diagnosis or treatment for epilepsy or reduce need for subsequent EEG or other diagnostic testing. Further data should be captured to focus on key drivers and uncertainties associated with implementing these technologies alongside standard care which include staff time involved with EEG review, whether the outputs of the technologies contribute to the final diagnosis of epilepsy and the number of patients in which these technologies could be used to determine their potential value.

Key points for decision makers:

- Five technologies are in scope of this early use assessment, however the value proposition may differ between technologies which flag IEDs and seizures (encevis, NeuroCenter, NeuroWorks, Persyst) and the remaining technology which provides a score linked to probability of epilepsy diagnosis (BioEP). The EAG built an economic model which was flexible to explore these different value propositions.
- There is a lack of real-world evaluations of the technologies in the UK when supporting clinical experts reviewing EEGs in a population of people with suspected epilepsy. Most of the evidence is conducted using the technologies fully automated; none of these technologies (which are class I-IIb medical devices) are intended to be used this way – all should be used with clinical interpretation. There is some uncertainty whether the technologies used alongside clinical reviews may increase diagnostic accuracy or reduce time for review and reporting of the EEG. Results may vary by type of EEG, by patient group. Further evidence should be

collected on the currently available versions to determine results when these technologies are used alongside clinical experts within a UK NHS setting.

- The EAG identified scenarios where all technologies (BioEP, encephalis, NeuroCenter, NeuroWorks, Persyst 15) could save money when compared with standard care, across a variety of modelled scenarios. However, further comparative data is needed to reduce uncertainties associated with these results, which are applicable across all technologies when used in an NHS setting.
- There is some uncertainty as to how many patients would benefit from these technologies; changing the numbers of people using the technologies would alter the cost per patient. Baseline measurements to better understand current NHS care of EEG interpretation in the patient population of suspected epilepsy would be beneficial and would provide a stronger basis for estimation of differences when implementing the technologies listed in the scope of this assessment.

1. Decision problem

The decision problem was as described in the Final Scope and EAG protocol – see [project page](#) on NICE website. No changes to the decision problem were proposed by the EAG, summarised in Table 1 for ease.

Table 1: Decision problem of the early use assessment

Item	Description	EAG comments
Population(s)	People having an EEG to support diagnosing epilepsy.	Use of technologies in interpreting EEGs outside support in the diagnosis of epilepsy (for example in epilepsy surgery planning or for monitoring) were out of scope of this assessment. Performance of technologies may vary with type of EEG (for example: routine, sleep-deprived, ambulatory).
Subgroups	If the evidence allows, the following subgroups may be considered: - People with conditions that may make it more difficult to interpret the EEG (such as neurodevelopmental conditions, neuropsychiatric disorders, cognitive impairment or medication that could influence the electrical activity in the brain) - Neonates, children and adults	The EAG considered evidence in populations and settings that align to the technology Instructions for Use (IFU). Any studies excluded based on population (including age) were documented.
Interventions	Clinician interpretation of EEG using one of the following software: - encevis - NeuroCenter EEG - NeuroWorks - Persyst 15 Clinician diagnosis of epilepsy using the additional information provided about EEGs without visual epileptiform activity by the software: - BioEP The technologies will not be assessed outside of their indicated use.	The EAG note that several clinical experts highlighted that diagnosis of epilepsy would largely be driven by clinical history and patient presentation; and that EEG would not be considered a sole diagnostic of epilepsy. The EAG considered evidence for the included technologies (and their predecessors if relevant to the NHS) and summarised the version used, where reported or confirmed by the company. As per the intended use stated in their instructions for use and approvals by a notified body for CE or UKCA marking, the EAG highlight that none of the technologies can

Item	Description	EAG comments
		be used in isolation (referred to as fully automated). The use of all 5 technologies listed in the scope must be supported within clinician review. The EAG summarised results from automated use to quantify the burden on clinical experts in review of outputs of the technologies.
Comparators	- Clinician interpretation of EEG without the software that assists reviewing and interpreting EEGs, by automatically detecting and marking interictal spikes, or spikes and seizures in EEG data - Clinician diagnosis of epilepsy without the software that assists diagnosing epilepsy, by classifying EEG recordings without visual epileptiform activity based on how supportive they are of epilepsy diagnosis.	Evidence pertaining to diagnostic accuracy is likely to include comparison with specialist opinion or other objective assessment. Role and training of staff conducting initial reporting and interpretation may differ between UK and some other countries, therefore the generalisability of evidence outside the UK may be limited (as raised in the scoping workshop).
Setting	Secondary or tertiary care services	No EAG comment.
Outcomes	Intermediate outcomes: - Diagnostic accuracy - Technical failure rate to analyse EEG - Lifetime number of EEGs - Number of people with diagnosed epilepsy - Clinician EEG review and report turnaround time - Impact of software result on clinical decision-making - Clinician acceptability and experience - Time to diagnosis and treatment Clinical outcomes: - Morbidity (including adverse events caused by assessment or treatment) - Mortality (including Sudden Unexpected Death in Epilepsy, SUDEP)	In the use case of using the technologies to prioritise the EEG recordings for review (as outlined in the Final Scope section 11.4), the EAG note that this would be measured indirectly through “Time to diagnosis and treatment” and potentially “Clinical EEG review and report turnaround time” outcomes.

Item	Description	EAG comments
	Patient-reported outcomes: • Health-related quality of life • Ability to participate in the community (for example having a driver's license or employment) • Acceptability, views, experience and satisfaction Cost and resource use: • Cost of technology • Cost of training • Cost of further testing • Cost of treatment and management • Health service use and cost at different settings	

Abbreviations: EAG, External Assessment Group; EEG, electroencephalogram; IFU, instructions for use; SUDEP, sudden unexpected death in epilepsy

1.1 Terminology

Epilepsy is a brain disorder defined by a long-term tendency to have recurrent, unprovoked epileptic seizures; it is not a single disease but a collection of conditions.

An **electroencephalogram (EEG)** is a test that records electrical activity in the brain, there are different types of EEG which may be requested depending on patient characteristics, clinical history, symptoms and availability of that EEG within the hospital. The different EEG types last different lengths of time. An EEG **epoch** refers to a segment of the EEG recording which has a fixed length of time.

Epileptiform activity refers to abnormal EEG waveforms that reflect pathological cortical hyperexcitability (brain cells fire electrical signals too easily or too much) and are associated with an increased risk for epileptic seizures. They can include spikes, sharp waves, spike-and-wave complexes and they usually interrupt normal background EEG activity. Some epileptiform patterns are strongly associated with clinical epilepsy, while others show only a weak or limited relationship with seizure disorders. **Interictal epileptiform**

discharges (IEDs), or interictal activity, occurs between seizures and are highly indicative of epilepsy.

Seizures (ictal events or activity) are the symptomatic events of general abnormal electrical activity in the brain and may be caused by a number of conditions including fever, infection, substance withdrawal and epilepsy.

Epileptic seizures define seizures caused by epilepsy and can take many forms; some involve movements that the person cannot control such as jerking or twitching, going stiff or falling to the floor and shaking (generalised seizures). Other symptoms may be feeling confused or having unusual sensation (focal seizures).

Additional detail in the clinical context is available in the Final Scope and [Section 3](#) of this report.

2. Technologies

Five technologies from five manufacturers have been included in this early use assessment. A summary of these technologies is included in [Table 2](#), this has been derived from information found in the [Final Scope](#) and company supplied 'requests for information' (RFI). Additional detailed information relating to each device can be found in [Appendix C](#).

All the technologies support the interpretation of EEGs, which can support the diagnosis of epilepsy. In terms of functionality across the five technologies:

- Four technologies annotate the EEG with flags to highlight potential IEDs to the reviewing clinician (encevis, NeuroCenter, NeuroWorks, Persyst).
- Three technologies annotate the EEG with flags to highlight potential seizures to the reviewing clinician (encevis, NeuroCenter, Persyst).
- One technology supports diagnosis of epilepsy (BioEP); the company stated it should be used in secondary or tertiary care

settings after a routine EEG has been performed and interpreted by a clinical neurophysiologist as inconclusive or non-contributory.

This technology does not annotate the EEG but instead reviews the EEG and provides a single score output to the diagnosing neurologist denoting an estimated probability of epilepsy. The clinical information used by the technologies to derive an output is summarised in Table 2.

- None of the technologies currently support in automated writing of the factual report. However, the companies of encevis, NeuroCenter and Persyst advised that they are actively developing reporting capabilities and are hoping that this would be available within the next year.

To enable a more comprehensive appraisal of the technologies in scope, in line with Section 2.1 of the EAG Protocol, the EAG considered evidence for the technologies and their components which support IED and seizure detection (for example SCORE-AI within NeuroWorks) and predecessors where described in comparative evidence including Persyst (versions 15, 14 and 13) and encevis (including DeepSpike, NeuroTrend and EpiScan modules); see [Appendix C1](#) for a description of differences between versions.

As of March 2026, and as indicated in the Final Scope, all 5 of the technologies (fixed algorithms) had regulatory approval:

- BioEP: class I software as medical device (UKCA).
- encevis: class IIb (EU MDR). The company confirmed that DeepSpike is the previous name for the artificial intelligence (AI) model for spike detection, that EpiScan is the previous name for seizure detection, NeuroTrend is used for continuous EEG analysis (and included in the encevis epilepsy package).
- NeuroCenter: class I (EU MDR).
- NeuroWorks (SCORE-AI): class IIa (EU MDR).

- Persyst 15: class IIa (UKCA). The company confirmed that evidence relating to Persyst 14 was considered most comparable (with older versions being considered historical).

All companies advised they do not currently have Digital Technology Assessment Criteria (DTAC) for their technologies (BioEP, encephalis, NeuroCenter, NeuroWorks, Persyst). However, Neuronostics stated that their technology (BioEP) has undergone DTAC self-assessment and that they have provided DTAC evidence to NHS Trusts as part of local review and implementation processes. All technologies are intended to aid the clinician in reporting, that is, they will not be used autonomously without human interpretation. This is explicitly stated in the instructions for use (IFU) of all the technologies; therefore, any evidence of fully automated use of these technologies (without human oversight) would be considered “off label” use.

All the technologies include an element of an *AI-derived algorithm*. Additional information regarding training and validation has been summarised by the EAG in [Appendix C](#). In a previous assessment ([HTG760 Artificial intelligence \(AI\) technologies to aid opportunistic detection of vertebral fragility fractures: Early Value Assessment](#)) undertaken by the Newcastle EAG, 2 local AI experts advised the EAG of the following in relation to regulations and best practices concerning the use of AI products for medical or clinical use:

- AI technologies intended for medical or clinical use must disclose their training dataset, information workflow and validation approach as part of regulatory compliance.
- AI technologies will be required to demonstrate they meet the DTAC, and the supplier should expect to provide a completed Data Protection Impact Assessment.
- Significant changes to the algorithm that could affect clinical impact, patient safety or change their regulatory classification require either a new submission or variation of the regulatory approval. All model changes require performance validation and clinical risk assessment.

Four companies stated that their technologies (BioEP, encephalis, NeuroWorks, Persyst) can detect all types of epilepsy and that technology performance was similar across all types of epilepsy. One company confirmed there was no major performance difference of their technology between detection of focal and generalised epileptiform discharges (NeuroCenter). One company stated that there was no difference in performance of their technology (NeuroWorks) between type of EEG assessment (routine, sleep-deprived, ambulatory). One company (Persyst) stated that no subgroups (not defined so unclear if this is related to patient age, or type of epilepsy) have been identified where performance of their technology is reduced.

Two companies confirmed that additional patient information is required to obtain an output from their technology. BioEP requires sex and whether the patient is taking anti-seizure medication, SCORE-AI (NeuroWorks) requires age and electrocardiogram (ECG) to run its analysis.

Claimed benefits across technologies included shorter time to review the EEG and write the factual report leading to shorter diagnostic times and greater standardisation of EEG interpretation (between centres and between clinicians) which may include the use of the technologies as a second reviewer. Higher impact is claimed at non-specialist centres or those without in-house neurophysiology expertise, or those with long waiting lists.

Table 2: Technology Summary

Device (company) [Previous Name] Class of device	Indications (age groups)	Type of algorithm (as claimed by company)	Use of patient information or clinical history	Outputs
BioEP (Neuronostics Ltd) UKCA-marked: class I SaMD [EU MDR class IIa submission planned for Q2 2027]	Patients aged 18 years or over who have undergone an EEG due to suspected epilepsy (expansion to paediatric population, aged 2 to 18 years, is planned for 2026) which was clinically inconclusive EEG (no visible epileptiform discharges). <u>Type of EEG</u> : resting-state awake EEG, but can be applied to resting-state segments from sleep-deprived or ambulatory EEGs provided they are 15 minutes or longer, eyes-closed where possible, artefact free, no epileptiform activity.	Three analytical approaches (signal analysis, network connectivity, dynamic modelling) integrated into a machine learning model.	Considers two confounding variables, patient sex at birth, and anti-seizure medication categorised as taking or not taking at time of EEG (if known).	5-point rating indicating the degree of support for an epilepsy diagnosis (i.e. very unsupportive, unsupportive, neutral, supportive, very supportive). Differentiates between cohorts with epilepsy and without epilepsy (including those with alternative conditions such as non-epileptic attack disorder).
encevis (Austrian Institute of Technology GmbH; AIT) CE-marked (EU MDR): class IIb	Adults aged 18 years or over <u>Type of EEG</u> : any scalp EEG	AI-based algorithms used for DeepSpike and EpiScan components. Machine learning-based algorithms locked and do not continue learning or adapt during clinical use.	None. 	Automatic detection of spikes and seizures. Identifies patterns that may be consistent with electrographic status epilepticus (ACNS 14). Outputs a set of quantitative measures from the EEG waveform including: seizure burden, frequency bands, rhythmic and periodic patterns, burst suppression, heart rate and spectrogram. Long-term trending enables up to 7 days within one view. All results showing in an overview even when the recording is split into multiple files. The availability of analysis features and viewers depends on the license installed.
NeuroCenter EEG (Clinical Science Systems) RFI states filing for CE mark in Q1 2026. CE-marked (EU MDR): class I for reviewing and analysing pre-recorded EEG files. (Note class IIa expected in early 2026 for recording EEG in addition to reviewing and analysis)	Patients aged 6 years and over <u>Type of EEG</u> : can be used with routine, sleep-deprived and ambulatory EEG recordings	AI module (convolutional neural network) highlights EEG segments highly likely to contain IEDs and identifies certain electrographic seizure patterns (including focal and generalised electrographic seizures). For real-time detection the technology is integrated into the EEG acquisition platform. Offline analysis can be performed on EDF+ files. Machine-learning algorithm & deep learning algorithm (depending on analysis tool)	None	Software detects EEG segments that are likely to contain IEDs (including spikes, sharp waves, spike-wave discharges, poly spike-wave complexes) and specific seizure types. Different analysis tools available depending on subscription (AI features might not be available in all levels of subscription), including: alpha / delta ratio analysis, Brain Symmetry Index, Cerebral Recovery Index, Deep Cerebral Recovery Index (DeepCRI), Interictal Epileptiform Discharge detector, Spectral Edge Frequency (SEF95), spectrogram analysis.
NeuroWorks (Natus Medical) which includes autoSCORE (also referred to as SCORE-AI) CE-marked (class IIa MDR)	The spike detection component of SCORE-AI is suitable for use in patients aged 3 months or over for EEGs of shorter than 4 hours; and people aged 2 years or over for EEGs over 4 hours. <u>Type of EEG</u> : routine, sleep-deprived and ambulatory EEGs	SCORE-AI is based on SCORE-AI, a convolutional neural-network model. SCORE-AI is a locked algorithm trained to indicate if sections of EEG include abnormalities by using standard deep learning principles. The company confirmed that SCORE-AI does not distinguish between ictal and interictal epileptiform activity. Note that SCORE-AI was not available in NeuroWorks 9.0.	Yes: company confirmed that age and ECG are mandatory to run the SCORE-AI analysis. Sex is also required (but "not set" is accepted by the analyser).	Multiple analysis tools available, including detecting and automatic editing of events: Spike Detectors and Event Detectors (XLEvent, Stellate ICTA-S, Persyst) Event Detectors for Depth/Grid (Stellate ICTA-D). SCORE-AI: Provides a probability for abnormality in routine EEG recordings. Scored as normal, probably normal, probable abnormal, abnormal – and these are displayed as 4 colour coded tags. Outputs: normal, epileptiform – focal, epileptiform – generalised, non-epileptiform – focal, non-epileptiform – diffuse.
Persyst 15 (Persyst Development LLC) UKCA-marked (class IIa medical device)	Spike detection: patients aged 1 month and over; Neonatal seizure detection: conceptional age between 36 and 44 weeks and chronologic age less than 2 weeks (company state this function is not applicable to current use case); Seizure detection and seizure probability: intended for patients aged 18 years or over; EEG review and analysis software (including image viewer): patients aged 12 years or over; Electrical source imaging: patients aged 3 years or over; Sleep state features: patients aged 13 years or over; <u>Type of EEG</u> : routine, sleep-deprived, and ambulatory EEG.	Deep learning (non-adaptive) locked algorithm.	None	Spike detection, seizure detection, quantitative EEG trending, heart rate trending, sleep state, electrical source localization, and neuroimage display. Quantitative measures include: FFT, rhythmicity (IFU states this is not a clinical validated measure), peak envelope, artefact intensity, amplitude, relative symmetry, suppression ratio (IFU states this does not attempt to identify a burst suppression pattern). Automatic event marking is not applicable to quantitative measures.

Abbreviations: ECG, F; EEG, electroencephalogram; FFT, Fast Fourier transformation; IED, Interictal epileptiform discharge; IFU, Instructions for use; RFI, Request for information

3. Clinical context

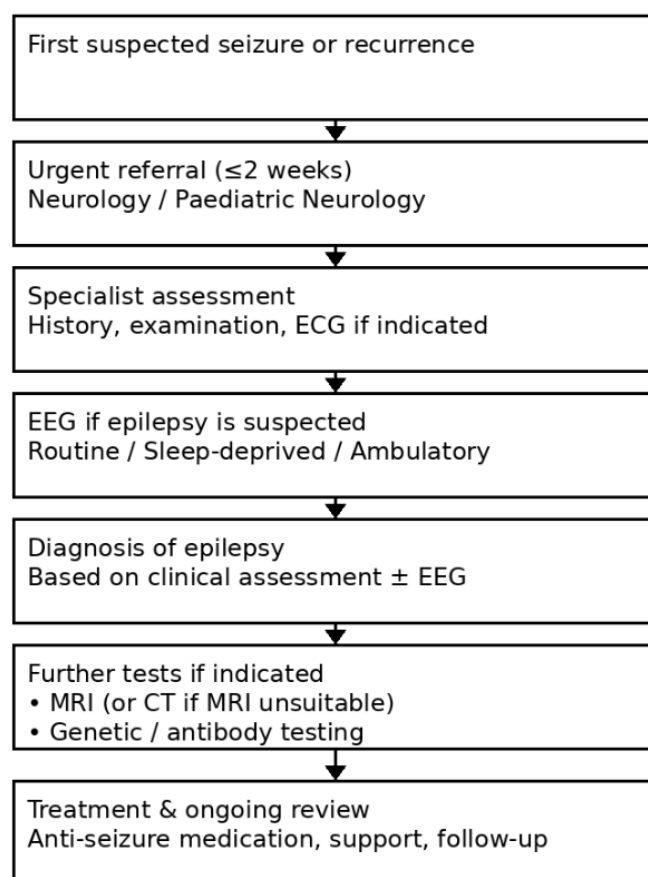
As summarised in the [Final Scope](#), epilepsy affects approximately 533,000 people in England and Wales including 112,000 children and young people. It drives substantial unplanned care (100,000 hospital presentations and 40,000 epilepsy-related admissions in England each year), creating persistent workload and cost pressures for the NHS. Epilepsy is associated with substantial morbidity, recurrent emergency department attendances, unplanned hospital admissions, and avoidable mortality. The original NICE guideline on epilepsy (2004) stated that the annual estimated (direct and indirect) cost of established epilepsy was around £2 billion ([Epilepsy Research Institute UK](#)), with ongoing pressure expected as service demand and treatment costs increase. Accurate, timely diagnosis is therefore a system priority.

A brief overview of the care pathways for diagnosis and management of epilepsy is summarised in the Final Scope (sections 3.1 to 3.4) and in Figure 1. This includes consideration of routine, sleep-deprived, ambulatory or telemetry EEG:

- Routine EEG recording: Lasting approximately 20 minutes in a hospital setting.
- Sleep-deprived EEG recording: Lasting approximately 1 hour in a hospital setting.
- Ambulatory or telemetry EEG recording: Telemetry typically refers to prolonged EEG recording with simultaneous video capture which may occur at home or in hospital. Ambulatory EEG refers to prolonged EEG recording (no video) where the patient attends hospital to have the electrodes connected and then the patient goes home. One clinical expert advised that duration of ambulatory EEG is typically 17 to 24 hours (rarely longer than 1 day).

Clinical experts supporting the topic advised the EAG that there is considerable variation in EEG referral practice, for example some hospitals do not offer ambulatory EEG. Despite the variability in practice the clinical experts agreed that the main bottle neck is the waiting time to receive an initial EEG. Clinical experts also advised that patient presentation and clinical history may inform the type of EEG. The Association of Neurophysiological Scientists (ANS) stated that following an EEG recording (which will vary in length depending on the type of EEG, and on the patient), the data is reviewed and a technical factual report is written; the staff involved varied by the type of EEG (broadly summarised in Table 3). They advised that the EEG and the factual report are reviewed by the reporting clinicians, and the clinical report sent to the referring clinician. However, it is important to note that clinical information (history, presentation) and information from other diagnostic tests contributes to the final diagnosis of epilepsy, and that the EEG in isolation is not used as the primary diagnostic in epilepsy.

Figure 1: Summary of the NHS care pathway for epilepsy diagnosis



Abbreviation: CT, computed tomography; ECG, electrocardiogram; EEG, electroencephalogram; MRI, magnetic resonance imaging

The EAG liaised with clinical experts to better understand typical timings within the care pathway (see [Appendix D2](#)). The EAG has summarised the differences in waiting times, review and report time, and NHS staff involved by type of EEG and (routine, sleep-deprived, ambulatory/telemetry) in **Table 3**. The clinical experts advised that quite often treatment may have been started before the EEG (with the EEG being used for classification of epilepsy type, focal versus generalised, with treatment implications [Appendix D1](#)), and if not treated beforehand that the referring clinician will integrate the EEG results with other diagnostic tests, presentation and clinical history to discuss the risks and benefits of treatment with the patient. They also advised that the

staff role and banding may vary by EEG type, but also by hospital (based on local training and resources).

Table 3: Summary of waiting and review/report times by electroencephalogram (EEG) type

EEG Type	Waiting Time	Process Steps & Durations
Routine EEG	3 weeks to 3 months	60 mins: set up, test acquisition, clear up (clinical physiologist: Band 5–6) 30 mins: review/report (clinical physiologist: Band 5–6) 20 minutes: interpretation (consultant clinical neurophysiologist)
Sleep-deprived EEG	3 weeks to 8 months	100 mins: set up, test acquisition, clear up (clinical physiologist: Band 5–6) 40 mins: review/report (clinical physiologist: Band 5–6) 30 minutes: interpretation (consultant clinical neurophysiologist)
Ambulatory/telemetry EEG* [*Noting some centres do not have access to ambulatory/telemetry EEG]	3 months to 12 months	120 mins: set up, test acquisition, clear up (clinical physiologist: Band 6–7) 360 mins: review/report (clinical physiologist: Band 6–7) 120 minutes: interpretation (consultant clinical neurophysiologist)

Abbreviation: EEG, electroencephalogram.

3.1 National guidelines

The NICE epilepsy guideline (NICE NG217, 2022) recommends use of EEG to support the diagnosis of epilepsy and help determine seizure type or epilepsy syndrome, but EEG alone cannot exclude epilepsy. The diagnosis of epilepsy is primarily clinical, supported by specialist assessment and further investigations where appropriate. NICE quality standards and referral guidance further highlight the importance of timely access to specialist assessment and investigations following a suspected epileptic seizure (NICE QS211, 2023).

Other national guidelines include:

- [British Society for Clinical Neurophysiology \(BSCN\) and Association of Neurophysiological Scientists \(ANS\) guidance on referral for neurophysiological testing \(2025\)](#);
- [BSCN guidance on practice of electroencephalography](#);
- [NICE recognition and referral of suspected neurological conditions guideline \(NICE NG127, 2019 updated in 2023\)](#);
- [NICE transient loss of consciousness \('blackouts'\) guideline \(NICE CG109, 2010 updated in 2023\)](#).

Additionally, two Medtech Innovation Briefings by NICE related to EEG monitoring which could be used in the diagnosis or monitoring of epilepsy have been published:

- [CerebAir for continuous EEG monitoring in intensive care \(MIB279, 2021\)](#)
- [24/7 EEG SubQ for epilepsy \(MIB277, 2021\)](#).

3.2 Routinely collected data in the NHS

3.2.1 National audits

The British Society for Clinical Neurophysiology (BSCN), in collaboration with the ANS, runs a national programme of clinical audits aimed at improving neurophysiology practice across the UK. The BSCN advised that they conduct 3 audits per year (usually conducted in two-year cycles) and EEG services play a central role in developing the audit methodology. For example, the UK EEG Quality Improvement Programme (Professional standards–based audit) have held 4 audit cycles from 2011 to 2018. Meetings focused on specific topics of EEG practice. The 2011–2012 cycle examined how hyperventilation was performed and documented as part of routine EEG and reviewed practice around prolonged EEG/video monitoring. The 2013–2014 audit cycle evaluated how photic stimulation was applied during EEG and adherence to standards and methods and quality of sleep-EEG induction for children. In 2015–2016 the meeting focussed on EEG for non-epileptic attack disorder (NEAD) and assessed whether EEGs for suspected NEAD were requested, performed and interpreted appropriately to avoid misuse. The 2017–2018 audit reviewed quality and indications for prolonged EEG recordings and evaluated technique, indications and consistency with standards for sleep-deprived EEG protocols.

National Audit of Seizure Management in Hospitals ([NASH round 3, 2020](#)) summarised results from a 2018 audit of 4,132 people presenting with a seizure to 137 emergency departments across the UK (95.6% from England). The median age was 43 years (nearly 20% aged over 65 years), the majority (61%) had an existing diagnosis of epilepsy (half of whom had attended A&E with a seizure in the previous year), 16.6% of whom had a learning disability, 23% had experienced likely a first seizure, 9.5% of whom were recorded as having dementia. This audit does not report the proportion of people undergoing EEG or the type of EEG.

Paediatric

Epilepsy12 is a national clinical audit for seizures and epilepsies in children and young people under paediatric care in England and Wales (without a numerical age limit), led by the Royal College of Paediatrics and Child Health (RCPCH). [The 2025 report](#) combines organisational and clinical audit findings covering children with a first paediatric epilepsy assessment between December 2022 and November 2023, and reviews service organisation as of November 2024 (cohort 6). 3,105 children and young people were included and 80% of eligible Health Boards and Trusts participated in the clinical audit. Main audit findings include (previous cohort 5 figures for comparison):

- **Epilepsy pathways and involvement of professionals:** 32.4% of children and young people were seen by a consultant paediatrician with expertise in epilepsies within 2 weeks from first paediatric assessment (previous cohort 50.8%) and 85.6% were seen by an Epilepsy Specialist Nurse within the first year of care (previous cohort 80.7%). 42.0% of children and young people who met Children's Epilepsy Surgical Service Referral (CESS) criteria had evidence of a CESS referral within the first year of care (previous cohort 37.3%).
- **Assessments:** Most children and young people with epilepsy received an EEG (98.5% (3,057 of 3,105)). In England and Wales, the median wait time for an EEG was 3.3 weeks. In terms of other diagnostic testing: 83.4% of children and young people with convulsive seizures had an electrocardiogram (ECG) within the first year of care (previous cohort 72.1%) and 49.2% (1,181 of 2,401) of children and young people with epilepsy and defined indications for an MRI had an MRI brain scan within 6 weeks of request (previous cohort 53.1%). Of the children and young people who met referral criteria to Children's Epilepsy Surgery Service (CESS), 42.0% (94 of 193) had evidence of CESS referral within the first year of care.
- **Mental health provision:** 38.2% of children and young people aged 5 years and over had documented evidence that they had been asked

about mental health (previous cohort 22.4%) and 76.6% that had an identified mental health problem, also had evidence of receiving mental health support within the first year of care (previous cohort 61.5%).

- **Care planning:** 85.8% (2,665 of 3,105) of children and young people with epilepsy had evidence of care planning agreement within the first year of care, 67.4% (2,093 of 3,105) had evidence of achieving all core elements of care and 67.2% (1,427 of 2,125) of children and young people aged over 5 years had evidence of a School Individual Healthcare Plan within the first year of care. 100% of female young people who are 12 years and over, currently on valproate anti-seizure treatment had a risk acknowledgement form completed ([MHRA's guidance](#) states that people of childbearing potential must not be prescribed valproate without a Pregnancy Prevention Programme in place).

3.2.2 Hospital activity

Routinely collected data within Hospital Episode Statistics (HES) does not currently capture detail regarding the technologies used during diagnosis, however it does give an idea of scale of hospital resource usage in England for patients with specific diagnoses. For example within the 2024/25 financial year, (NHS England HES APC, 2025) reports released by NHS Digital stated the following totals of finished consultant episodes with a primary diagnosis (ICD10 code): Epilepsy (G40) was the primary reason for admission documented in 57,278 hospital admissions (30,514 of which were emergency admissions), with a median length of stay of 1 day (mean 4.0 days) and mean age of 41 years, with activity increasing with the Index of Multiple Deprivation (IMD) decile group.

The EAG was unable to robustly identify the total number of each type of EEGs conducted in the NHS annually due to lack of granularity in clinical coding. The lack of coding of clinical neurophysiology services was highlighted in the [Getting It Right First Time Neurology report](#) published in 2021. As an estimate, the NHS National Cost Collection from 2024/25 reported the following total activity:

- 230,251 conventional EEG, EMG or nerve conduction studies conducted in an outpatient setting in adults, and 28,356 in children (see [section 6.2.4](#) for more detail); the EAG note that this may include routine EEG, sleep-deprived EEG and other diagnostic testing unrelated to EEG.
- 4,474 standard long-term EEG monitoring, which the EAG assumed could include ambulatory EEG.
- 3,436 conventional EEG, EMG or nerve conduction studies conducted in an admitted patient care (elective) setting in adults, and 33 in children; which the EAG assumed could include in-hospital video telemetry. An additional 571 conventional EEG, EMG or nerve conduction studies conducted in a day case setting in adults, and 1,868 in children; which the EAG assumed could include home video telemetry.

The clinical experts highlighted that the type of EEG used varies across the UK. A sample of 4 clinical experts stated that a total of between 1,000 and 4,000 EEGs were performed at their centre per year (see Question 11 in [Appendix D1](#)).

3.3 Training

In terms of staff training, the Association of British Neurologists (ABN) stated in their professional organisation submission to NICE that:

- In the NHS the diagnosis of epilepsy is predominantly clinical and based on careful history taking in line with NICE epilepsy guidance. EEG is used as an adjunct to support diagnosis, characterise epilepsy syndromes, evaluate new seizure types, guide antiseizure medication decisions, support management of status epilepticus, and inform decisions around medication withdrawal.
- EEG recording is performed by trained Clinical Physiologists or Clinical Scientists within secondary or tertiary care neurology services, with interpretation undertaken by Consultant Neurophysiologists or epilepsy

specialists. Prolonged video-EEG telemetry is available in selected centres, typically over several days, and requires integration of EEG signals with video (referred to as video-EEG) and clinical context.

- Access to EEG and, in particular, timely clinical expert reporting is variable across the UK. EEG is rarely accessible in primary care and remains concentrated in specialist centres. Reporting is labour-intensive and dependent on limited specialist workforce capacity, contributing to delays in diagnosis and management.

The British Society of Clinical Neurophysiologists (BSCN) stated that training of those interpreting EEGs (neurophysiology, representing current standard of care in the NHS) is extensive in the UK. They considered that similar professional training was conducted in countries such as Spain, Portugal, and Scandinavian countries; and that benefits reported for technologies when used in other countries (where training is less specific or shorter) may not be generalisable to the NHS.

Specific training related to the use of the technologies has been summarised in [section 7.3](#).

3.4 Patient and professional organisations

Three patient and professional organisations were registered stakeholders for this topic and provided an organisational response to the NICE for this early use assessment.

Young Epilepsy

Standard care in the NHS

Young Epilepsy highlighted that children and young people can experience significant diagnostic delays when routine EEGs are normal, inconclusive or difficult to interpret. Families describe repeated EEGs, long waits for appointments and uncertainty about whether episodes are caused by epilepsy. Young Epilepsy's work with children and young people has highlighted the following themes in relation to diagnostic testing:

- Fear of missed seizures: families want reassurance that subtle or nocturnal seizures will be detected even when staff are stretched or monitoring is brief.
- Desire for fewer tests and faster answers.
- Need for clear communication: young people are open to using new technology in general but parents want clarity that clinicians remain responsible for decisions.
- Reducing stress during the EEG procedures; tools that shorten appointments, reduce the need for sedation or allow remote review are valued.

Potential advantages associated with technologies in scope

The organisation stated that technologies that improve detection, reduce repeated testing, or accelerate diagnosis address a substantial unmet need in paediatric epilepsy care. They considered that earlier diagnosis would have benefits in education, mental health, behaviour and sleep. They also highlighted potential benefits of standardisation of reporting, support for non-specialists in settings with limited neurophysiology expertise and enhanced safety in ICU and long-term monitoring. They felt that new technologies and emerging tools play a crucial role in improving the quality and speed of quantifying seizures and detecting spikes and supporting stretched neurophysiology services (for example in relation to extended EEGs) for more equitable access across the UK, including community diagnostic hubs.

Potential disadvantages associated with technologies in scope

Young Epilepsy considered the following disadvantages of the health technologies being assessed:

- False positives may increase workload, and false negatives may miss diagnoses.
- Over-reliance on automated outputs may erode clinical confidence or lead to misinterpretation by non-experts.

Young Epilepsy considered a number of challenges related to EEG interpretation in children and young people:

- Developmental variability; EEG patterns change significantly across infancy, childhood and adolescence.
- High artefact burden; movement, behavioural challenges and sensory sensitivities increase artefact, making detection more complex.
- Children with complex developmental epileptic encephalopathies (DEE) often have atypical or evolving EEG patterns that may not be represented in adult-trained models. They highlighted that the technologies should have evidence across all types of epilepsy. The EAG identified one source from New Zealand which estimated that “epilepsy and developmental impairment before the age of 16 years occurs in 1 in 340, with 1 in 590 having a DEE and 1 in 800 having intellectual disability and epilepsy” (Poke et al., 2023). The EAG was unable to identify an estimate of DEE in the UK from the UKRET website. However, one clinical expert stated that the figures from New Zealand seemed appropriate.
- Shorter or fragmented recordings are common in children, which would reduce the data available to train and validate AI algorithms.

The organisation highlighted that the technologies should be transparent, auditable and within clear governance frameworks and validated in paediatric cohorts.

The Association of British Neurologists (ABN)

Standard care in the NHS

The Association of British Neurologists (ABN) stated that there is an unmet need to access timely EEG reporting, where workforce shortages in neurophysiology contribute to long waiting times for both EEG investigations and formal reports which may delay diagnosis and treatment. They stated that sensitivity of routine EEG for detecting epileptiform abnormalities was approximately 20% to 50%; often requiring repeated or prolonged studies

(which would increase pressure on specialist services), and they also commented on high intra- and inter-observer variability during interpretation.

Potential advantages associated with technologies in scope

The ABN stated the following benefits of the technologies:

- Earlier diagnosis following first seizure, earlier initiation of antiseizure medication, improved management of status epilepticus through more rapid identification of ongoing epileptiform activity and in prolonged telemetry faster identification of diagnostic events could reduce inpatient length of stay.
- Automated event detection may help prioritise EEGs over normal studies enabling more effective allocation of specialist time.
- System benefits such as reduced reporting time by physiologists and neurophysiologists, reduced need for repeated EEG investigations, improved standardisation across NHS trusts.

They stated that software for EEG interpretation would sit in the process between EEG data acquisition and final clinical reporting. They highlighted that the technologies could not replace the need for expert clinical interpretation of EEG findings in conjunction with patient history and clinical examination. This is in line with the technologies' intended use.

The ABN considered that patients most likely to benefit would include adults undergoing prolonged or ambulatory EEG, those requiring continuous EEG monitoring in an ICU setting for suspected non-convulsive status epilepticus, and patients whose recordings contain infrequent but clinically important epileptiform events.

Potential disadvantages associated with technologies in scope

The ABN considered that those less likely to benefit from the technologies would be those with EEGs heavily contaminated by artefact, individuals with complex epilepsy syndrome that are poorly represented in AI training datasets, and patients undergoing telemetry for surgical planning following

medication withdrawal where patterns may be atypical. They considered that false positive results may lead to over-diagnoses of epilepsy, unnecessary long-term antiseizure medication (including drugs with pregnancy-related risks), driving restrictions, and social or occupational consequences. False negatives could delay diagnosis and treatment and increase the risk of seizure-related harm.

The ABN considered that reductions in reporting time were unlikely to be sufficient to reduce overall staffing requirements associated with EEG, and that resource impact would depend on software costs, performance and the extent to which expert supervision remains necessary. They also expressed concern that over time clinicians may place excessive reliance on the AI outputs, reducing critical scrutiny of the results.

Association of Neurophysiological Scientists (ANS)

Standard care in the NHS

The Association of Neurophysiological Scientists (ANS) stated that there is national variation in the provision of EEG services, with respect to patient access and time-to-reporting related to lack of healthcare scientists and medical support. They noted that EEG diagnostic provision is not currently reported to NHS England via diagnostic waiting times and activity (DM01) reporting.

Potential advantages associated with technologies in scope

The ANS stated that AI software that helps triage referrals is already available. They stated that the potential benefits of technologies could be in the removal of interference from the EEG, faster review, automatic detection of abnormalities, detecting EEG biomarkers not easily seen on traditional visual report, and an AI report could be generated and checked by a qualified clinician. Benefits to patients may include quicker diagnosis, avoidance of repeated testing, subsequently leading to improved access to EEG. Benefits to the system may include faster reporting times leading to increased department capacity and increased digital skill acquisition for staff (including audit of AI outcomes).

Potential disadvantages associated with technologies in scope

The ANS stated that there would be no direct side effects associated with the technologies, but that the technologies would not be a substitute for clinical expert diagnosis.

Other organisations

One clinical expert highlighted that other patient and professional organisations are relevant to this topic. The EAG combined these with those listed on the stakeholder list on the [NICE topic webpage](#), however would note that organisational responses were not submitted to NICE and therefore were not summarised in the EAG report:

- [Epilepsy Action](#) and [Epilepsy Society](#); two primary epilepsy patient organisations in the UK,
- [HOPE for Epilepsy](#) charity which supports and connects families with children affected by epilepsy in the UK,
- [UK rare epilepsies Together network \(UKRET\)](#) which is a network of patient support groups and charities representing those impacted by rare and complex epilepsies across the UK.
- [SUDEP Action](#) patient organisation with focus on sudden death in epilepsy,
- The [International League Against Epilepsy \(ILAE\)](#) which is a leading international resource for current and emerging standards and best practices in epilepsy care. One clinical expert highlighted that the British chapter was one of the most active.
- [Epilepsy Nurses Association \(ESNA\)](#) which represents the views of epilepsy nurses in the UK & Ireland,
- The [British Paediatric Neurology Association \(BPNA\)](#) which the clinical expert advised was the equivalent to the ABN in adults,
- The [Royal College of Psychiatrists \(RCPsych\)](#) which the clinical expert highlighted has relevant guidance in Intellectual Disabilities which includes an outcomes framework and care pathways.

3.5 Equality issues

Equality issues and considerations for this early use assessment are described in the [Equalities Impact Assessment \(2025\)](#) alongside the [Final Scope](#). Contraindications associated with each of the technologies are reported (where available) in [Appendix C1](#). A recent systematic review and meta-analysis identified a positive association between socio-economic deprivation and incidence of epilepsy in the UK with the rate of epilepsy being 1.34 times higher in the most deprived group compared to the least (Bush et al., 2024). The association held true for studies involving children only which had been an area of conflicting evidence previously. What is not known is which factors influence the association such as rural-urban settings, ethnicity, obesity and multiple medical conditions (Bush et al., 2024).

Young Epilepsy stated that AI trained primarily on adult datasets may misinterpret EEG for children and young people with learning disabilities, rare epilepsies, or complex neurodevelopmental conditions. Similarly, the ABN also stated that there was a concern regarding performance of the technologies in patients with learning disabilities, medically refractory epilepsy, non-epileptic attack disorder, or complex focal epilepsies, and potential lack of validation in paediatric or neonatal populations. Both the ABN and the ANS stated that the technologies included in the assessment would only initially benefit services with existing EEG infrastructure; potentially widening health inequalities. Both organisations stated that algorithmic bias was a concern if the training datasets did not adequately represent the diversity of NHS populations, potentially reducing accuracy and leading to unequal treatment in under-represented groups.

4. Clinical evidence

To identify clinical evidence associated with the technologies included within the NICE scope, the EAG conducted a literature search supplemented by evidence submitted by the companies.

4.1 Search strategies and study selection

The EAG search strategies were developed using search terms from the original NICE information specialist's scoping searches, from companies and their websites, from bibliographic database thesauri (for example, MEDLINE MeSH and Embase Emtree) and from literature identified during the initial scoping searches.

A search strategy was developed by one of the EAG's information specialists in Embase and peer reviewed by a second information specialist using the PRESS checklist (McGowan et al., 2016). The strategy was translated, adapted and run on 03 February 2026 independently on Embase (OVID), MEDLINE (OVID), the Cochrane Library (CDSR/CENTRAL: systematic reviews and trials, Wiley), and the International HTA Database (INAHTA) to identify reports of any potentially relevant studies and conference abstracts. For completed and ongoing clinical trials, a trial registry and a multi-registry search platform were searched (ClinicalTrials.gov, WHO ICTRP). The search strategies for clinical evidence are presented in [Appendix A1](#). Records were imported into EndNote 21 where deduplication took place. Based on product dates, a publication limit of 2009 onwards was applied to all searches. Clinical effectiveness searches retrieved a total of 250 results, of which, 189 remained after deduplication.

The searches were built around product names (with limited additional topic requirements) and company names (with more stringent topic requirements); see [Appendix A1](#) for more details. If papers exist relevant to the technologies but with no reference to the product or company names, then they would have been missed. However, initial testing found minimal evidence to suggest the existence of this type of paper. The PRISMA-S checklist was used to guide reporting of the search methods (Rethlefsen et al., 2021).

4.2 Included and excluded studies

The titles and abstracts of the 189 results of the database searches were sifted according to the protocol ([NICE, 2026](#)) by a single reviewer (PL, [Appendix A2](#)), with a 20% sample also checked by a second reviewer (KK). A

total of 92 items were subsequently excluded. Full papers were retrieved (n=97) and reviewed by 2 reviewers (double review; PL, KK). Due to the lack of clinical evidence relevant to the device versions listed in the Final Scope, the EAG considered evidence from predecessors. The EAG noted that there was limited evidence available for some technologies when used alongside clinical experts (as per their indication for use, which also aligns with the decision problem of the Final Scope of this early use assessment), and no evidence of this use case for some technologies. Therefore, the EAG also considered evidence when the technologies were used fully automated.

Of the full papers reviewed, 45 were deemed relevant to the scope and 29 of these were subsequently deprioritised. Reasoning for deprioritisation included smaller sample sizes, older predecessors (applied for encephalis and Persyst), early results of technologies which were undergoing development, available as abstract only with limited methods or results), as tabulated in [Appendix A5](#).

The 16 papers which remained for data extraction, were supplemented with a total of 35 references provided by the companies, of which 23 were considered in scope and 11 of these were subsequently deprioritised ([Appendix A5](#)); leaving 12 remaining. Due to overlap with the evidence identified by the independent literature search of the EAG, the evidence from the companies provided only 1 additional paper for inclusion (provided academic-in-confidence) (Persyst Development LLC, no date). Therefore, a total of 17 papers were included in the clinical evidence summary, Table 4 (detailed study characteristics reported in [Appendix A4](#)). All data extraction was completed by one reviewer (DM, KK) and quality assurance checked by another reviewer (PL, KB, DM).

For all included studies, the EAG extracted all outcomes reported that aligned with those listed in the Final Scope. The EAG noted the results from fully automated use of the technologies would give evidence of validation, and context of how many false negatives and false positives when using the technologies (and the impact that this may have on staff time and staff acceptability) may support committee decision making. The EAG therefore reported diagnostic accuracy and EEG review and report time results

separately for technologies when used alongside clinical experts, and when used fully automated. However, the EAG would stress caution in interpreting these fully automated results as these are not the intended use that these technologies have gained regulatory approval as medical devices for.

A total of 70 excluded studies and reasons for exclusion have been tabulated in [Appendix A6](#). See [Appendix A2](#) for the PRISMA flow diagram associated with the clinical evidence.

Table 4: Characteristics of included studies (N=17)

#	Author (reference, year; page)	Study design (n=EEGs, patients or clinicians); Setting (country)	Population	Intervention [type of EEG]	Comparator [type of EEG]	Reference standard [type of EEG]	Outcomes reported					
							Diagnostic accuracy	Technical failure rate	Clinical EEG review and report time	Impact of software on clinical decision making	Clinician acceptability	Cost of training
1.	Charles et al., 2026 (Epilepsy & Behavior 177:110925).	Observational, retrospective (n=196 patients; 33.7% with epilepsy); UK (N=6 seizure clinics)	Age, years: median 38.8 (range 18 to 91); Male: 45.9%	BioEP similarity score used as biomarker to prioritise follow-up EEG + clinical expert [max 20-minute routine EEG]	Modelled standard referral-based scheduling of follow-up EEGs (random sampling) [N/A]	Final clinical diagnosis (epilepsy versus non-epilepsy) and stable for 1 year after first routine EEG (not defined)	Partially	-	-	-	-	-
2.	da Silva Lourenço (Clin Neurophysiol, 2023; 43-48)	Diagnostic accuracy (n=100 EEGs) The Netherlands (N=1 centre)	Age, years: mean 43.6, Male: 47%	NeuroCenter EEG [mean 20-hour ambulatory EEG] + clinical expert (N=1) looking at flagged epochs	-	Original EEG report	Yes (IED)	-	Yes	-	-	-
3.	Duckworth (J Integrative Neurosci, 2024; 150)	Retrospective case-control (n=98 patients) UK	Age, weeks: median 11.0 (cases), 8.0 (controls) Male: 27% (cases), 28% (controls)	Persyst 14 + clinical expert [continuous videoEEG, 60-minResus 2022a, s]	-	Expert	Yes (seizure)	-	-	-	-	-
4.	Koren (Frontiers in Neurol, 2018; 454)	Feasibility study (n=20 patients, 80 datasets received, 76 EEG segments analysed); Austria (critical care setting)	Age: NR Male: NR	encevis (NeuroTrend) + clinical expert [continuous EEG, 6 hr]	-	Experts (N=2)	Yes (seizure)	Yes	Yes	-	-	Partially
5.	Kural (Epilepsia, 2022; 1064-1073)	Diagnostic accuracy (n=60 patients; 50% with epilepsy); Denmark (N=2 hospitals)	Age, years: median 36 (range 2 to 77); Male: 45%	encevis (DeepSpike) , SpikeNet, Persyst 13 with clinical expert interpretation [20-min routine EEG]	Clinical interpretation [20-min routine EEG] alone; N=3 experts	Clinical interpretation [videoEEG], N=2 experts	Yes (IED)	-	Yes	-	-	-
6.	Reus (Seizure, 2022a; 13-17);	Diagnostic accuracy (n=286 EEGs, from 283 patients); The Netherlands (N=1 epilepsy monitoring unit)	Age, years: 16 to 86; Male: 48%	Persyst 14 , encevis v1.9.2 , and BESA v2.0 [median 20 hours ambulatory EEG] with seizure detection performance by online human observation	Live monitoring (nurse observations and individual alarm button) and offline review (clinical physiologist)	All seizures included in clinical report, and true positives from algorithms as determined by 2 experts	Yes (seizures)	-	-	-	-	-
7.	Tittensor (MedRxiv, 2024) Preprint	Prospective diagnostic belief updating study (n=86 patients); UK (N=1 nurse-led first seizure clinic)	Age, years: median 35.5 Male: 53.5%	BioEP + clinical expert [routine EEG]	Expert (N=2) [routine EEG]	-	-	-	-	Yes		
8.	Sharpe (J Clin Neurophysiol, 2019; 9-13)	Qualitative study (n=9 neurologist interviews related to Persyst);	Age: EEGs in neonatal intensive care unit	Persyst [continuous videoEEG; duration NR];	-	-	-	-	-	-	Yes	-

#	Author (reference, year; page)	Study design (n=EEGs, patients or clinicians); Setting (country)	Population	Intervention [type of EEG]	Comparator [type of EEG]	Reference standard [type of EEG]	Outcomes reported					
							Diagnostic accuracy	Technical failure rate	Clinical EEG review and report time	Impact of software on clinical decision making	Clinician acceptability	Cost of training
		New Zealand		<i>Unclear if used alongside clinical expert or not</i>								
9.	Janmohamed (J Clinical Neurophysiology, 2024; 618-624)	Validation (n=125 EEGs from n=125 patients); Australia, US (N=3 hospitals)	Age: NR Male: NR	encevis 1.11.4 , [routine < 4 hours 89%, prolonged > 4 hours: 11%] Fully automated	Persyst 14 [routine < 4 hours 89%, prolonged > 4 hours: 11%]	Experts (N=3 epileptologists; agreement of at least 2; updated after review of software outputs)	Yes (IED)	-	Partially (processing time)	-	-	-
10	Koren (Clin Neurophysiol, 2025; 178-188)	Diagnostic accuracy, retrospective (n=80 patients); Austria	Age, years: median 33 (range 14 to 73) Male: 52.5%	encevis 2.0, Persyst 14 [videoEEG, median 93 hours] Fully automated	Original EEG report	Experts	Yes (seizure)	Yes	Partially (detection delay)	-	-	-
11	Mansilla (Epilepsia, 2024; 3028-3037)	Diagnostic accuracy, retrospective (n=104 patients); Canada (N=1 adult neurology)	Age, years: range 16 to 91 Male: 38.5%	SCORE-AI (NeuroWorks) [25-min routine EEG] Fully automated	Experts (N=3) [25-min routine EEG]	Expert review [videoEEG], patient follow-up and final diagnosis on electronic health records	Yes (IED)	-	-	-	-	-
12	Persyst [Supplied by company_1]	Internal performance testing; Setting: NR	Spike detection (n=50 EEGs, 277 EMU EEGs, and 14 non-spike EMU EEGs) Age, years: 0.5 to 66 Male: NR Seizure detection (n=85 adults, 55 neonates) Age: NR Male: NR	Persyst 15 [long-term EEG] *Fully automated	-	Experts (N=5)	Yes (IED, seizure)	-	-	-	-	-
13	Reus (Seizure, 2022b; 33-37)	Diagnostic accuracy (n=30 EEGs from 30 patients) The Netherlands (N=1 epilepsy monitoring unit)	Age, years: median 39 (range 18 to 76) Male: 43%	Persyst 14, encevis v1.9.2. and BESA v2.0 [30-minute section of EEG] Fully automated	Experts (N=3)	Expert consensus (agreement by at least 2 of 3)	Yes (IEDs)	-	Partially (processing time)	-	-	-
14	Tait (Epilepsia, 2024; 2459-2469)	Validation study (n=281 patients); UK (N=8 neurology clinics)	Age, years: mean 42 (range 18 to 91) Male: 42.7%	Unnamed (assumed BioEP as shared by Neuronostics) [20-min EEG] Fully automated	-	Established clinical diagnosis (and stable 1 year)	Yes	-	-	-	-	-
15	Tsereteli (Epilepsia Open, 2025; 70193)	Prospective real-world evaluation (n=267 EEGs); Georgia	Age, years: median 27 (range 2 to 75) Male: 47.6% Diagnosis epilepsy: 57.3% (74.5% focal,	encevis [median 12-hour EEG] Fully automated	-	Expert consensus (N=2) [video EEG]	Yes (IED and seizure)	-	-	-	-	-

#	Author (reference, year; page)	Study design (n=EEGs, patients or clinicians); Setting (country)	Population	Intervention [type of EEG]	Comparator [type of EEG]	Reference standard [type of EEG]	Outcomes reported					
							Diagnostic accuracy	Technical failure rate	Clinical EEG review and report time	Impact of software on clinical decision making	Clinician acceptability	Cost of training
			25.5% generalised)									
16	Tsereteli (Epilepsy & Beh, 2024; 100656)	Prospective real-world evaluation (n=255 EEGs); Georgia	Age, years: (range 4 to 67) Male: 55.8%	encevis v1.7 [mean 11 hours] Fully automated	-	Expert consensus [video EEG]	Yes (seizure)	-	-	-	-	-
17	Tveit (JAMA Neurol, 2023; 805-812);	Clinical validation in 3 datasets (n=100, 9785, 60 EEGs) Denmark, US, Norway	1) Age, years: median 25.8 Male: 61% 2) Age, years: median 38.9 Male: 52.8% 3) same as Kural et al. 2022	SCORE-AI (comparison with encevis in dataset 3) Fully automated	Experts	Expert consensus	Yes (IED)	-	-	-	-	-

Key: Y=yes, reported; P=partially reported; * assumed by the EAG (limited information provided)

Abbreviations: EEG, electroencephalogram; EMU, Epilepsy monitoring unit; IED, interictal epileptiform discharge; NR, not reported

5. Clinical evidence review

5.1 Quality appraisal of studies

Of the 17 included studies, only 7 described the use of the technologies alongside clinical experts. Of those seven, four studies included cohorts with suspected epilepsy with the proportion of diagnosis unknown at the time of the EEG analysis (da Silva Lourenço et al., 2023; Koren et al., 2018; Reus et al., 2022a; Tittensor et al., 2024 [pre-print]), and three were case-control studies with a proportion of known epilepsy diagnoses (Charles et al., 2026; da Silva Lourenço et al., 2023; Duckworth et al., 2024; Koren et al., 2018; Kural et al., 2022; Reus et al., 2022a; Tittensor et al., 2024 [pre-print]). Only 3 studies described the use of the technologies used alongside clinical experts, when compared to clinical experts alone.

Across the 17 included studies:

- BioEP was included in 1 validation study (Tait et al. 2024), 1 retrospective observational study (Charles et al. 2026) and 1 study available as pre-print only (1 prospective belief updating study, Tittensor et al. 2024).
- encephalis was used in 8 studies:
 - encephalis 2.0 (Koren et al. 2025, which reported different algorithm settings),
 - encephalis 1.11.4 (Janmohamed et al. 2024),
 - encephalis 1.9.2 (Reus et al. 2022a; Reus et al. 2022b),
 - encephalis 1.7 (Tsereteli et al. 2024),
 - encephalis with DeepSpike (Kural et al. 2022),
 - NeuroTrend encephalis (1 feasibility study by Koren et al. 2018),
 - Version not reported (Tsereteli et al. 2025).

- NeuroCenter EEG was used in 1 diagnostic accuracy study (da Silva Lourenço et al. 2023).
- NeuroWorks (SCORE-AI) was used in 2 studies (1 retrospective diagnostic accuracy study by Mansilla et al. 2025 and 1 clinical validation study by Tveit et al. 2023).
- Persyst was used in 8 studies (see [Appendix C1](#) for a summary of differences between versions where available):
 - Persyst 15 was used in 1 internal performance testing report which was provided by the company (Persyst Development LLC, no date),
 - Persyst 14 (Duckwork et al. 2024; Janmohamed et al. 2024; Koren et al. 2025; Reus et al. 2022a; Reus et al. 2022b). Two studies reported results using different settings of Persyst (Janmohamed et al. 2024; Koren et al. 2025)
 - Persyst 13 (Kural et al. 2022), which the company advised was considered a historical version. However, the EAG included this evidence as it was one of the few studies which reported results when compared to clinical experts when not supported by the technologies, and it also considered two technologies (Persyst 13, encevis DeepSpike) separately within the same population which may give some indication of relative performance.
 - Version not reported (Sharpe et al. 2019); however, the authors confirmed that the version was not FDA approved for commercial use.

One technology (SCORE-AI with NeuroWorks) and the latest version of Persyst (Persyst 15, as listed in the Final Scope) only had evidence available when used fully automated.

In line with the early use assessment process and methods, full critical appraisal was not conducted for the included evidence, rather, a summary of

the evidence quality has been presented here. Across the 17 studies included, the sample size varied (some reporting per patient, per EEG or per EEG segment). Four studies were conducted in a UK setting (Charles et al. 2026; Duckworth et al. 2024; Tait et al. 2024; Tittensor et al. 2024); as discussed earlier evidence from countries with less extensive training than the UK may not be generalisable to the NHS (see [section 3.3](#)). One was a pre-print lacking peer-review (Tittensor et al. 2024), and 1 internal study (unpublished) was submitted by the company and may lack peer-review. One summarised qualitative interviews with 9 neurologists (small sample) regarding the use of Persyst within a larger feasibility study of providing continuous long-term neonatal EEG monitoring (Sharpe et al. 2019).

The EAG only identified one prospective study using one of the technologies in scope in a population with suspected epilepsy; this was the pre-print by Tittensor et al. 2024 which reported a prospective diagnostic belief updating study using BioEP alongside a clinical expert across 86 patients attending a nurse-led first seizure clinic in the UK (Tittensor et al., 2024 [pre-print]). For the seven studies which reported use of the technology alongside a clinical expert, the role and the expertise of the expert varied (clinical neurophysiologist, clinical physiologist, consultant epilepsy nurse, clinician, board certified EEG reviewers, epileptologist) or was not reported; which may limit the generalisability of results to the UK NHS.

Nine studies reported the use of the technologies fully automated, of which four were conducted in a fully diagnosed epilepsy cohort (Janmohamed et al., 2024; Koren et al., 2025; Mansilla et al., 2024; Persyst Development LLC, no date; Reus et al., 2022b; Tait et al., 2024; Tsereteli et al., 2024; Tsereteli et al., 2025; Tveit et al., 2023), two were case-control studies with a fixed split of known epilepsy diagnoses (Mansilla et al., 2024; Tait et al., 2024) and three were diagnostic accuracy studies in undiagnosed populations (Persyst Development LLC, no date; Reus et al., 2022b; Tveit et al., 2023). One study reported results when the technology was used alongside a clinical expert and when used fully automated in a cohort with a fixed diagnosis split ((Kural et al., 2022). It was unclear from one qualitative study (which considered

clinician perception of seizure detection algorithms in continuous long-term EEG monitoring in neonates without confirmed epilepsy diagnoses) where the technology was or was not used alongside clinical expert review (Sharpe et al., 2019). It is unclear whether this perception is generalisable to other populations and settings. The EAG note that results from fully automated use of the technologies have been included for context purposes only due to this being outside the intended use of these technologies and therefore results from studies should be interpreted with caution.

It was unclear from one qualitative study (which considered clinician perception of seizure detection algorithms in continuous long-term EEG monitoring in neonates without confirmed epilepsy diagnoses) where the technology was or was not used alongside clinical expert review (Sharpe et al., 2019). It is unclear whether this perception is generalisable to other populations and settings.

Nine quantitative studies included children (Duckworth et al. 2024; Koren et al. 2025; Kural et al. 2022; Mansilla et al. 2024; internal report provided by Persyst; Reus et al. 2022a; Tsereteli et al. 2025; Tsereteli et al. 2024; Tveit et al. 2023), however only 1 was conducted exclusively in children (Duckworth et al., 2024). Given the difficulty described by the clinical experts in diagnosing epilepsy in children, it is unclear whether the results summarised in this report (which were largely from adult or mixed populations) can be generalised to paediatric populations. One qualitative study interviewed staff when implementing continuous EEG monitoring in neonatal intensive care units to monitor outcomes of a first-line treatment of neonatal seizures (Sharpe et al., 2019). The types of EEG included routine EEG (N=8), ambulatory EEG (N=7) and video EEG (N=2). No studies were identified which applied the technologies to sleep-deprived EEG.

In terms of diagnostic accuracy, a total of 6 studies reported IED detection only, 5 studies reported seizure detection only; and 2 studies reported both (Tsereteli et al. 2025 and the internal report provided by Persyst). The EAG would highlight that EEG abnormalities flagged by the technologies when compared to a clinician provides helpful context. However, differences in IED

and seizure detection between technologies and clinicians may not impact on the final diagnosis, which relies on clinical history and patient presentation.

The EAG note that the included evidence also reported comparative results for other technologies not listed in the Final Scope (BESA, SpikeNet); however, these results were not extracted by the EAG.

5.2 Results from the evidence base

5.2.1 Intermediate outcomes

Diagnostic accuracy

IED detection

A total of 8 studies reported diagnostic accuracy of the technologies in IED detection (da Silva Lourenço et al., 2023; Janmohamed et al., 2024; Kural et al., 2022; Mansilla et al., 2024; Persyst Development LLC, no date; Reus et al., 2022b; Tsereteli et al., 2025; Tveit et al., 2023). However, of these only 2 studies were directly in line with the scope of this early use assessment and reported use of the technologies alongside clinical expert review.

Used alongside clinical experts

Of the 2 studies (which included adults and children) reported the use of the technologies alongside clinical experts (da Silva Lourenço et al., 2023; Kural et al., 2022). Only 1 of these studies reported diagnostic accuracy in IED detection of clinical expert reviewers with and without the technologies (Kural et al., 2022) reporting improvements in specificity (when using encephalis or Persyst 13 alongside clinical experts), however variable impact on sensitivity (increased when used alongside encephalis, decreased when used alongside Persyst 13).

Kural et al. 2022 reported analysis of 60 routine EEGs (each 20-minute duration) where 50% were diagnosed with epilepsy from 2 hospitals in Denmark. These recordings contained a total of 340 IEDs as determined by a reference standard of 2 independent clinical experts. This study reported improvements in overall diagnostic accuracy when using a hybrid approach where clinicians were supported by either encephalis or Persyst 13 technologies,

Table 5. This was mostly driven by improvements in *specificity*, which increased from 73.3% with clinical experts alone to 93.3% when supported by encephalis, and to 96.7% when supported by Persyst 13. One technology however showed a drop in *sensitivity*, which was 93.3% with clinical experts alone, which was maintained when supported by encephalis, and decreased to 76.7% when supported by Persyst 13. The EAG note that this may be due to differences between the algorithms of the technologies. Additionally, the EAG would note that Persyst considered version 13 of their technology to be a historic technology, and that the study was published in 2022 (no recruitment dates reported) and therefore is likely to include an older version of the encephalis technology also. The EAG would anticipate that diagnostic performance of newer versions of the technologies may have improved. The EAG note that diagnostic performance may differ in a patient population suspected of epilepsy (in line with the decision problem, and how these technologies would be used in the NHS). A similar sensitivity in IED detection of 93% on a per-EEG recording basis was reported for 1 clinical expert supported by NeuroCenter EEG in the study by da Silva Lourenço et al. 2023, which analysed 100 ambulatory EEGs (mean 20-hour duration, it is unclear whether this was recorded in the home or hospital setting) in the Netherlands. The study reported that the number of detections per hour duration of EEG was 7.1 (average number per EEG of 141.5). The EAG note a limitation of this study was that the clinical expert only reviewed epochs that were flagged by the technology, which may not reflect its use in the NHS. Neither study reported on performance by type of epilepsy.

Table 5: Summary of diagnostic accuracy of technologies in IED detection when alongside clinical expert review

Study name	Type of EEG	No. IEDs identified by reference standard	Intervention	Sensitivity (95% CI), %	Specificity (95% CI), %	Accuracy (95% CI), %	Comparator	Sensitivity (95% CI)	Specificity (95% CI)	Accuracy (95% CI)
(Kural et al., 2022)	Routine 20-min EEG (n=60 EEGs from 60 patients, 30 with epilepsy)	340 IEDs (306 focal, 34 generalised)	encevis with DeepSpike + clinical expert	93.3 (77.9-99.2)	93.3 (77.9-99.2)	93.3 (77.9-99.2) AUROC: 0.935	Conventional visual assessment by experts	93.3 (77.9-99.2)	73.3 (55.1-87.7)	83.3 (71.5-91.7) AUROC: 0.837
			Persyst 13 + clinical expert	76.7 (57.7-90.1)	96.7 (82.8-99.9)	86.7 (75.4-94.1) AUROC: 0.871				
(da Silva Lourenço et al., 2023)	Ambulatory EEG, mean 20-hour (n=100 EEGs; assumed hospital setting)	42 EEGs contained IEDs	NeuroCenter EEG + clinical expert (review of flagged epochs)	93.0	100.0	-	-	-	-	-

Abbreviations: AUROC, area under the receiver operating characteristic curve; CI, confidence interval; EEG, electroencephalogram; IED, interictal epileptiform discharge

Fully automated

Seven studies reported the diagnostic accuracy when using fully automated technologies to detect IEDs (Janmohamed et al., 2024; Kural et al., 2022; Mansilla et al., 2024; Persyst Development LLC, no date; Reus et al., 2022b; Tsereteli et al., 2025; Tveit et al., 2023); the majority applied to routine EEG. However, the EAG would stress that none of the technologies are indicated for fully automated use. For IED detection, the diagnostic sensitivity of the technologies was as low as 46% and specificity as low as 3.3% were reported; whereas sensitivity of the original clinical report or clinical review (reported in 3 unique studies conducted in routine EEGs) was broadly above 90%. Therefore, it is unclear whether time savings associated with EEG review for IED detection could be achieved, or whether clinician review was be increased when checking all the false positives flagged by the technologies. The EAG would also note that different sensitivity and specificity in IED detection were reported between different versions of the same technologies, between different technology settings (within the same version), and between EEG types; these factors should be recorded in future research.

Table 6: Summary of diagnostic accuracy of technologies in IED detection when used fully automated [Note that none of the technologies are indicated for this use case]

Intervention	Study name	Type of EEG	No. IEDs	Sensitivity (95% CI), %	Specificity (95% CI), %	Accuracy (95% CI), %	Agreement with reference standard	False positive rate	Comparator	Sensitivity (95% CI)	Specificity (95% CI)	Accuracy (95% CI)	Agreement
encevis (fully automated)	(Tsereteli et al., 2025)	Routine EEG >3 h, median 12-hour EEG (n=257 recordings)	162 recordings with IEDs	97.4% PPV: 69.3%	40.2% NPV: 91.8%	-	-	-	-	-	-	-	-
encevis with DeepSpike (fully automated)	(Kural et al., 2022; Tveit et al., 2023)	Routine 20-mins EEG (n=60 patients)	NR	96.7 (82.8-99.2)	16.7 (5.6-34.7)	56.7 (43.2-69.4)	-	-	Conventional visual assessment by experts	93.3 (77.9-99.2)	73.3 (55.1-87.7)	83.3 (71.5-91.7)	-
encevis 1.11.4 (fully automated)	(Janmohamed et al., 2024)	Mean 2.5 hours [89% routine EEG (<4 hours); 11% prolonged (>4 hours)] (n=125 EEGs from 125 patients)	5,907 IEDs	46% Whole EEG 95.2%	97% (SD 0.08)	-	-	Mean (SD) per hour: 25.9 (54.5)	-	-	-	-	-
encevis 1.9.2 (fully automated)	(Reus et al., 2022b)	30-minute awake EEG (sections of EMU prolonged EEG) (n=30 EEGs from 30 patients)	20 EEGs contained IEDs (6 generalised, 14 focal)	30-minute selection 86% (64-96%) 10-second epochs 61% (57-65%)	30-minute selection 88% (47-99%) 10-second epochs 99% (99-99%)	-	30-minute selection Kappa 0.68 (0.40-0.97) 10-second epochs Kappa 0.67 (0.63-0.70)	-	Clinical report	30-minute selection 91% (69-98%) 10-second epochs NR	30-minute selection 100% (60-100%) 10-second epochs NR	-	30-minute selection Kappa (between software and reference standard): 0.80 (0.54-1.00) 10-second epochs Kappa NR
Persyst 15 (fully automated)	(Persyst Development LLC, no date)	3 datasets: • n=50 EEGs (4.1 hours) • 277 EMU EEGs (226.3 hours) • 14 non-spike EMU EEGs (76.7 hours)	Limited reporting (across 3 datasets: 1952 spikes, 31,265 spikes and 0 spikes)	>95	-	-	-	<0.4/min	-	-	-	-	-

Intervention	Study name	Type of EEG	No. IEDs	Sensitivity (95% CI), %	Specificity (95% CI), %	Accuracy (95% CI), %	Agreement with reference standard	False positive rate	Comparator	Sensitivity (95% CI)	Specificity (95% CI)	Accuracy (95% CI)	Agreement
Persyst 14 (fully automated)	(Janmohamed et al., 2024)	Mean 2.5 hours [89% routine EEG (<4 hours); 11% prolonged (>4 hours)] (n=125 EEGs from 125 patients)	5,907 IEDs	<u>Epileptiform abnormalities</u> Low: 47% Default: 67% High: 77% <u>Whole EEG</u> Low: 91.1% Default: 97.6% High: 98.4%	<u>Epileptiform abnormalities</u> Low: 97% (SD 0.08) Default: 93% (SD 0.13) High: 99% (SD 0.02)	-	-	Mean (SD) per hour Low: 8.8 (33.9) Default: 35.1 (90.3) High: 75.3 (145)	-	-	-	-	-
Persyst 14 (fully automated)	(Reus et al., 2022b)	30-minute awake EEG sections (n=30 EEGs from 30 patients)	20 EEGs contained IEDs (6 generalised, 14 focal)	<u>30-minute selection</u> Default: 95% (75-100%) Low: 82% (59-94%) <u>10-second epochs</u> Default: 82% (79-85%) Low: 64% (60-67%)	<u>30-minute selection</u> : Default: 88% (47-99%) Low: 100% (60-100%) <u>10-second epochs</u> Default: 96% (95-96%) Low: 99% (96-99%)	-	<u>30-minute selection</u> Kappa: Default: 0.83 (0.60-1.00) Low: 0.71 (0.45-0.96) <u>10-second epochs</u> Default: 0.72 (0.69-0.75) Low: 0.73 (0.70-0.76)	-	Clinical report	<u>30-minute selection</u> 91% (69-98%) <u>10-second epochs</u> NR	<u>30-minute selection</u> 100% (60-100%) <u>10-second epochs</u> NR	-	<u>30-minute selection</u> Kappa (between software and reference standard): 0.80 (0.54-1.00) <u>10-second epochs</u> NR
Persyst 13 (fully automated)	(Kural et al., 2022; Tveit et al., 2023)	Routine 20-mins EEG	NR	100 (88.4-100)	3.3 (0.1-17.2)	51.7 (38.4-64.8)	-	-	Conventional visual assessment by experts	93.3 (77.9-99.2)	73.3 (55.1-87.7)	83.3 (71.5-91.7)	-

Intervention	Study name	Type of EEG	No. IEDs	Sensitivity (95% CI), %	Specificity (95% CI), %	Accuracy (95% CI), %	Agreement with reference standard	False positive rate	Comparator	Sensitivity (95% CI)	Specificity (95% CI)	Accuracy (95% CI)	Agreement
SCORE-AI (NeuroWorks) (fully automated)	(Tveit et al., 2023) multi-centre dataset	Routine EEG	NR	-	-	Normal: 95(89.6-97.9) GE: 94.9 (89. – 97.8) FE: 84.7 (76.7-90.5) FNE: 85.7 (77.9-91.4) DNE: 84.7 (76.6-90.8)	-	-	-	-	-	Normal: 91.4 (88.0-94.1) GE: 95.4 (92.5-97.5) FE: 88.4 (84.4-91.9) FNE: 85.3 (81.0-88.8)) DNE: 86.1 (82.0-89.7)	-
SCORE-AI (NeuroWorks) (fully automated)	(Tveit et al., 2023) – AI comparison dataset	Routine EEG	NR	86.7% (72.8-96.5%)	90.0% (77.4%-99.2%)	88.3% (79.2%-94.9%)	-	-	Conventional visual assessment by experts	93.3% (82.5-99.8%)	73.3% (56.5-87.8%)	83.3% (73.0-91.4%)	-
SCORE-AI (NeuroWorks) (fully automated)	(Mansilla et al., 2024)	Routine 25-min EEG (n=104 patients, 52 normal recordings, of the 52 abnormal 12.5% generalised, 12.5% focal, 12.5% focal non-epileptiform, 12.5% diffuse non-epileptiform)	50%	Overall: 88 (86-91) Normal: 86 (79-93) GE: 92 (87-97) FE: 84 (76-90) FNE: 88 (81-94) DNE: 96 (92-99)	Overall: 94 (91-96) Normal: 94 (87-100) GE: 97 (94-100) FE: 91 (85-97) FNE: 91 (84-97) DNE: 94 (89-99)	Overall: 92 (90-94) Normal: 90 (84-96) GE: 97 (93-100) FE: 90 (84-96) FNE: 90 (84-96) DNE: 95 (91-99)	<u>SCORE-AI versus experts:</u> Normal: 0.79 (0.69-0.88) GE: 0.84 (0.68-0.96) FE: 0.61 (0.44-0.77) FNE: 0.60 (0.46-0.74) DNE: 0.56 (0.39-0.72)	-	-	Overall: 90 (87-92) Normal: 90 (84-96) GE: 84 (77-91) FE: 84 (77-91) FNE: 92 (86-97) DNE: 95 (91-99)	Overall: 96 (94-98) Normal: 96 (90-100) GE: 100 (100-100) FE: 97 (94-100) FNE: 88 (91-95) DNE: 97 (94-100)	Overall: 94 (92-96) Normal: 93 (88-98) GE: 98 (95-100) FE: 96 (92-99) FNE: 89 (83-95) DNE: 97 (93-100)	<u>Inter-expert agreement</u> Normal: 0.74 (0.61-0.87) GE: 0.89 (0.80-0.97) FE: 0.68 (0.53-0.81) FNE: 0.57 (0.41-0.73) DNE: 0.70 (0.57-0.84)

Key: '-' not reported. Abbreviations: CI, confidence interval; DNE, diffuse non-epileptiform; EEG, electroencephalogram; EMU, epilepsy monitoring unit; FE, focal epileptiform; FNE, focal non-epileptiform; GE, generalised epileptiform; IED, interictal epileptiform discharge; NPV, negative predictive value; NR, not reported; PPV, positive predictive value; SD, standard deviation

Seizure detection

A total of 7 studies reported diagnostic accuracy of the technologies in seizure detection (Duckworth et al., 2024; Koren et al., 2025; Koren et al., 2018; Persyst Development LLC, no date; Reus et al., 2022a; Tsereteli et al., 2024; Tsereteli et al., 2025) although only 3 of the studies investigated the indicated use alongside clinical experts..

Used alongside clinical experts

Only 3 studies were directly in line with the scope of this early use assessment and reported use of the technologies alongside clinical expert review (Duckworth et al., 2024; Koren et al., 2018; Reus et al., 2022a). All were conducted on continuous EEG in an epilepsy monitoring unit, critical care or intensive care unit setting. The use of the technologies alongside clinical experts had reported diagnostic sensitivity in seizure detection of between 80% and 98%; which was between 2-10% lower when using encevis or Persyst 14 alongside experts when compared to clinical experts alone (Table 7).

The study by Reus et al. 2022a conducted in the Netherlands reported the use of encevis and Persyst alongside clinical experts in review of 286 ambulatory EEGs (median 20 hours). The study reported a total of 249 seizures within 64 EEGs (using a pragmatic reference standard of all seizures mentioned in the original clinical report supplemented by true detections made by the software), of which 184 were first detected in a live setting (nurse observations, individual alarm buttons), 60 were first detected offline following clinical physiologist review, and 5 were undetected (all focal in nature). Of the 249 seizures a subset (59%) had an ictal duration of 10 seconds or more, a total of 139 were detected by Persyst 14 (133 of which had an ictal duration of 10 seconds or more), and 129 were detected by encevis (121 of which had an ictal duration of 10 seconds or more). This highlights the difficulty in both technologies detecting shorter duration seizures. However, when the technologies were used alongside clinical experts the diagnostic sensitivity of seizure detection was high for both encevis (per EEG sensitivity: 98%, per seizure sensitivity: 93%), and Persyst 14 (per EEG sensitivity: 95%, per seizure sensitivity: 88%). The authors reported higher false positive detections

for encevis (5.5 per 24-hour duration of EEG) than Persyst 14 (1.7 per 24 hour) and noted that false positives were chewing artefacts, non-seizure related tachycardia, muscle artefacts, movement artefacts or interictal activity. Due to the study design it was not possible to determine specificity.

Two studies lacked a comparator arm (such that seizure detection by clinical experts was not quantified when the technology was not available); therefore, the improvement from the addition of the technology supporting standard care remains unknown.

The single-centre retrospective service evaluation by Duckworth et al. 2024 conducted in a UK setting reported the use of Persyst 14 in neonatal intensive care units which included 1-hour segments from 49 cases and 49 seizure-free controls. This reported sensitivity of 80% and specificity of 98% on a per-EEG basis; however, it is unclear whether diagnostic performance could be translated to a population of patients with suspected epilepsy (aligned with the scope). The study by Koren et al. 2018 reported seizure detection in 76 continuous EEG segments (6 hours each) from 20 critical care patients in Austria. This found substantial agreement (on a per segment basis) between 4 reviewers when supported by NeuroTrend (encevis) when compared to a reference standard (2 independent clinical neurophysiologists), with a mean sensitivity of 86.8% (range between 68.4% to 97.4%) and mean specificity of 82.2% (range between 68.4% and 92.1%).

Table 7: Summary of diagnostic accuracy of technologies in seizure detection alongside clinical expert review

Technology	Study name, design and location	Type of EEG	No. seizures	Sensitivity (95% CI)	Specificity (95% CI)	Accuracy/Agreement	False detection rate	Comparator	Comparator: Sensitivity (95% CI)
encevis + clinical expert	(Reus et al., 2022a) The Netherlands	286 ambulatory EEG (median 20 hours)	249 seizures in 64 EEG	<u>Per EEG</u> : 95% (86-99%) <u>Per seizure</u> : 88% (83-92%)	-	-	5.5 per 24 h*	Live observation + offline review by clinical physiologist	<u>Per EEG</u> : 100% (93-100%) <u>Per seizure</u> : 98% (95–99%)
NeuroTrend (encevis) + clinical expert	(Koren et al., 2018) Austria	Continuous EEG (76 segments at 6 hours each from 20 patients; critical care setting)	NR	Mean 86.8% (range between 68.4% to 97.4% between 4 reviewers)	Mean 82.2% (range between 68.4% and 92.1% between reviewers)	<u>Inter-rater agreement, AC₁ (95% CI)</u> : Substantial for 4 reviewers 0.79 (0.65-0.93) 0.71 (0.55-0.87) 0.66 (0.49-0.84) 0.61 (0.43-0.79)	-	-	-
Persyst 14 + clinical expert	(Reus et al., 2022a) The Netherlands	286 ambulatory EEG (median 20 hours)	249 seizures in 64 EEG	<u>Per EEG</u> : 98% (90-100%) <u>Per seizure</u> : 93% (89-96%)	-	-	1.7 per 24 h*	Live observation + offline review by clinical physiologist	<u>Per EEG</u> : 100% (93-100%) <u>Per seizure</u> : 98% (95–99%)
Persyst 14 + clinical expert (neonatal)	(Duckworth et al., 2024) UK	ICU continuous EEG >60-mins	49 seizures, 49 seizure-free controls	<u>Per EEG</u> : 80% (Optimal threshold for diagnostic accuracy 0.4)	<u>Per EEG</u> : 98% (Optimal threshold for diagnostic accuracy 0.4)	<u>AUC</u> 0.94 (0.889 to 0.988)	-	-	-

Note: * aggregates multiple false detections within 60s as a single false detection.
Abbreviation: AC₁, Gwent's agreement coefficients for categorical data; AUC, area under curve; CI, confidence intervals; EEG, electroencephalogram; EMU, epilepsy monitoring unit; ICU, intensive care unit; NR, not reported

Fully automated

Four studies reported the diagnostic accuracy when using fully automated technologies to detect seizures (Koren et al., 2025; Persyst Development LLC, no date; Tsereteli et al., 2024; Tsereteli et al., 2025), all applied the technologies to long-term EEG (ambulatory or video). However, the EAG would stress that none of the technologies are indicated for fully automated use. For seizure detection, diagnostic sensitivity as low as 6.3% was reported (for seizures with a duration of less than 10 seconds) and only 1 study reported specificity as 48.2% (per EEG). False detection rates reported ranged from 0.0 to 2.2 per hour of EEG recording. As with IED detection, it is unclear whether time savings associated with EEG review for seizure detection could be achieved, or whether if clinician review was increased when checking false positives flagged by the technologies. The EAG would also note that the variation in diagnostic accuracy of the technologies in seizure detection was reported between different versions of the same technologies, between different technology settings (within the same version), between seizure types, between seizure durations (Tsereteli et al. 2025 reported that sensitivity increased with longer ictal activity), between seizure onset locations, and patient age group (neonatal, adult); these factors should be considered in future research.

Table 8: Summary of diagnostic accuracy of technologies in seizure detection when used fully automated [Note that none of the technologies are indicated for this use case]

Technology	Study name, design and location	Type of EEG	No. seizures	Sensitivity	Specificity	False detection rate	Agreement with reference standard
encevis (v2.0) (fully automated)	(Koren et al., 2025)	EMU Long term video EEG (median 93 hours)	912 (including 54 generalised or focal to bilateral tonic seizures). Median seizure duration was 70 s (range 10 to 2066 s)	<u>By technology setting</u> High sensitivity: 89.1% High specificity: 80.7%	-	<u>By technology setting</u> High sensitivity: 0.93 per hour High specificity: 0.50 per hour	<u>By technology setting</u> High sensitivity: 71.3% (AC ₁ : 0.7 95%CI 0.59 to 0.81) High specificity: 63.8% (AC ₁ : 0.62 95%CI 0.51 to 0.73)
encevis (fully automated)	(Tsereteli et al., 2025)	Hospital prolonged EEG >3 hours (median 12-hour)	114 seizures in 43 seizure positive recordings	FB-TCS: 100% BTCS: 100% GTCS: 100% FE with impaired consciousness: 66.7% FE with preserved consciousness: 36.4% Tonic seizures: 23.1% Per EEG: 97.7% PPV: 26.6%	Per EEG: 48.2% NPV: 99.1%	0.27 per hour	-
encevis (fully automated)	(Tsereteli et al., 2024)	EMU prolonged (Mean 11 hours)	112 seizures (76 focal, 36 generalised) in 43 recordings	<u>Per EEG</u> : 71.2% FE: 75.1% (frontal lobe onset: 73.8%; temporal lobe onset: 76.2%, occipital/parietal lobe onset: 75%) GE: 62% <u>By seizure duration</u> : <10s: 6.3% 10-60s: 55.7% >60s: 63.9% <u>Per seizure</u> : 51.8% Frontal lobe: 53.5% Parietal/occipital lobe: 75% Temporal lobe: 69% Generalised: 33.3% <u>Ictal EEG patterns</u> : Rhythmic: 59.4% Arrhythmic: 41.7%	-	6.3 per recording 0.35 per hour (range between 0 per hour to 2.2 per hour)	-
Persyst 15 (assume fully automated)	(Persyst Development LLC, no date)	Long-term EEG (adult: 85 records; neonates: 55)	Adults: NR Neonates: 475	Adult seizure detection: 92.3% Neonatal seizure detection: >60%	-	Adult seizure detection: 0.74 per 24h Neonatal seizure detection: <10 per 24 h	-
Persyst 14 (fully automated)	(Koren et al., 2025)	EMU Long term video EEG (median 93 hours)	912 (including 54 generalised or focal to bilateral tonic seizures). Median seizure duration was 70 s (range 10 to 2066 s)	<u>By technology setting</u> High sensitivity: 71.1% Default setting: 68.9% High specificity: 67.3%	-	<u>By technology setting</u> High sensitivity: 0.17 per hour Default setting: 0.12 per hour High specificity: 0.07 per hour	<u>By technology setting</u> High sensitivity and default: 52.5% (AC ₁ : 0.51 (95%CI 0.39 to 0.62)) High specificity: 50% (AC ₁ : 0.48 (95%CI 0.36 to 0.59))

Abbreviation: AC₁, Gwet's agreement coefficient; BTCS, Bilateral tonic-clonic; CI, confidence interval; EEG, electroencephalogram; EMU, epilepsy monitoring unit; FB-TCS, Focal to bilateral tonic-clonic; FE, Focal epilepsy; GE, Generalised epilepsy; GTCS, Generalised tonic-clonic; NPV, negative predictive value; NR, not reported; PPV, positive predictive value;

Diagnosis of epilepsy

This outcome is only relevant to BioEP (see [section 2](#) for a more detail on technology functionality) and was reported in two studies. Only one study (Charles et al, 2026) investigated the indicated use of the technology, alongside clinical experts, and the other looked at fully automated use (Tait et al, 2024).

Used alongside clinical experts

One UK study reported the diagnostic yield when using BioEP scores to prioritise the ordering of follow-up EEGs (following 196 initial normal non-contributory nondiagnostic EEGs) for 40 people with suspected epilepsy in a waiting list (Charles et al., 2026). When using BioEP to prioritise the EEGs, when half of the follow ups were done, 10% more people had received epilepsy diagnosis than when the waiting list was in a random order and not prioritised using the BioEP score. This corresponded to a 5% increase in the EEG diagnostic yield for epilepsy, Table 9.

Table 9: Summary of diagnostic yield

Study name, design and location	Type of EEG	Intervention	Comparator	No. of epilepsy patients seen after 50% follow-up visits	Diagnostic yield
(Charles et al, 2026) UK	Routine EEG [max 20-minute] 33.7% diagnosed with epilepsy	BioEP (re-ordering follow-up lists)	Standard referral For diagnostic yield assumed sensitivity of 54% for second-line EEG investigations	Increased by 10% (95% CI 7 to 15%)	Increased 5% (95%CI 4.9% to 10%)

Abbreviations: CI, confidence interval; EEG, electroencephalogram

Fully automated

One UK study (Tait et al., 2024) reported the diagnostic accuracy of BioEP fully automated in the diagnosis of epilepsy, Table 10. However, the EAG

would stress that none of the technologies are indicated for fully automated use.

Table 10: Summary of diagnostic accuracy of technologies when used fully automated (epilepsy) [Note that none of the technologies are indicated for this use case]

Intervention	Study name, design and location	Type of EEG	Diagnosis of epilepsy, %	Diagnostic accuracy
BioEP (Neuronostics) (fully automated)	(Tait et al., 2024) UK	Routine 20-minute EEG normal clinically non-informative (n=281 patients)	46% (9 generalised, 106 focal, 14 unclassified)	Sensitivity: 61.2% Specificity: 74.6% Accuracy: 67.90 PPV: 55.4% NPV: 78.9% AUROC: 0.715

Abbreviation: AUROC, area under the receiver operating characteristic curve; EEG, electroencephalogram; NPV, negative predictive value; PPV, positive predictive value

Failure to analyse EEG

Two studies reported failure to analyse EEGs (Koren et al. 2025; Koren et al. 2018); one describing use alongside a clinical expert (Koren et al, 2018) and one used fully automated (Koren et al, 2025). Two additional studies (Tsereteli et al., 2024; Tsereteli et al., 2025) both using technologies fully automated reported technical issues as exclusions for EEG recordings from a single centre, however reporting was unclear whether these were technical issues related to processing with the algorithm.

Table 11: Summary of studies reporting technical failure

Study	Technology	Type of EEG	Failure
(Koren et al., 2018)	NeuroTrend (encevis) Used alongside clinical expert	Continuous EEG (6 hours)	4/80 continuous EEG excluded due to technical issues and low data quality (no additional detail provided; unclear how many patients the excluded EEGs referred to as recordings from 20 patients were cut into 6 hours segments).

Study	Technology	Type of EEG	Failure
(Koren et al., 2025)	encevis 2.0, Persyst 14 Fully automated	Video EEG (median 93 hr)	1/81 patients excluded from analysis due to lower sampling rate (128 Hz versus 2048 Hz in all other recordings); which caused methodological problems for seizure detection with the updated versions of both technologies.

Abbreviations: EEG, electroencephalogram;

Lifetime number of EEGs recorded

No study reported on this outcome.

Number of people with diagnosed epilepsy

No study reported on this outcome.

Clinician EEG review and report turnaround time

A total of six studies reported on clinical EEG and report time: three studies when used alongside clinicians and three studies used fully automated.

Used alongside clinical experts

Three studies reported EEG timings (mean time for EEG assessment per patient, per recording, per segment) when the technologies were used alongside clinical experts (da Silva Lourenço et al., 2023; Koren et al., 2018; Kural et al., 2022). However, only one study reported timings comparatively with clinical interpretation alone, Table 12.

The comparative study measured and reported the time for visual assessment of routine EEGs (20-minute recordings) with and without 2 technologies considered separately (Kural et al., 2022). This demonstrated a time saving with Persyst 13 (mean time saving of 101 seconds per recording) and encevis (mean time saving of 42 seconds per recording) technologies were used. While these differences were deemed statistically significant, it is unclear whether these time differences were clinically significant when aggregated across a working day to enable an increase in throughput, and whether they would be realised in a UK NHS setting. While it is anticipated that time savings associated with EEG review may be larger for other types of EEG

(sleep-deprived, ambulatory or telemetry EEGs), no comparative evidence was identified by the EAG which quantified this.

Two studies reported the review time of continuous or ambulatory EEG when two technologies (NeuroTrend, NeuroCenter EEG) were used alongside clinical expert review (da Silva Lourenço et al. 2023; Koren et al. 2018); both lacked a comparator arm however one stated in the discussion that ambulatory EEGs would on average take 2 to 3 hours to review (which appears broadly in line with clinical expert opinion, [Appendix D3](#)). The EAG note that an average review time of 12 minutes for each 24-hour continuous EEGs reviewed with a clinical expert supported by NeuroTrend (Koren et al., 2018), and mean review time of 2.4 minutes for each 20-hour ambulatory EEG with a clinical expert supported by NeuroCenter EEG. However, it is unclear whether this time includes time to review all detections of the technologies which may include a proportion of false positives. The EAG note that the study by Koren et al. 2018 reported that the mean review time for EEG review per patient was statistically different between 4 reviewers supported by NeuroTrend (range between 9.1 (6.0) to 15.2 (4.6) minutes) and that the mean review time per 6 hour of continuous EEG also was statistically different between the 4 reviewers (range between 2.5 (1.8) and 4.0 (2.3) minutes). Therefore, EEG review time savings claimed by the technologies may need to consider the type of EEG, the training of the staff involved in the EEG review (and its generalisability to the NHS) and the magnitude of variation between staff conducting EEG review.

Table 12: Summary of studies reporting EEG and report turnaround time when used alongside clinicians

Study	Parameter (units)	Type of EEG	Intervention	Comparator	p-value
(Kural et al., 2022)	Mean time for EEG assessment (s per recording)	Routine EEG (20-mins)	Persyst 13 + clinical expert: 59 (95% CI: 50-67)	Clinical interpretation alone: 160 (95% CI: 146-172)	<0.001
(Kural et al., 2022)	Mean time for EEG assessment (s per recording)	Routine EEG (20-mins)	encevis + clinical expert: 118 (95% CI: 103-134)	Clinical interpretation alone: 160 (95% CI: 146-172)	<0.001

Study	Parameter (units)	Type of EEG	Intervention	Comparator	p-value
(Koren et al., 2018)	Mean (SD) review time (minutes per patient)	Continuous EEG (24 hours)	NeuroTrend + clinical expert: 12 (5.3)	NR	-
(Koren et al., 2018)	Mean (SD) review time (minutes per 6h segment)	Continuous EEG (6 hours)	NeuroTrend + clinical expert: 3.3 (1.9)	NR	-
(da Silva Lourenço et al., 2023)	Average [max] time for EEG assessment (minutes)	Ambulatory (mean duration 20.6 hours)	NeuroCenter EEG + clinical expert: 2.4 • Normal: 1.5 [8.4] • Abnormal (no IED): 1.9 [16.4] • IEDs: 3.0 [17.5]	NR	-

Abbreviations: CI, confidence interval; IED, interictal epileptiform discharges; EEG, electroencephalogram; NR, not reported; SD, standard deviation

Fully automated

Three studies reported timings when using the technologies fully automated; two reporting processing time (Janmohamed et al., 2024; Koren et al., 2025; Reus et al., 2022b). The EAG would stress that none of the technologies are indicated for fully automated use, however when practically integrating these technologies into the NHS, may contribute to longer clinical expert review times.

Two retrospective studies also reported processing time for routine EEGs, between 30 minutes and 4 hours duration (Janmohamed et al., 2024; Koren et al., 2025). Both studies reported similar review times when using encephis (between 5 and 8 minutes), but larger differences were reported between the studies which used Persyst 14 (5 minutes when processing 4 EEGs at the same time, to 2 hours and 10 minutes during offline processing). If these technologies were used in the NHS in real-time, it is unclear whether the processing time would add significantly to total time (processing, analysis and review by a clinical expert). This may be a contributory factor given that the eligibility of each EEG should be considered on a case-by-case basis before analysis conducted by the technologies (considering indications for use vary by technologies), and data flows may differ by technologies when used in an NHS hospital.

One study describing fully automated use of the technologies (Koren et al. 2025) also reported detection delay time (calculated from the timepoint of validated seizure onset marker to the timepoint of the actual seizure detection of each software in every seizure epoch) for different sensitivity settings of encevis and Persyst technologies. While the authors acknowledge the limited value of this parameter in a retrospective review they do note its importance in real-time application.

Table 13: Summary of studies reporting EEG and report turnaround time when used fully automated

Study	Parameter (units)	Type of EEG	Intervention
(Janmohamed et al., 2024)	Processing time (minutes)	Mean 2.5 hours [89% routine EEG (<4 hours); 11% prolonged (>4 hours)] (n=125 EEGs from 125 patients)	encevis (fully automated): less than 8 minutes (running parallel with processing software) Persyst (fully automated): 2 hours 10 minutes (during offline processing)
(Reus et al., 2022b)	Processing time (minutes)	30-minute EEGs	encevis and Persyst (fully automated): approximately 5 minutes to process (however Persyst can process 4 at the same time without losing processing speed)
(Koren et al., 2025)	Detection delay (seconds)	VideoEEG (median 93 hr)	Technologies (fully automated) encevis high sens: 19s encevis high spec: 23s Persyst 14 high sens: 19s Persyst 14 default: 19s Persyst 14 high spec: 20s

Abbreviations: EEG, electroencephalogram;

Impact of software result on clinical decision making

Used alongside clinical experts

One prospective diagnostic belief updating study using BioEP in a UK NHS nurse-led first-seizure clinic was reported in a pre-print (Tittensor et al., 2024 [pre-print]). Overall, BioEP was supportive of a diagnosis in epilepsy in 11.2% of all cases, unsupportive of a diagnosis in 55.6% and neutral in 33.3% of cases. This study reported the impact of BioEP scores on 2 reviewers (a consultant nurse, and an independent clinician) when considering 86 patients with suspected epilepsy and the probability of those patients having another

epileptic seizure, Table 14. For 1 reviewer the availability of BioEP in addition to clinical history and routine EEG, increased the probability in 15 patients and decreased the probability in 10 patients; for the other reviewer the availability of BioEP increased the probability in 21 patients and decreased the probability in 37 patients. The authors noted a difference of the impact of BioEP between the two reviewers and highlighted that the second reviewer did not see the patient face-to-face and instead based their estimates based on clinical history and test results, which may have influenced findings. The authors acknowledged that there was no follow-up for these patients and no reference standard therefore it is unclear how the reviewer estimates related to the final clinical diagnosis.

Table 14: Summary of studies reporting impact of software on clinical decision making when used alongside clinical experts

Study	Type of EEG	BioEP scoring	Clinical decision making
(Tittensor et al., 2024 [pre-print])	Routine EEG [Duration=NR]	Supportive: 11.2% Neutral: 33.3% Unsupportive: 55.6%	Proportion of patients where probability rating changed by at least 1 category after presenting with BioEP: - Reviewer 1: 35/86, 0.41 (95%CI 0.30 to 0.51) - Reviewer 2: 58/86, 0.67 (95%CI 0.58 to 0.77) Likelihood ratios reported that probabilities were adjusted both upwards and downwards given the BioEP score.

Abbreviations: CI, confidence intervals; EEG, electroencephalogram; NR, not reported

Clinician acceptability and experience

Used alongside clinical experts

One qualitative study (Sharpe et al., 2019) reported on the perception of seizure detection algorithm with Persyst by 9 neurologists. This was part of a trial of levetiracetam as a first-line treatment of neonatal seizures where continuous video EEG was implemented to give real-time response to seizure detection, Table 15. This study also reported that the main barriers to implementation of continuous video EEG were starting a recording (incl. EEG setup, maintenance of electrode contact) and resourcing real-time specialist review of suspected seizures; the EAG considered that these barriers would likely impact the NHS.

Table 15: Summary of studies reporting clinician acceptability and experience when used alongside clinical experts

Study	Technology [type of EEG]	Clinician experience
(Sharpe et al., 2019)	Persyst [continuous video EEG]	- All neurologists (N=9) found Persyst a useful tool for seizure detection. - Many (N=NR) reported fairly high sensitivity, but false positives (from patting artefact) were common. - Accuracy was such that it could not be relied upon or used without human review. - Instant messaging alert function was used by 2/9 neurologists; others found false positives too disruptive.

Abbreviations: EEG, electroencephalogram; NR, not reported

Time to diagnosis and treatment

No study reported on this outcome.

5.2.2 Clinical outcomes

Morbidity

No study reported on this outcome.

Mortality

No study reported on this outcome.

5.2.3 Patient-reported outcomes

Health-related quality of life

No study reported on this outcome.

Ability to participate in the community

No study reported on this outcome.

Patient acceptability, views, experience and satisfaction

No study reported on this outcome.

5.2.4 Cost and resource use

Cost of technology

No study reported on this outcome. However costing information was provided by all the companies (see [section 6.2.4](#) for a cost breakdown per technology which includes installation, integration with existing systems, training, updates and maintenance).

Cost of training

One study (Koren et al., 2018), describing the use of a technology when used fully automated, reported on the training requirements for 4 EEG reviewers (with more than 5 years' experience) who used NeuroTrend (encevis) with no previous experience with the technology. This study reported on staff time but not explicitly costs. This level of training is consistent with that reported by the company (see breakdown of costs which includes support in [section 6.2.4](#)).

Table 16: Summary of training

Study	Technology	Training
Koren (Frontiers in Neurol, 2018; 454)	NeuroTrend (encevis)	2 hours: • 1 hour: Critical Care EEG training module, introduction to NeuroTrend and its graphical user interface. • 1 hour: 10 training datasets: • Training slides were provided for self-study but could not be used during review

Abbreviation: EEG, electroencephalogram

Cost of further testing

No study reported on this outcome.

Cost of treatment and management

No study reported on this outcome.

Health service use and cost at different settings

No study reported on this outcome.

5.3 Adverse events and clinical risk

No specific adverse events related to the use of the technology were identified in the clinical evidence.

The EAG searched [MHRA Field Safety Notices](#) from 01 January 2020 to 11 February 2026 and found no mention of any of the company or technology names listed in the Final Scope. The companies for BioEP (Neuronostics), encevis (AIT), NeuroCenter (CSS), NeuroWorks (Natus Medical) and Persyst (Persyst 15 and predecessors) all confirmed that they have not received any safety alerts for their technologies.

5.4 Clinical evidence summary and interpretation

The main aim of this assessment was to determine the evidence available for the technologies in scope and identify evidence gaps to support future evidence generation. In line with the early use assessment process and methods, the EAG conducted a rapid review and identified 17 sources of evidence comprising: full papers, pre-print publications and information provided by the companies, which may lack peer-review. Only 7 studies described the use of the technologies alongside clinical experts, which is the indicated use for the technologies according to their instructions for use (IFU); and only 3 of those compared to standard care (clinical experts without the use of the technologies). No evidence of using SCORE-AI (NeuroWorks) alongside clinical experts was identified. The generalisability of results to current versions of the technologies, when applied to patients with suspected epilepsy when utilised in an NHS setting in the UK is unclear. No study reported on the clinical outcomes of morbidity or mortality. No study addressed patient-reported outcomes of health-related quality of life, the ability to participate in the community, or patient views on acceptability, experience or satisfaction. No study reported on the further testing, treatment and management, or health service use and costs at different settings.

There is a lack of real-world UK evidence using encevis, NeuroCenter, NeuroWorks and Persyst technologies alongside clinical experts to support IED or seizure detection during EEG reviews in patients with suspected

epilepsy. For studies conducted outside of a UK setting, differences in EEG reviewer training (as indicated in [section 3.3](#)), may limit the generalisability of results. Comparative diagnostic accuracy (of clinical experts with and without the technologies) in IED detection is lacking for NeuroCenter and NeuroWorks (SCORE-AI), lacking for the latest versions of encephalis and Persyst 15, and is lacking in sleep-deprived EEG. The volume of EEG types across the NHS, by subgroup, and the total number of EEGs that would be eligible for analysis specifically with BioEP (which is only indicated for inconclusive EEGs) is currently unknown. Understanding failure rate of all technologies, and inconclusive (neutral) results for BioEP, would help future economic modelling of per patient costs. Evidence exclusively conducted in children is limited; training and validation of the technologies in young people, and across different types of epilepsy appears limited. Fully automated use of the technologies was described in 9 of 17 papers which is not their intended purpose (as stated in their instructions for use); however diagnostic accuracy when fully automated does show a high volume of false positives (which would require clinical review if implemented in the NHS) and also shows differences in performance across different versions and settings of the technology, types of EEG, types of seizure, seizure durations, seizure onset locations, and patient age groups; which should be captured in future research.

6. Economic evidence

6.1 Existing economic evidence

The initial assessment of the clinical results suggested that they would not provide much economic evidence. Literature searches to identify potentially relevant economic evaluations and models were developed by an information specialist with the intent of broadening the subject to epilepsy (diagnosis ideally, but also more generally) while increasing the specificity of the search to ensure an optimal manageable quantity of results. For the databases not focused on economic content (Embase and MEDLINE), a range of specific terms were used to identify papers likely to be relevant to economic modelling. Given the developments in the field of epilepsy, a date limit of 2015 onwards was applied across searches to focus on evidence that is more generalisable to current NHS care.

The search strategy was developed in Embase (OVID) and then translated, adapted and run on 27 January 2026 independently for each individual database (Embase (OVID), Medline (OVID), RePEc IDEAS, PEDE, CEA Registry). Records were imported into EndNote 21 where deduplication took place. The search strategies used to locate economic evidence are presented in [Appendix A1](#).

A total of 433 records were identified; 282 remained after deduplication. A single reviewer (KK), with a 20% sample checked by a second reviewer (RO), sifted through the titles and abstracts and found none were specific to the technologies listed in the scope or any other digital technology used to support the diagnosis of epilepsy. To support development of an early economic model, the sift was then repeated to identify any economic evaluations of other diagnostic interventions related to epilepsy and broadened further to include economic evaluations of treatments of epilepsy within a UK setting. Using this approach, a total of 16 titles and abstracts were considered potentially relevant. Full papers retrieved were checked for inclusion by two reviewers (KK,RO). Of the 16 papers, 5 were not directly relevant to the decision problem but were considered partly relevant to inform

development of an early economic model ([Appendix A3](#)). A summary of these 5 papers is provided in [Appendix B1](#).

No economic evidence was submitted by AIT (encevis), Natus Medical (NeuroWorks), Persyst (Persyst 15) or CSS (NeuroCenter EEG). Neuronostics shared an executable preliminary economic model and description of this analysis (determining the cost-effectiveness of BioEP in an NHS setting) during company factual accuracy consultation. This was provided as commercial-in-confidence. The base case results

[REDACTED]

[REDACTED] Additional detail on the rapid EAG review (conducted during company factual accuracy consultation) of the economic model provided by Neuronostics is provided in [Appendix B5](#).

6.1.1 Relevant economic models from NICE guidelines

The EAG reviewed NICE clinical guidelines for relevant economic models. This included economic analysis used to support the update of NG217 on diagnosing and managing epilepsy in children, young people and adults ([NG217, 2025](#)). In terms of diagnosis, the topic was not prioritised for new cost-effectiveness analysis and instead unit costs of investigations and imaging used to support diagnosis of epilepsy were tabulated. The use of antiseizure medication to treat both focal and generalised tonic clonic seizures was supported by a decision tree and a Markov model, also described by Tinelli et al. (2024). This covered monotherapy, transition to adjunctive therapy, and finally maintenance therapy when other treatment lines failed. An alternative treatment option, resective surgery for people with drug refractory

epilepsy was considered in health economic modelling, as described in Bonnon et al. (2026), who also used a decision tree and a Markov model.

6.2 Early economic model

The main value propositions proposed by the companies included reduced waiting time for EEG, reduced time to diagnosis and reduced time to treatment. The EAG considered these value propositions in light of the published clinical evidence, and feedback from 7 clinical experts who attended a meeting with the EAG (see [Appendix D2](#)). Of note, there were additional value propositions identified at this meeting that had not been described in the EAG protocol:

1) Reduced waiting time for EEG: The clinical experts advised that the main bottleneck in the clinical pathway was the waiting time for EEG. They shared approximate waiting times which vary across the different types of EEG (routine, sleep-deprived, ambulatory, and video telemetry), vary between NHS centres (between 3 weeks and 12 months), and may vary based on patient characteristics (age, presentation, clinical history). This aligns with the [Getting It Right First Time neurology report in 2021](#), which recommended deployment of new technologies to enhance service delivery to ensure neurophysiology services are available at large general hospitals with inpatient services, including remote reporting of EEG, home telemetry service (to reduce the need for inpatient video telemetry) and improved access to prolonged EEG. GIRFT stated that remote consultant supervision would allow neurophysiology to be developed at more sites. The clinical experts felt that technologies to support EEG interpretation were unlikely to directly reduce the waiting time for EEG, because of the need for a healthcare professional to still apply electrodes and record the EEG. The EAG did not identify any published literature for the technologies which reported on waiting times as an outcome measure. However, the EAG considered that if the 4 technologies which highlight abnormalities on the EEG (IED, seizures) could reduce clinical review and interpretation time, they could indirectly reduce waiting times for results. Similarly, the EAG considered that if BioEP was able to support a clinician within the diagnostic pathway of epilepsy, they could potentially

reduce the need for further subsequent EEGs, and that this could indirectly reduce waiting times. It was unclear exactly how many subsequent EEGs would need to be avoided to make a clinical impact, but this is explored in the context of the base case results presented.

2) Reduced time to diagnosis: The clinical experts emphasised that EEG is not used in isolation to diagnose epilepsy, and that clinical history and presentation are significant factors. They also noted that some patients may be diagnosed with epilepsy without an EEG. Clinical experts confirmed that the technologies in scope may be useful to support clinical decision making but cannot be used in isolation. The clinical experts felt that technologies to support interpretation of EEG were unlikely to significantly reduce the time for diagnosis. It is plausible that if BioEP could be used to support a diagnosis without waiting for additional EEGs, this may reduce time to a definitive diagnosis for some patients. However, this would be limited by the clinician acceptability to diagnose epilepsy using the BioEP result without requesting further testing. The EAG did not identify any published literature for the technologies which reported on time to diagnosis as an outcome measure.

3) Reduced time to treatment: The clinical experts advised that some patients may receive treatment while waiting for an EEG, and that some may receive treatment without ever having an EEG. The clinical experts felt that technologies to support interpretation of EEG were unlikely to significantly reduce the time to treatment. Although BioEP could potentially reduce time to diagnosis for some patients, as indicated above, the impact that this may have on starting treatment is unclear. The EAG did not identify any published literature for the technologies which reported on time to treatment as an outcome measure.

4) Reduced time for interpreting and reporting EEG: The clinical experts agreed that reducing the time spent reviewing, reporting on, and interpreting the EEG was the main value proposition of most of the technologies (that is, not BioEP). The clinical experts advised that, for standard care, reviewing and reporting ranges from 30 minutes for a routine EEG, up to 6 hours for a 24-hour ambulatory EEG (see Table 3). The EAG identified 6 studies that

reported on different timings associated with EEG review. Of those, only 1 used the technologies alongside clinical experts and reported statistically shorter review times of routine EEG when supported by the technologies (encevis, Persyst 13; see section 5.2.1). However, this did not account for processing time (that is time taken for the technologies to process the EEG before an output is created) and relates to older versions of the technologies. Therefore, the EAG explored total timing savings associated with EEG review and interpretation that could offset the technology cost per patient within the economic model sensitivity analysis. This value proposition is unlikely to apply to BioEP, which is applied as an extra processing step on top of the same review, reporting and interpretation that takes place in standard care.

5) Increased diagnostic accuracy in diagnosis of epilepsy: The EAG also considered the value proposition of slightly increased diagnostic sensitivity in the base case for detection of IEDs and seizures (encevis, NeuroCenter, NeuroWorks, Persyst), and for supporting a diagnosis of epilepsy (BioEP). The impact of assuming equivalent diagnostic accuracy (that is, only varying staff time) for the comparator and intervention arms is explored in threshold analysis.

6.2.1 Model structure

The clinical experts advised that a reduction in staff time spent reviewing and reporting on EEGs was the most plausible value proposition, and evidence was available to support this for two technologies (encevis, Persyst 13; older versions). Although a key value proposition for BioEP was a reduction in waiting times for EEG, there was no evidence available to support this. Therefore, the EAG developed a simple early decision tree model to explore staff time spent reviewing and reporting on EEGs, and to account for the difference between the 4 technologies that identify abnormalities on the EEG, and BioEP, the EAG then considered the potential downstream impact of BioEP, in terms of reduced need for subsequent EEGs. Results presented should be interpreted in line with the differences between the technologies and value propositions they support. Because practice varies across the NHS, the EAG chose a general structure that could be applied to routine, sleep-

deprived and ambulatory or home video telemetry EEG. The base case used hypothetical diagnostic accuracy values, including a slight improvement in sensitivity, alongside the costs for each technology, because there was a lack of evidence for the diagnostic accuracy of each technology. Where diagnostic accuracy data were available, this was applied in sensitivity analysis. A more complex Markov model is presented in [section 6.5](#), and this could be used to explore all value propositions for all technologies in the future, if data were available to support this.

The decision tree developed by the EAG considers whether the recorded EEG is 'Supportive' or 'Unsupportive' of a diagnosis of epilepsy. The EAG parameterised the decision tree using diagnostic accuracy (sensitivity and specificity), such that it could be used to model standard care (clinician review) and standard care when supported by any of the technologies in scope. To demonstrate how the use of BioEP is different to the other technologies, two separate decision trees are presented: Figure 2 illustrates the use of encevis, NeuroCenter, NeuroWorks and Persyst, and Figure 3 illustrates the use of BioEP.

At the left of the tree, the cohort entering the decision tree are split into those having their EEGs reviewed under standard care, and those having their EEGs reviewed with assistance by the technologies in scope. Because the focus of this assessment, and intended use of the technologies in scope, is to consider only the interpretation of EEGs conducted in a population with suspected epilepsy, the next node in the tree splits the cohort into those with and without abnormalities on their EEG. After splitting the cohort by abnormality or no abnormality, a seizure may be detected, and then if a seizure is not detected, an IED may be. The proportions travelling down each branch are determined using the diagnostic accuracy values of either standard care or the intervention. The EAG note that this ordered approach (prioritising seizure detection and then IED detection) does not reflect clinical practice, in which the EEG is considered as a whole for both features alongside one another. However, this approach was taken to allow the EAG to

include separate diagnostic accuracy parameters for seizure and IED detection in the model.

- For those with an abnormality to be detected on EEG, the prevalence of seizures in the population (noting that seizures may be more likely to be observed on longer EEG recordings such as ambulatory or home video telemetry), determines how many seizures occur. Diagnostic accuracy of the comparator and interventions then determines how many seizures are identified, with those identified reaching a terminal node associated with the EEG being 'Supportive' of a diagnosis of epilepsy. If a seizure is not identified, an IED may be. Whether or not an IED is identified is determined by the diagnostic accuracy of the comparator and interventions. If IEDs are identified, a terminal node is reached, which is associated with the EEG being 'Supportive' of a diagnosis of epilepsy.
- Those reaching a 'Supportive' terminal node where an abnormality was not present, can be considered false positives, and those reaching a 'Supportive' terminal node where an abnormality was present, can be considered true positives.
- If no abnormalities are identified on the EEG, then the EEG is 'Unsupportive' of a diagnosis of epilepsy. Whether or not this result is correct is determined by whether or not there was an abnormality that could have been detected on the EEG. That is, those reaching an 'Unsupportive' terminal node where an abnormality was present, can be considered false negatives, and those reaching an 'Unsupportive' terminal node where an abnormality was not present, can be considered true negatives.

Because BioEP is only indicated for use on EEGs that have not supported a diagnosis of epilepsy, the economic model uses the diagnostic accuracy of the standard care arm to determine the population for whom BioEP would be applied (that is, the earlier branches are identical to the comparator arm). Then for the BioEP arm, there is an additional chance node after seizures and

IEDs have been ruled out (Figure 3). This is where BioEP is used and it generates an 'Inconclusive', 'Supportive' or 'Unsupportive' result.

Figure 2: Decision tree used for encephalis, NeuroCenter, NeuroWorks, Persyst

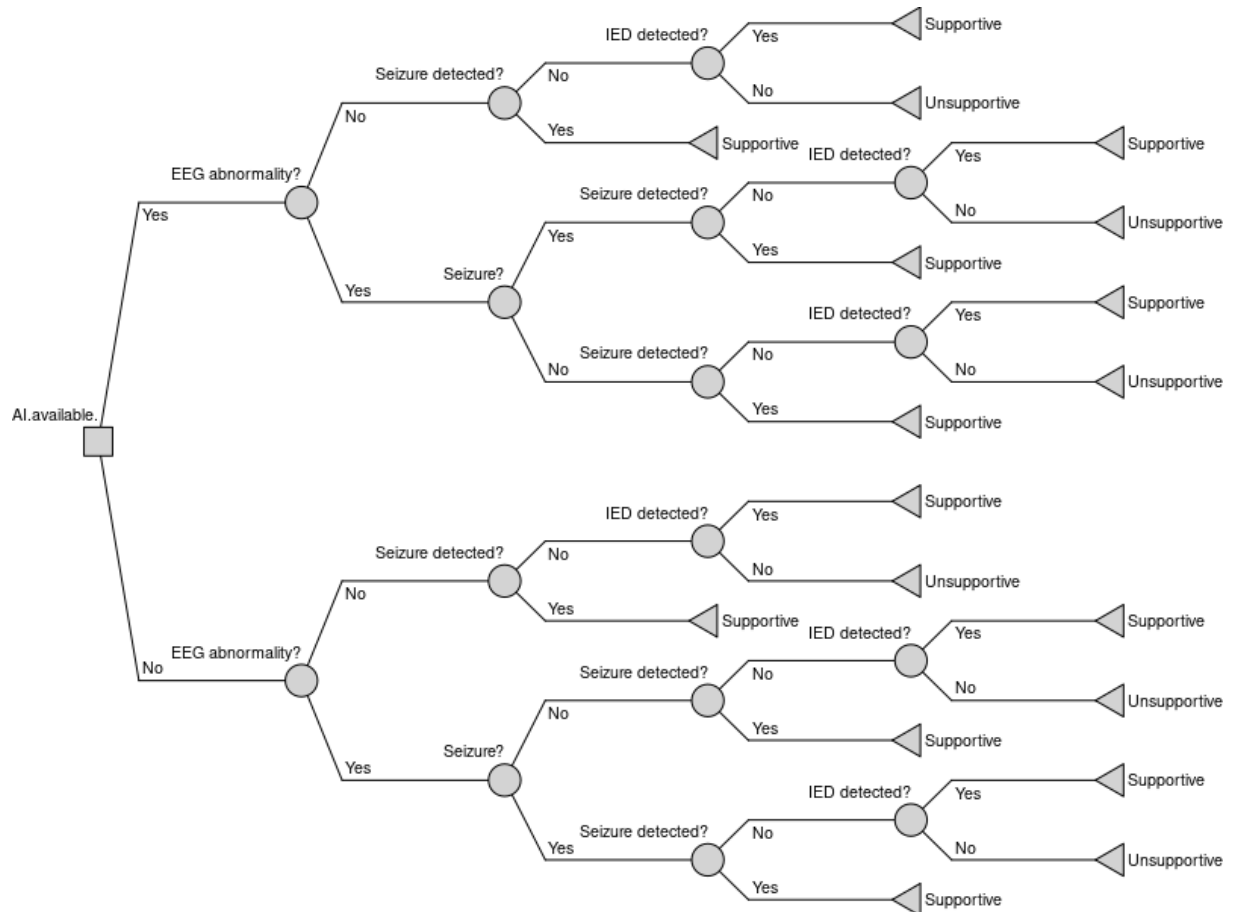
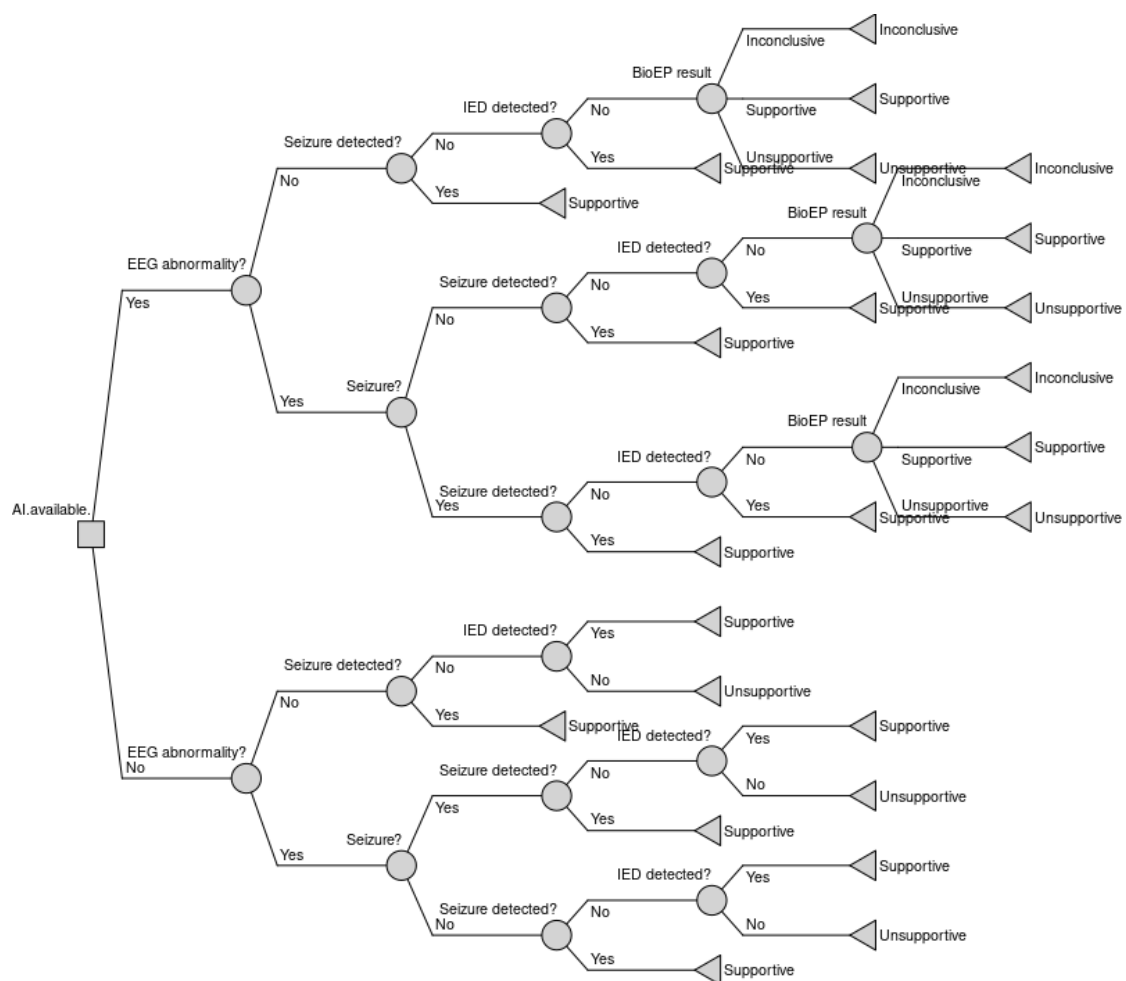


Figure 3: Decision tree used for BioEP



The model itself was coded in R Programming Language, using the ‘*rdecision*’ package. The model reads in an input table in Microsoft Excel; where each column represents a parameter, and each row represents a new scenario modelled. The model was developed from a UK NHS and Personal Social Services (PSS) perspective. The time-horizon of the decision tree was short (days) representing only the time period during which the EEG would be carried out, reviewed and results interpreted. This approach enabled modelling of the direct impact of reduction in staff time and changes in diagnostic accuracy associated with the technologies supporting a clinical expert during EEG review. This was in line with the purpose of the model, which was to support the detection of abnormalities on EEG recordings and therefore support the diagnosis of epilepsy, and not to model the whole diagnostic pathway. To allow the potential benefits and harms of the

technologies to be explored, estimated costs and utilities over 1 year are applied to the terminal nodes. This may not accurately reflect clinical practice in the NHS across all centres, patients, and types of EEG, given the simplicity of the modelling (single monotherapy treatment only). However, it can give some indication of the plausibility of long-term cost effectiveness of the technologies.

6.2.2 Model assumptions

The EAG has made the following assumptions when developing the decision model:

- The decision tree itself is concerned only with the identification of abnormal features on EEG suggestive of epilepsy (specifically seizures and IEDs), and not with the subsequent diagnosis of epilepsy. As stated previously, the diagnosis of epilepsy considers EEG findings alongside clinical history and presentation and is made by a qualified healthcare professional, which should be taken into account when interpreting the results of this economic modelling. However, to determine the plausibility of the technologies being cost effective during their intended use, the EAG did hypothetically model costs and utilities for each possible outcome, where it was assumed that the result of the EEG supported the same diagnosis being made.
- In line with the above point, the model categorises the cohort passing through it into 3 groups: EEG 'Supportive' (all technologies) of an epilepsy diagnosis, EEG 'Unsupportive' (all technologies) of an epilepsy diagnosis, 'Inconclusive' (BioEP only). The latter is an option available only for BioEP and is associated with the output of "neutral" probability of epilepsy which was reported to be high (approximately a third) in one study (see [section 5.2.1](#)). In these cases, the cost of the technology is applied and patients accrue the same utilities as for the corresponding "true" or "false" negative nodes, to reflect that an "Inconclusive"

output is not a “Supportive” result and therefore cannot impact quality of life. However, the EAG acknowledges that this may not reflect clinical practice, in which it would be possible for a neutral output to support a positive diagnosis of epilepsy in the presence of other clinical factors. BioEP actually places EEGs into 5 categories (‘Very supportive’, ‘Supportive’, ‘Neutral’, ‘Unsupportive’, ‘Very unsupportive’). However, the EAG has taken a simplified approach and assumed that the two “supportive” outcomes can be grouped, and the two “unsupportive” outcomes can be grouped. Because there is no evidence to support how the results of BioEP would be used in practice, this approach is appropriate for the purpose of this assessment. Future comparative evidence would be needed to determine the extent to which the outputs of BioEP would support a clinical expert in making a diagnosis, and its performance as “rule in” or “rule out” technology.

- Although the decision tree diagram suggests that the EEG would be reviewed for seizure detection before IED detection to support the diagnosis of epilepsy, this does not reflect the current clinical process. A clinical expert indicated that they review the whole EEG (like reading a sentence, starting from the left and making your way to the right), without specifically looking for seizures or stopping when they identify them. This ordering in the economic model instead simply allowed the EAG to apply the different diagnostic accuracies for the technologies in identifying seizures and IEDs.
- Due to the lack of evidence comparing standard care against standard care supported by the latest versions of the technologies, the EAG assumed a small improvement of 0.1% in diagnostic sensitivity for the encephalogram, NeuroCenter, NeuroWorks and Persyst 15 technologies in both seizure and IED detection. For BioEP, which does not distinguish between these features, a single improvement in sensitivity of 0.1% was applied.
- Because BioEP is only indicated for use in diagnostically inconclusive or negative EEGs, the EAG applied the sensitivity and

specificity of standard care for seizure and IED detection to determine the number of patients where BioEP could be used.

- For simplicity, the EAG did not include a test failure branch in the decision tree. Instead, where test failures were to be accounted for, the proportion in which the test failed (based on clinical evidence) were reallocated to a different group after running the tree, based on them defaulting to standard care with the appropriate sensitivity and specificity applied. Clinical experts did not give any indication of how frequently a test failure may happen but were not concerned because the patient would revert to standard care ([Appendix D2](#)).
- The cost of staff time for setting up and recording the EEG is not accounted for in the model because it would be the same for both the comparator and intervention and would effectively cancel out. Staff time is accounted for only for reviewing, reporting on, and interpreting the EEG.
- Costs of investigations are limited to the different types of EEG only. That is, no costs are included in the model for imaging, blood tests or other investigations that may be used in the pathway. Thus, the time horizon for diagnostic costs is short – unspecified but a few days at most.
- For simplicity, it was assumed when applying utilities to the terminal nodes, that these would persist for 1 year and would be accompanied by treatment for those reaching a positive diagnosis. This is equivalent to estimating quality adjusted life years (QALYs) for a 1-year time horizon. The EAG recognises that this introduces a bias, in that not all positive findings on EEG will lead to a positive diagnosis of epilepsy and subsequent treatment. Indeed, there will likely be people with negative findings on EEG who have a subsequent positive diagnosis of epilepsy based on other clinical factors. However, it allows the potential differences between the two arms to be explored.

- Because there was limited evidence for populations of different ages, the EAG economic modelling considered a mixed population, with costs attributed as a weighted average between adult and children based on NHS activities where these were available separately.
- Mortality is not incorporated in the model. The expected differences between the comparator and intervention are small (due to the diagnosis of epilepsy being based on clinical factors and patient presentation, not on the EEG in isolation as discussed previously); and expected to have negligible impact on results. The impact of this is that QALYs over 1 year may be over-estimated.

6.2.3 Clinical parameters

Clinical parameters and diagnostic accuracy parameters used in the economic model are summarised in Table 17 and Table 18. Due to a lack of clinical evidence directly related to the decision problem, most of the parameters in this section have been assumed by the EAG or advised by clinical experts. For the base case, for all types of EEG, the EAG assumed a small increase in diagnostic sensitivity (0.1%) when standard care was supported by the technologies, when compared with standard care alone, and also a reduction in time spent (by the same staff roles) to review and report on, and interpret the EEG recording (see [section 6.2.4](#)). Due to uncertainty in these parameters, diagnostic accuracy and review time were varied independently in sensitivity analysis. For clarity, reference to false positive and false negative results arising from the decision tree refers only to the detection of abnormalities on EEG. For the purposes of attributing costs and utilities to estimate cost effectiveness, it is assumed a diagnosis of epilepsy is made in line with this. However, clinical experts have stressed that this is based on other factors besides the EEG, and the modelling carried out does not explore any other aspects of the diagnostic pathway, which the EAG acknowledges as a limitation.

For clinical parameters relating to prevalence of abnormalities on EEG, or seizures during the recording of the EEG, the EAG felt that seeking clinical

expert advice would be more reflective of features seen in NHS practice than the evidence base, which may introduce biases relating to the included population. In terms of sensitivity and specificity of both the comparator and intervention, the evidence base was limited to a few studies using the technologies alongside a clinical expert, which did not cover all types of EEG, all technologies, or current versions of the technologies. To address the key purpose of the early use assessment, to establish plausibility of the technologies being cost-effective, the EAG treated all types of EEG and all technologies the same in the base case. That is, diagnostic accuracy was advised by clinical experts, and failures of the technologies to interpret the EEGs were assumed to be 0%. Clinical experts expressed that they were not concerned by the potential for test failures because they would then rely on standard care. Where evidence was available for diagnostic accuracy and failures of specific technologies, this was explored in sensitivity analysis by combining changes in these specific parameters independently with the costs of the relevant technology. That is, to explore diagnostic accuracy, sensitivity and specificity (where available) were both varied with the cost of the technologies, and separately, test failures were explored by varying this alongside the cost. Although it would be plausible that a technology with lower diagnostic accuracy could influence the time taken to review, report on, and interpret the EEG, this parameter was not varied alongside any others.

Table 17: Economic model: clinical parameters

Variable [parameter name in economic model]	Value	Source	EAG comment
Number of patients (starting population) [cohort_n]	1,000	Assumption	Assumed a starting population of 1000 patients per year per hospital undergoing EEG with suspicion of epilepsy.
Prevalence of abnormal EEGs in starting cohort [prev_abn]	Routine: 35.0% Sleep-deprived: 60.0% Ambulatory: 75.0% Telemetry: 77.5%	EAG Assumption	Queried with clinical experts (Appendix D3), mid-value selected; extreme values considered in sensitivity analysis

Variable [parameter name in economic model]	Value	Source	EAG comment
Prevalence of epileptic seizures during EEG [prev_sz]	Routine: 1% Sleep-deprived: 3% Ambulatory: 10% Telemetry: 20%	Clinical experts (Appendix D3)	Broadly the increasing prevalence aligns with the increasing duration of the EEG recording. Varied in sensitivity analysis.
Proportion of BioEP results inconclusive [p_bioep_inc]	33.7%	(Tittensor et al., 2024 [pre-print])	BioEP provides a 5-point scale (very supportive, supportive, neutral, unsupportive, very unsupportive). Tittensor et al. 2024 reported that 27/86 (33.7%) of patients attending a nurse-led first-seizure clinic had a neutral score. This parameter is varied in sensitivity analysis
Proportion of tests for which technologies fail to process the EEG [p_testfailure]	0%	EAG Assumption	Test failures from clinical evidence (Koren et al., 2025), and (Koren et al., 2018), are explored in sensitivity analysis

Abbreviations: EAG, External Assessment Group; EEG, electroencephalogram

Table 18: Economic model - diagnostic accuracy parameters

Diagnostic accuracy parameter [parameter name in economic model]	Type of EEG	Detecting	Value	Source	EAG commentary on availability, quality, reliability and relevance of the source/s
Sensitivity, comparator [sens_c_sz] (also applied to [sens_i_sz] when intervention is BioEP)	Routine	Seizure	95.0%	Clinical expert (Appendix D3)	Ideal source for this parameter would be published evidence. The EAG acknowledges this is a limitation.
Sensitivity, intervention [sens_i_sz]	Routine	Seizure	95.1%	EAG assumption	Assumed slight improvement in sensitivity of the intervention, to allow differences in utilities to be modelled. Ideal source for this parameter would be published evidence. The EAG acknowledges this is a limitation.
Sensitivity, comparator [sens_c_ied] (also applied to [sens_i_ied] when intervention is BioEP)	Routine	IED	97.0%	EAG assumption, queried with clinical experts (Appendix D3)	Assumed specificity of intervention is same as comparator. Ideal source for this parameter would be published evidence. The EAG acknowledges this is a limitation. However, would highlight that this value is consistent with the sensitivity of clinical experts (including original clinical reports) in IED detection as reported in section 5.2.1.
Sensitivity, intervention [sens_i_ied] [sens_bioep]	Routine	IED	97.1%	EAG assumption	Assumed slight improvement in sensitivity of the intervention, to allow differences in utilities to be modelled. Ideal source for this parameter would be published evidence. The EAG acknowledges this is a limitation.
Sensitivity, comparator [sens_c_sz] (also applied to [sens_i_sz] when intervention is BioEP)	Sleep-deprived	Seizure	95.0%	EAG assumption, queried with clinical experts (Appendix D3)	Ideal source for this parameter would be published evidence. The EAG acknowledges this is a limitation.
Sensitivity, intervention [sens_i_sz]	Sleep-deprived	Seizure	95.1%	EAG assumption	Assumed slight improvement in sensitivity of the intervention, to allow differences in utilities to be modelled. Ideal source for this parameter would be published evidence. The EAG acknowledges this is a limitation.
Sensitivity, comparator [sens_c_ied] (also applied to [sens_i_ied] when intervention is BioEP)	Sleep-deprived	IED	97.0%	EAG assumption, queried with clinical experts (Appendix D3)	Ideal source for this parameter would be published evidence. The EAG acknowledges this is a limitation.
Sensitivity, intervention [sens_i_ied] [sens_bioep]	Sleep-deprived	IED	97.1%	EAG assumption	Assumed slight improvement in sensitivity of the intervention, to allow differences in utilities to be modelled. Ideal source for this parameter would be published evidence. The EAG acknowledges this is a limitation.
Sensitivity, comparator [sens_c_sz] (also applied to [sens_i_sz] when intervention is BioEP)	Ambulatory or home video telemetry	Seizure	95.0%	EAG assumption, queried with clinical experts (Appendix D3)	Ideal source for this parameter would be published evidence. The EAG acknowledges this is a limitation.
Sensitivity, intervention [sens_i_sz]	Ambulatory or home video telemetry	Seizure	95.1%	EAG assumption	Assumed slight improvement in sensitivity of the intervention, to allow differences in utilities to be modelled. Ideal source for this parameter would be published evidence. The EAG acknowledges this is a limitation.
Sensitivity, comparator [sens_c_ied] (also applied to [sens_i_ied] when intervention is BioEP)	Ambulatory, home video telemetry	IED	95.0%	EAG assumption, queried with clinical experts (Appendix D3)	Ideal source for this parameter would be published evidence. The EAG acknowledges this is a limitation.
Sensitivity, intervention [sens_i_ied] [sens_bioep]	Ambulatory, home video telemetry	IED	95.1%	EAG assumption	Assumed slight improvement in sensitivity of the intervention, to allow differences in utilities to be modelled. Ideal source for this parameter would be published evidence. The EAG

Diagnostic accuracy parameter [parameter name in economic model]	Type of EEG	Detecting	Value	Source	EAG commentary on availability, quality, reliability and relevance of the source/s
					acknowledges this is a limitation.
Specificity, comparator and intervention [spec_c_sz] [spec_i_sz]	Routine, sleep-deprived, ambulatory, home video telemetry	Seizure	90.0%	EAG assumption, queried with clinical experts (Appendix D3)	Assumed specificity of intervention is same as comparator. Ideal source for this parameter would be published evidence. The EAG acknowledges this is a limitation.
Specificity, comparator and intervention [spec_c_ied] [spec_i_ied] [spec_bioep]	Routine, sleep-deprived, ambulatory, home video telemetry	IED	75.0%	EAG assumption, queried with clinical experts (Appendix D3)	Ideal source for this parameter would be published evidence. The EAG acknowledges this is a limitation.

Abbreviations: EAG; External Assessment Group; EEG, electroencephalogram; IED, interictal epileptiform discharge

6.2.4 Resource use and cost parameters

Parameters incorporated in the economic model relating to resource use and costs are described in Table 19, Table 20 and Table 21. Costs were inflated to the latest available year using the [CCEMG – EPPI Centre Cost Converter](#).

The EAG note that the pricing structure varied across each of the technologies (per user, per computer, per hospital). To apply a consistent approach, where applicable, it was assumed that separate licenses were needed for 5 computers, and for technologies where only a capital purchase option was available, a 5-year lifetime for the software was assumed. The EAG assumed that all technologies except BioEP would be used to support interpretation of 1,000 EEGs per year and distributed total costs accordingly to achieve a per-EEG cost. However, because BioEP is applied only to EEGs without an abnormality identified using standard care reporting and interpreting, and not routinely applied to all EEGs, its costs were distributed over how many patients reached that node in the decision tree (according to prevalence of EEG abnormalities, seizures, and sensitivity and specificity of standard care).

The cost of an EEG for the comparator arm was taken from NHS National Cost Collection 2024/25 data. It was assumed that patients having EEG as an outpatient, or at home, would also receive an outpatient appointment before the EEG, and an outpatient appointment after the EEG to receive the results. To estimate the hypothetical cost of the EEG for the intervention arm, and to avoid double counting of costs, the cost of staff time for reviewing, reporting and interpreting an EEG in the comparator arm was removed from the NHS National Cost Collection EEG cost, and the estimated cost of staff time for the intervention arm was added.

As the output of BioEP is a single score output, the staff time for reviewing an EEG using BioEP is assumed to be the same as standard care. In the base case, no additional time is added on for BioEP, but in sensitivity analysis an additional 2 minutes of time for the person reviewing the EEG, to submit it for BioEP analysis, was added. This is in line with how one of the clinical experts described use of the technology ([Appendix D3](#)).

Table 19: Economic model: Resource use parameters

Variable [parameter name in economic model]	Value	Source	EAG comment
Routine EEG, Sleep-deprived EEG [c_eeg]	£356.00	NHS National Cost Collection 2024/25: Outpatient Procedure Adults: Conventional EEG, EMG or Nerve Conduction Studies, 19 years and over (AA33C) Children: Conventional EEG, EMG or Nerve Conduction Studies, 18 years and under (AA33D)	Weighted average of adults £349.91 (activity: 230,251) and children £405.44 (activity: 28,356). The EAG note that this may include other types of diagnostic testing unrelated to EEG.
Ambulatory EEG [c_eeg]	£519.89	NHS National Cost Collection 2024/25: Outpatient Procedure Standard Long-Term EEG Monitoring (AA81Z)	Activity: 4,474.
Home video telemetry [c_eeg]	£870.62	NHS National Cost Collection 2024/25: Admitted Patient care (daycase) Adults: Conventional EEG, EMG or Nerve Conduction Studies, 19 years and over (AA33C) Children: Conventional EEG, EMG or Nerve Conduction Studies, 18 years and under (AA33D)	Weighted average of adults £883.26 (activity: 571) and children £866.76 (activity: 1,868). One clinical expert advised the ratio of home video telemetry to inpatient telemetry to be around 10:1, and that other centres are moving towards home video telemetry although the shift is incomplete. Varied in sensitivity analysis (described in section 6.2.7).
Additional outpatient appointment before EEG, routine EEG and sleep-deprived EEG [c_op1]	£306.87	NHS National Cost Collection 2024/25: Outpatient care (Neurology service) Non-Admitted Face-to-Face Attendance, First (WF01B)	Activity: 372,490. Assume review and reporting time is captured within outpatient appointment cost.
Additional outpatient appointment before EEG, ambulatory EEG and home video telemetry [c_op1]	£345.84	NHS National Cost Collection 2024/25: Outpatient care (Neurology service) Multiprofessional Non-Admitted Face-to-Face Attendance, First (WF02B)	Activity: 6,784. Assume review and reporting time is captured within outpatient appointment cost.
Additional outpatient appointment after EEG, routine EEG and sleep-deprived EEG [c_op2]	£238.81	NHS National Cost Collection 2024/25: Outpatient care (Neurology service) Non-Admitted Face-to-Face Attendance, Follow-up (WF01A)	Activity: 536,692. Assume review and reporting time is captured within outpatient appointment cost.
Additional outpatient appointment after EEG, ambulatory EEG and home video telemetry [c_op2]	£333.45	NHS National Cost Collection 2024/25: Outpatient care (Neurology service) Multiprofessional Non-Admitted Face-to-Face Attendance, Follow-up (WF02A)	Activity: 14,730. Assume review and reporting time is captured within outpatient appointment cost.
Review and reporting of routine or sleep-deprived EEG by Physiologist (Band 5), per hour [c_rev]	£43	(Jones et al., 2025)	Varied in sensitivity analysis (described in section 6.2.7).
Review and reporting of ambulatory or telemetry EEG by Physiologist (Band 7), per hour [c_rev]	£66	(Jones et al., 2025)	Varied in sensitivity analysis (described in section 6.2.7).
Interpretation by Consultant Neurophysiologist, per hour [c_interp]	£157	(Jones et al., 2025)	Varied in sensitivity analysis (described in section 6.2.7).
Medical management of epilepsy with carbamazepine (monotherapy) for 1 year [c_treat]	£123.45	Inflated from £40.93 for 6 months from BNF in 2021, as used in NG217	Varied in sensitivity analysis (described in section 6.2.7).

Abbreviations: EAG, External Assessment Group; EEG, electroencephalogram; EMG, electromyogram; NG, NICE guideline;

Table 20: Staff time related to EEG review with and without the technologies

Arm	Type of EEG	Physiologist review / report time (Band) [t_c_rev] [t_i_rev]	Consultant Neurophysiologist interpretation time [t_c_interp] [t_i_interp]	Source
Standard care, and standard care with BioEP	Routine	30 minutes (Band 5)	20 minutes	Clinical expert opinion (see Appendix D3)
	Sleep-deprived	40 minutes (Band 5)	30 minutes	
	Ambulatory/telemetry	360 minutes (Band 7)	120 minutes	
Standard care with technologies (except BioEP)	Routine	10 minutes (Band 5)	10 minutes	
	Sleep-deprived	15 minutes (Band 5)	15 minutes	
	Ambulatory/telemetry	120 minutes (Band 7)	60 minutes	

Abbreviations: EEG, electroencephalogram;

Table 21: Key technology costs (excluding VAT)

Item	BioEP (Neuronostics) [c_bioep]	encevis (AIT) [c_i]	NeuroCenter (CSS) [c_i]	NeuroWorks (Natus) [c_i]	Persyst 15 (Persyst) [c_i]
Capital purchase of perpetual licence	-	-	-	-	£31,000 (clinical review site licence) £1,800 (routine and ambulatory review which enables offline processing).
Annual licence	Costs based on set number of EEGs technology is used for per year per NHS Trust or Health Board: £25,000 (between 1 and 200 EEGs)	£7,875 (£1,575 per recording station, users can access the network, but only one user at a time so have	£10,750 (£2,150 per installed computer; assuming 5 installed computers)	£13,750 (assuming 1 licence per recording machine, and 5 machines per site)	-

Item	BioEP (Neuronostics) [c_bioep]	encevis (AIT) [c_i]	NeuroCenter (CSS) [c_i]	NeuroWorks (Natus) [c_i]	Persyst 15 (Persyst) [c_i]
	£40,000 (between 201 and 349 EEGs) £65,000 (between 350 and 650 EEGs) £120,000 (between 651 and 1,100 EEGs)	assumed 5 installed computers , no volume restrictions on EEGs or users)			
Installation (one-off)	N/A (included in price)	£1,000	N/A (included in price)	N/A (included in price)	N/A (included in price).
Support (one-off)	N/A (included in price)	N/A (additional support available, see Appendix C2)	N/A (included in price)	N/A (included in price)	£2,400 (per on-site engagement ; additional cost associated with training, travel and subsistence if required would be agreed separately).
Maintenance , updates (per year)	N/A (included in price)	N/A (included in annual licence price)	N/A (included in price)	N/A (included in price)	£6,200 and £360 (annual Prime licences to cover ongoing support and upgrades; included in purchase so does not apply in year 1).
Cost per patient (assuming 1000 patients undergoing EEG per year)	Between £100 and £200, depending on how many patients have EEGs unsupportive of epilepsy diagnosis which then use BioEP.	£8.88	£10.75	£13.75	£7.04 (year 1); £13.60 (year 2+)

Abbreviations: EEG, electroencephalogram; N/A, not applicable; VAT, value-added tax

6.2.5 Health state utilities

Although the clinical experts claimed the most plausible value proposition of these technologies was a reduction in the time spent reviewing and interpreting EEGs, the EAG included utilities on the terminal nodes of the decision tree to reflect the potential impact on quality of life if additional patients were diagnosed with epilepsy when the technologies were used. This implemented the highest utilities in the true negative cases, and the lowest utilities in false negative cases. This is intended to be illustrative only and does not account for whether or not the result of the EEG, with interpretation unassisted or assisted by the technologies in scope, influenced any diagnoses made.

Variable [parameter name in economic model]	Value	Source	EAG commentary on availability, quality, reliability and relevance of the source/s
Utility, 'Supportive' terminal nodes in those with EEG abnormalities to be detected; applied to true positives [u_tp]	0.805	NG217, greater than 50% seizure reduction (originally Marson 2007)	Vary to 0.869 (NG217), assuming seizure free on medication, in sensitivity analysis
Utility, 'Supportive' terminal nodes in those with no EEG abnormalities to be detected; applied to false positives [u_fp]	0.895	Age and gender specific utilities selected from NICE Decision Support Unit (Hernández Alava et al., 2022) using median age of first seizure of 35 years (Tittensor, 2024) and assuming 50% males, and arbitrary utility decrement to reflect possible harm while on inappropriate treatment. $0.5 * (0.8963 + 0.9138) - 0.010 = 0.895$	Assumed people without epilepsy have utilities equivalent to the general population, consider 16-year-old values in sensitivity to more closely reflect children (no utilities available for under 16s) $0.5 * (0.9103 + 0.9446) - 0.010 = 0.917$
Utility, 'Unsupportive' and 'Inconclusive'	0.905	Age and gender specific utilities selected from NICE	Assumed people without epilepsy have utilities equivalent to

Variable [parameter name in economic model]	Value	Source	EAG commentary on availability, quality, reliability and relevance of the source/s
(BioEP only) terminal nodes, in those without EEG abnormalities to be detected; applied to true negatives [u_tn]		Decision Support Unit (Hernández Alava et al., 2022) using median age of first seizure of 35 years (Tittensor, 2024) and assuming 50% males $0.5 * (0.8963 + 0.9138) = 0.905$	the general population, consider 16-year-old values in sensitivity to more closely reflect children (no utilities available for under 16s) $0.5 * (0.9103 + 0.9446) = 0.927$
Utility, 'Unsupportive' and 'Inconclusive' (BioEP only) terminal nodes, in those with EEG abnormalities to be detected; applied to false negatives [u_fn]	0.623	NG217, not seizure free (originally Marson 2007)	-

Abbreviation: EAG, External Assessment Group; EEG, electroencephalogram;

6.2.6 Model validation

The EAG built an early economic model for this EVA, rather than a fully parameterised economic model needed to support routine use guidance. The focus of the early modelling was to identify key drivers and uncertainties; therefore, validation was mainly internal rather than external. This modelling approach enabled identification of which parameters the model results were most sensitive to, rather than whether the predictions were consistent with other analyses or data.

The EAG applied extreme value testing and documented model validation using the AdViSHE tool (see [Appendix B2](#)). Two authors (RO, SG) reviewed the model outputs to ensure that appropriate numbers of patients resulted in terminal nodes ([Appendix B3](#)). Extreme value testing of parameters was also performed to check that results were plausible given inputs (RO, SG). The results of the economic model were peer reviewed by an experienced health economist (LV).

6.2.7 Presentation of results

The results of the EAG modelling should be interpreted while keeping in mind that there are 4 technologies that assist with identification of visible abnormalities on EEG recordings. For these technologies the key value proposition is reduced reviewing, reporting and interpretation time. There is a further 1 technology that identifies features that are not visible to a human reader for which the key value proposition is avoiding subsequent EEGs by supporting diagnosis in those with non-contributory EEG recordings. Additionally, the EAG highlights that the economic modelling is intended to explore the plausibility of technologies being cost effective in NHS use and does so in line with the assumptions and limitations described previously. To determine the key drivers from the economic modelling and to inform future data collection efforts, the EAG focused on univariate deterministic sensitivity analysis, Table 22. The EAG also carried out threshold analysis to determine how much staff time for review and interpretation of the EEG would need to be saved to result in the interventions being cost-effective at a willingness to pay threshold of £20,000 per QALY. For this threshold analysis, the sensitivity and specificity of the technologies were assumed to be the same as for the comparator. That is, the EAG assumed that the only value proposition of the technologies was to save time in the review and interpretation of EEGs, and that all other input parameters were equivalent to standard care. The EAG also further explored BioEP, acknowledging that it would be used in addition to standard care. This has the potential to increase costs incurred by identifying further positive results that could lead to increased treatment costs, and by identifying inconclusive results that are paid for, but offer no clinical benefit. The EAG therefore considered how changing the rate of inconclusive results and the specificity of BioEP (to vary false positive findings) would affect the results. From these results, the EAG also briefly considered the downstream impact of BioEP, including around reduced need for subsequent EEGs in some patients.

Because the developed early model was and intended to explore plausibility of the included technologies being cost effective in use in the NHS, and because the assumptions made in determining values for the parameters

included were likely prone to high levels of baseline uncertainty, it was not appropriate for the EAG to carry out probabilistic sensitivity analysis.

6.2.8 Cost of reversing a decision

Most of the technologies (encevis, NeuroCenter, NeuroWorks and BioEP) are offered on an annual license basis. It is assumed that this is paid for at the start of each year and cannot be reversed (that is, refunded) if the decision is made to stop using the technology. Therefore, this decision to reverse would lead to increased per patient costs for the rest of the current year.

Persyst incurs a capital license cost, which the EAG has assumed (in line with correspondence with the company) can be distributed over a five-year lifetime of the software. However, it is unclear what impact reversing the decision to use this technology would have. Where a physical device could be sold to recoup the costs, it is unlikely that this could be done for a software license. Therefore, a decision to stop using Persyst before the intended lifetime of the software (assumed in this case to be 5 years) is likely to mean that the costs of the license cannot be recovered. For simplicity in the economic model the EAG annualised the cost of the license. This has very slightly reduced the cost per patient, but has simplified the modelling, and is unlikely to have a noticeable impact on results.

Table 22: Summary of univariate sensitivity analysis by disease group and population

Parameter	Value	Source	Comment
Volume	500 per year	Assumption	Young Epilepsy stated that affordability for smaller services should also be considered. Therefore, the EAG considered a smaller hospital volume (base case: 1,000 per year).
Volume	2,000 per year, 4,000 per year	Clinical experts (Appendix D1)	-
Staff band involved in routine/sleep-deprived EEG review and reporting [c_rev]	Band 6: £55 per hour	(Jones et al., 2025) advised by experts-	-
Staff band involved in interpretation [c_interp]	Band 7: £66 per hour Band 8a: £74 per hour Band 8c: £103 per hour	(Jones et al., 2025) advised by experts	One clinical expert stated that normal EEG reports would be reviewed by someone at Band 7, so this range of values covers the range of potential interpretation costs.
Staff time to interpret ambulatory or telemetry EEG	40 minutes	Clinical experts (Appendix D3)	Suggested greater time saving with more prolonged recording (down from 60 minutes in the base case).
Lower specificity for IED detection	0.700	Clinical experts (Appendix D3)	-
Technology specific diagnostic accuracy, encevis with DeepSpike for IED detection in <u>routine</u> EEGs only	sens_i_ied: 0.933 spec_i_ied: 0.933 sens_c_ied: 0.933 spec_c_ied: 0.733	Applying the diagnostic accuracy as reported by Kural et al. 2022	Assumed that prevalence of abnormalities on EEG was the same as in the base case. Also assumed equivalent seizure detection between intervention and comparator to allow the difference between IED detection to be shown more representatively.
Technology specific diagnostic accuracy, Persyst 13 for IED detection in <u>routine</u> EEGs only	sens_i_ied: 0.767 spec_i_ied: 0.967 sens_c_ied: 0.933 spec_c_ied: 0.733	Applying the diagnostic accuracy as reported by Kural et al. 2022	Assumed that prevalence of abnormalities on EEG was the same as in the base case. Also assumed equivalent seizure detection between intervention and comparator to allow the difference between IED detection to be shown more representatively.
Technology specific diagnostic accuracy, encevis for seizure detection in <u>ambulatory</u> EEGs only	sens_i_sz: 0.950 spec_i_sz: 1.000 sens_c_sz: 1.000 spec_c_sz: 1.000	Applying the diagnostic accuracy as reported by Reus et al. 2022a	Assumed that prevalence of abnormalities on EEG was the same as in the base case. Also assumed equivalent IED detection between intervention and comparator to allow the difference between seizure detection to be shown more representatively. No specificity values reported for either comparator or intervention, so assumed 100% for each.
Technology specific diagnostic accuracy, Persyst 14 for seizure detection in <u>ambulatory</u> EEGs only	sens_i_sz: 0.980 spec_i_sz: 1.000 sens_c_sz: 1.000 spec_c_sz: 1.000	Applying the diagnostic accuracy as reported by Reus et al. 2022a	Assumed that prevalence of abnormalities on EEG was the same as in the base case. Also assumed equivalent IED detection between intervention and comparator to allow the difference between seizure detection to be shown more representatively. No specificity values reported for either comparator or intervention, so assumed 100% for each.
Routine and sleep-deprived EEG costs, vary to consider adults and children separately	Adults: £80,566,319 divided by 230,251 procedures = £349.91 Children: £11,496,588 divided by 28,356 procedures = £405.44	NHS National Cost Collection 2024/25: Outpatient Procedure Adults: Conventional EEG, EMG or Nerve Conduction Studies, 19 years and over (AA33C) Children: Conventional EEG, EMG or Nerve Conduction Studies, 18 years and under (AA33D)	-
Test failure, encevis for <u>ambulatory</u> EEGs only	p_testfailure: 0.05	Applying the test failure rate reported in Koren et al., 2018	Assumed 6-hour EEG was ambulatory.
Test failure, encevis and Persyst 14 for <u>video telemetry</u> EEGs only	p_testfailure: 0.012	Applying the test failure rate reported in Koren et al., 2025	-
Proportion of BioEP results inconclusive [p_bioep_inc]	0%, 5%, 10%, 20%	Assumption: base case assumed 33.7% neutral output	-
Additional time spent on BioEP, submitting EEG for review [t_bioep]	2 minutes of time of person carrying out review and reporting, 10 minutes	EAG assumption	Base case assumed no extra time to submit EEG for BioEP review, that is, it would be negligible in the context of the standard care review already carried out. One clinical expert stated that this would take 2 minutes at most, so sensitivity analysis assumes this. The same clinical expert stated that the result is sent straight to referring clinician so no additional interpretation needed.
Utility, 'Supportive' terminal nodes in those with EEG abnormalities to be detected [u_tp]	0.869	NG217 (originally Marson 2007)	Assuming patient is completely seizure free, and not just greater than 50% seizure free as in the base case

Parameter	Value	Source	Comment
Utility, 'Supportive' terminal nodes in those with no EEG abnormalities to be detected, and 'Unsupportive' and 'Inconclusive' (BioEP only) terminal nodes, in those without EEG abnormalities to be detected [u_fp] [u_tn]	u_fp: 0.917 u_tn: 0.927	Age and gender specific utilities selected from NICE Decision Support Unit (Hernández Alava et al., 2022) using median age of first seizure of 16 years, which is the youngest available	$0.5 * (0.9103 + 0.9446) - 0.010 = 0.917$ $0.5 * (0.9103 + 0.9446) = 0.927$
Prevalence of abnormal EEGs in starting cohort [prev_abn]	Routine EEG: 20%, 50% Sleep-deprived EEG: 50%, 70% Ambulatory: 70%, 80% Telemetry: 70%, 85%	Clinical expert opinion (Appendix D3)	-
Prevalence of seizures [prev_sz]	Routine: 0.6% (3/500), 2% Sleep-deprived: 0.6% (3/500), 4% Ambulatory: 30% Telemetry: 40%	Clinical expert opinion (Appendix D3)	Increased ambulatory and telemetry 20% to account for suggestion that it should be higher
Cost of EEG, inpatient video telemetry [c_eeg]	£4,421.15	NHS National Cost Collection 2024/25: Admitted Patient care (elective inpatient) Adults: Conventional EEG, EMG or Nerve Conduction Studies, 19 years and over (AA33C) Children: Conventional EEG, EMG or Nerve Conduction Studies, 18 years and under (AA33D)	Weighted average of adults £4,428.05 (activity: 3,436) and children £3,702.46 (activity: 33)
Cost of treatment [c_treat]	Gabapentin: £39.53, Lacosamide: £2,170.82	Inflated from £17.11 and £940.26 respectively, for 6 months from BNF in 2021, as used in NG217	-

Abbreviations: EAG, External Assessment Group; EEG, electroencephalogram; EMG, electromyogram; IED, interictal epileptiform discharge;

6.3 Results from the economic modelling

6.3.1 Base case results

Base case results are described in Table 23.

6.3.1.1 Routine EEG

encevis, NeuroCenter, NeuroWorks, Persyst 15

When modelling the 4 technologies that highlight abnormalities in the EEG waveform (encevis, NeuroCenter, NeuroWorks, Persyst 15) applied to 1,000 patients, the small increase in diagnostic sensitivity for the interventions meant that there were no differences in true positive, true negative, false positive, and false negative results when rounded to the nearest whole number. However, differences in costs and utilities were calculated based on the actual proportions reaching each terminal node and are therefore not zero. At a 1-year time horizon, the addition of the technologies to standard of care was associated with an incremental QALY of 0.000057 and an incremental cost saving of between £27 (NeuroWorks) and £33 (Persyst 15, year 1), resulting in the technologies being considered dominant. Total costs were attributed to recording the EEG (88%), technology (1%), staff time to review (1%) and interpret (3%), and treatment (7%). For the comparator, total costs were attributed to recording the EEG (85%), staff time to review (2%) and interpret (5%), and treatment (7%).

The highest ICERs were observed for routine EEG compared with the 3 other types considered (sleep-deprived, ambulatory, home video telemetry). This was due to routine EEG being modelled as having the lowest prevalence of IED and seizures, and smallest utility gain.

If a 20-minute time saving for review and reporting per routine EEG was realised using the technologies in scope (see Table 20), this could equate to a total time saving of 20,000 minutes for each 1,000 EEGs recorded. Assuming 60 minutes for an EEG appointment, this time saving could potentially allow for an additional 333 routine EEGs; assuming 40 minutes for

an EEG appointment would allow for an additional 500 EEGs. Applying this over a year, this would equate to between 1 and 2 additional EEGs being recorded each working day. However, the plausibility of this happening in practice and being able to have a positive impact on waiting lists would need further discussion with clinical experts.

BioEP

In standard care, if 1,000 routine EEGs were reviewed a total of 448 would be considered negative for epilepsy and could potentially be considered for subsequent EEGs (as per national guidelines see Section 3.1). However, if BioEP was used in those 448 patients, the total number of negative cases who may need additional EEG testing could reduce by 230 (from 448 in comparator arm, to 218 in intervention arm) and an additional 6 patients with epilepsy could be identified. However, the EAG note that the use of BioEP also resulted in 151 inconclusive results (incurring the technology cost but no change in utilities as no clinical benefit was realised) and 73 more false positive results (comparator: 211, intervention: 284). Overall, the implementation of BioEP in review of routine EEGs was associated with an incremental cost of £155 per patient, incremental QALY gain of 0.00037 and an ICER of £418,832 per QALY. In the case of BioEP the total costs were attributed to recording the EEG (74%) the technology (13%), staff time to review (2%) and interpret (5%), and treatment (7%). These results are driven by the higher cost of the technology per patient and high proportion of patients having an inconclusive (“neutral”) output from BioEP (33.7%). Without considering savings associated with subsequent EEGs, a larger clinical benefit would be required to offset the high technology costs associated with BioEP. If it was plausible that BioEP could reduce the need for subsequent EEGs, the cost of BioEP being used in 448 patients (£65,000) could potentially be offset if this avoided 72 further routine or sleep-deprived EEGs, or 54 ambulatory EEGs, or 42 home video telemetry EEGs, and the associated outpatient appointments. This could also have a positive impact on waiting times for these types of EEGs.

At company factual accuracy consultation, the company raised concerns that this impact of BioEP on further EEG use should have been modelled. No direct evidence was identified for this value proposition. However, the EAG ran additional analysis for routine EEG to reflect this by applying the cost of a further EEG to all terminal nodes where the diagnosis of epilepsy was either “Unsupported” or “Inconclusive”. To capture the full range of costs, the EAG considered the cost of the subsequent EEG being sleep-deprived, and separately, involving video telemetry. The EAG also considered that not all the patients who reach these terminal nodes may need a further EEG. This is because some would be diagnosed by other clinical factors. As the proportion of people who reach the terminal nodes but do not need an EEG is unknown, the cost was applied to 50%, 75% and 100% of patients reaching those terminal nodes to model this uncertainty. The lowest ICER, of £233,302 per QALY, was achieved when all patients with an “Unsupportive” (standard care, and BioEP) or “Inconclusive” (BioEP only) EEG were assumed to have a subsequent video telemetry EEG. In this scenario, to offset the cost difference of £86.21 between arms and achieve cost-effectiveness at a willingness to pay threshold of £20,000 per QALY, an incremental QALY of 0.00431 would be needed per patient when using BioEP alongside standard care.

6.3.1.2 Sleep-deprived EEG

encevis, NeuroCenter, NeuroWorks, Persyst 15

Similar results were observed for sleep-deprived EEG as with routine EEG. When encevis, NeuroCenter, NeuroWorks or Persyst technologies were used alongside clinical reviewers for 1,000 sleep-deprived EEGs, 1 fewer false negative result was identified; this was a consequence of a slight increase in diagnostic accuracy assumed with the technologies. As the specificity was the same in both arms, no difference in false positives were observed. At 1 year, the use of the technologies alongside clinical experts was associated with an incremental QALY of 0.000096 (almost double what was observed for routine EEG), and incremental cost savings between £43 (NeuroWorks) and £50 (Persyst 15, year 1), resulting in the technologies being considered dominant. Total costs were attributed to recording the EEG (84% to 85%, depending on

the technology), the technology (1%), staff time to review (1%) and interpret (4%), and treatment (9%). For the comparator, total costs were attributed to recording the EEG (80%), staff time to review (3%) and interpret (8%), and treatment (9%).

If a 25-minute time saving per sleep-deprived EEG for review and reporting using the technologies in scope was realised, this could equate to a total time saving of 25,000 minutes for each 1,000 EEGs recorded. In theory, freeing up these 417 hours of staff time could allow an additional 333 sleep-deprived EEGs to be recorded (assuming 1 hour and 15 minutes to attach electrodes, record the EEG, and review and report on it). Applying this over a year, this would equate to between 1 and 2 additional EEGs being recorded each working day. However, the plausibility of this happening in practice and being able to have a positive impact on waiting lists would need further discussion with clinical experts.

BioEP

In standard care, if 1,000 sleep-deprived EEGs were reviewed by a clinical expert a total of 286 would be considered negative for epilepsy and could potentially be considered for subsequent EEGs. Implementing BioEP in these 286 patients could reduce the total number of negative cases who may need additional EEG testing by 152 (comparator: 286, intervention: 134), and result in an additional 10 patients with epilepsy being identified, whilst also classifying 96 patients as inconclusive cases, and giving 45 additional false positives. The use of BioEP in sleep-deprived EEG review was associated with an incremental utility of 0.001397, incremental cost of £147 per patient (70% recording the EEG, 12% technology, 3% staff time to review, 7% staff time to interpret, and 8% treatment) and an ICER of £105,071 per QALY. If it was plausible that BioEP could reduce the need for subsequent EEGs, the cost of BioEP being used in 286 patients (£40,000) could potentially be offset if this avoided 44 routine or further sleep-deprived EEGs, or 33 ambulatory EEGs, or 26 home video telemetry EEGs, and the associated outpatient appointments. This could also have a positive impact on waiting times for these types of EEGs.

6.3.1.3 Ambulatory EEG

encevis, NeuroCenter, NeuroWorks, Persyst 15

When the encevis, NeuroCenter, NeuroWorks or Persyst technologies were used alongside clinical experts reviewing 1,000 ambulatory EEG, there was 1 fewer false negative result in the intervention arm than in the comparator arm. At 1 year, these technologies were associated with an incremental QALY of 0.000112, incremental cost savings of between £407 (NeuroWorks) and £414 (Persyst 15, year 1); resulting in the technologies being considered dominant. Total costs were attributed to recording the EEG (55%), technology (1% to 2%, depending on the technology), staff time to review (15%) and interpret (18%), and treatment (11%). For the comparator, total costs were attributed to recording the EEG (38%), staff time to review (31%) and interpret (24%), and treatment (8%).

If a 4-hour time saving per ambulatory EEG for review and reporting using the technologies in scope was realised, this could equate to a total time saving of 4,000 hours for each 1,000 EEGs recorded. In theory, freeing up this staff time could allow an additional 571 ambulatory EEGs to be recorded (assuming 1 hour to attach electrodes and set up, and for consistency with routine and sleep-deprived results, the 6 hours for review and reporting from the standard care arm). However, the plausibility of this happening in practice and being able to have a positive impact on waiting lists would need further discussion with clinical experts.

BioEP

In standard care, from a total of 1,000 ambulatory EEGs reviewed by a clinical expert, 199 would be considered negative for epilepsy and would potentially be considered for subsequent EEGs. Implementing BioEP in these 199 patients (noting that BioEP is indicated for analysis of resting-state segments of ambulatory EEG, see technology functionality summarised in Table 2) could reduce the total number of negative cases who may need additional EEG testing by 114 (comparator: 199, intervention: 85), and result in an additional 19 patients with epilepsy being identified, 67 patients would be

classified as inconclusive cases, and there would be 28 additional false positives. The use of BioEP in ambulatory EEG review was associated with an incremental utility of 0.003227, incremental cost of £131 (34% recording the EEG, 9% technology, 28% review time, 22% interpretation time and 7% treatment) and an ICER of £40,671 per QALY. If it was plausible that BioEP could reduce the need for subsequent EEGs, the cost of BioEP being used in 199 patients (£25,000) could potentially be offset if this avoided 28 routine or sleep-deprived EEGs, or 21 further ambulatory EEGs, or 16 home video telemetry EEGs, and the associated outpatient appointments. This could also have a positive impact on waiting times for these types of EEGs.

6.3.1.4 Home video telemetry EEG

encevis, NeuroCenter, NeuroWorks, Persyst 15

Lastly, when encevis, NeuroCenter, NeuroWorks and Persyst were used alongside clinical experts reviewing 1,000 home video telemetry EEGs, there was no change in the number of false negatives or false positives between the intervention and comparator arms. There was a difference in QALYs of 0.000104, and a cost saving of between £407 (NeuroWorks) and £414 (Persyst 15, year 1), resulting in the intervention being dominant. Total costs were attributed to recording the EEG (68%), technology (1%), staff time to review (11%) and interpret (13%), and treatment (8%). For the comparator, total costs were attributed to recording the EEG (51%), staff time to review (24%) and interpret (19%), and treatment (6%).

If a 4-hour time saving per video telemetry EEG for review and reporting using the technologies in scope was realised, this could equate to a total time saving of 4,000 hours for each 1,000 EEGs recorded. In theory, freeing up this staff time could allow an additional 571 video telemetry EEGs to be recorded (assuming 1 hour to attach electrodes and set up, and for consistency with routine and sleep-deprived results, the 6 hours for review and reporting from the standard care arm). However, the plausibility of this happening in practice and being able to have a positive impact on waiting lists would need further discussion with clinical experts.

BioEP

In standard care, from a total of 1,000 home video telemetry EEGs reviewed by a clinical expert, a subset of 180 would be considered negative for epilepsy and would potentially be considered for subsequent EEGs. Implementing BioEP in these 180 patients could reduce the total number of negative cases who may need additional EEG testing by 103 (comparator: 180, intervention: 77), result in an additional 18 patients with epilepsy being identified, 61 inconclusive cases, and 25 additional false positives, leaving 1 false negative remaining. At 1 year, BioEP when applied to home video telemetry EEGs was associated with an incremental utility of 0.002994, an incremental cost of £144 (47% recording the EEG, 8% technology, 22% review time, 17% interpretation time and 6% treatment) and an ICER of £48,115 per QALY. As for ambulatory EEG, the cost of BioEP being used in 180 patients (£25,000) could potentially be offset if this avoided 28 routine or sleep-deprived EEGs, or 21 ambulatory EEGs, or 16 further home video telemetry EEGs, and the associated outpatient appointments. This could also have a positive impact on waiting times for these types of EEGs.

Table 23: Base case results (routine, sleep-deprived, ambulatory, video telemetry EEG)

Type of EEG	Technology	n, patients	Inconclusive	TP	TN	FP	FN	Cost per patient	QALYs per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Routine	Standard care (SoC) alone	1,000	-	341	439	211	9	£969.81	0.866	-	-	-
	encevis	1,000	-	341	439	211	9	£938.23	0.866	£31.58	0.000057	Dominant
	NeuroCenter	1,000	-	341	439	211	9	£940.10	0.866	£29.71	0.000057	Dominant
	NeuroWorks	1,000	-	341	439	211	9	£943.10	0.866	£26.71	0.000057	Dominant
	Persyst (year 1)	1,000	-	341	439	211	9	£936.39	0.866	£33.42	0.000057	Dominant
	Persyst (year 2 onwards)	1,000	-	341	439	211	9	£942.95	0.866	£26.86	0.000057	Dominant
	BioEP	1,000 (BioEP applied to 448)	151	347	218	284	0	£1,124.59	0.867	£154.77	0.00037	£418,832
Sleep-deprived	Standard care alone	1,000	-	584	270	130	16	£989.86	0.841	-	-	-
	encevis	1,000	0	585	270	130	15	£941.63	0.841	£48.22	0.000096	Dominant
	NeuroCenter	1,000	0	585	270	130	15	£943.50	0.841	£46.35	0.000096	Dominant
	NeuroWorks	1,000	0	585	270	130	15	£946.50	0.841	£43.35	0.000096	Dominant
	Persyst (year 1)	1,000	0	585	270	130	15	£939.79	0.841	£50.06	0.000096	Dominant
	Persyst (year 2 onwards)	1,000	0	585	270	130	15	£946.35	0.841	£43.50	0.000096	Dominant
	BioEP	1,000 (BioEP applied to 286)	96	594	134	175	0	£1,136.62	0.842	£146.76	0.001397	£105,071
Ambulatory	Standard care alone	1,000	-	719	169	81	31	£1,298.02	0.824	-	-	-
	encevis	1,000	0	720	169	81	30	£885.98	0.824	£412.04	0.000112	Dominant
	NeuroCenter	1,000	0	720	169	81	30	£887.85	0.824	£410.17	0.000112	Dominant
	NeuroWorks	1,000	0	720	169	81	30	£890.85	0.824	£407.17	0.000112	Dominant
	Persyst (year 1)	1,000	0	720	169	81	30	£884.14	0.824	£413.88	0.000112	Dominant
	Persyst (year 2 onwards)	1,000	0	720	169	81	30	£890.70	0.824	£407.32	0.000112	Dominant
	BioEP	1,000 (BioEP applied to 199)	67	739	84	109	1	£1,429.29	0.827	£131.26	0.003227	£40,671
Home video telemetry	Standard care alone	1,000	-	747	152	73	28	£1,651.12	0.822	-	-	-
	encevis	1,000	0	747	152	73	28	£1,239.07	0.822	£412.05	0.000104	Dominant
	NeuroCenter	1,000	0	747	152	73	28	£1,240.94	0.822	£410.18	0.000104	Dominant
	NeuroWorks	1,000	0	747	152	73	28	£1,243.94	0.822	£407.18	0.000104	Dominant
	Persyst (year 1)	1,000	0	747	152	73	28	£1,237.23	0.822	£413.89	0.000104	Dominant
	Persyst (year 2 onwards)	1,000	0	747	152	73	28	£1,243.79	0.822	£407.33	0.000104	Dominant
	BioEP	1,000 (BioEP applied to 180)	61	765	76	98	1	£1,795.19	0.825	£144.07	0.002994	£48,115

Abbreviations: EEG, electroencephalogram; FN, false negatives; FP, false positives; ICER, incremental cost-effectiveness ratio; QALY, quality adjusted life year; TN, true negatives; TP, true positives;

6.3.2 Sensitivity analysis results

A summary of the results from univariate sensitivity analysis are shown in Table 24. Scenarios which decreased the review time of clinical staff found four technologies (encevis, NeuroCenter, NeuroWorks, Persyst) were considered cost-effective at a willingness to pay threshold of £20,000, and clinically plausible. None of the modelled scenarios demonstrated cost-effectiveness for BioEP at a willingness to pay threshold of £20,000. Full detailed results from extensive univariate sensitivity analysis are described in [Appendix B4](#).

Table 24: Summary of univariate sensitivity analysis in the economic model

Type of EEG	Early economic model parameter sensitivity		
	Insensitive	Sensitive	Sensitive
	Negligible impact on ICER	Favour of intervention	Favour of comparator
Routine, Sleep-deprived, Ambulatory, Home video telemetry	- Starting utility values based on 16-year-old, - Modelling adult/children costs separately, - Highest/lowest monotherapy treatment costs, - Review and reporting conducted by Band 6, - Interpretation by Band 8a or Band 8c, - Adding 2 minutes review time (BioEP only), - Non-zero test failure rates for ambulatory (1.2%, encevis only) and video telemetry (5.0%, encevis and Persyst) EEGs - Higher and lower prevalence of abnormalities on EEG (all technologies, except BioEP)	- Reduction in staff time associated with review, - Reduction in staff time associated with interpretation, - Higher utility associated with true positives, - Lower diagnostic accuracy of standard care (sensitivity, specificity) for IED detection - Higher specificity for epilepsy diagnosis (BioEP) - Annual volume of EEGs (bigger) - Decreasing inconclusive results (BioEP), - Increased prevalence of abnormalities on routine and sleep-deprived EEG (BioEP) - Lower diagnostic accuracy of EEGs	- Increasing review time associated with technologies - Annual volume of EEGs (smaller) - Reduced prevalence of abnormalities on all types of EEG, increased prevalence of abnormalities on ambulatory and video telemetry EEG (BioEP) - Lower sensitivity of BioEP, from Tait et al. 2024

		in diagnosing epilepsy in standard care (BioEP)	

Abbreviations: EEG, electroencephalogram; ICER, Incremental cost effectiveness ratio; IED, interictal epileptiform discharge

6.3.2.1 Parameter changes having negligible impact on ICERs

For all types of EEG, and for all technologies, the following scenarios had negligible impact on the observed ICERs: separating adult and child EEG costs instead of a using weighted average (considered for routine and sleep-deprived EEG only), changing review to be conducted by a Band 6 member of staff, changing interpretation to be conducted by Band 8a or Band 8c members of staff, using the lowest and highest monotherapy treatment costs available from NG217, and using population based starting utility values for a 16 year old without epilepsy.

encevis, NeuroCenter, NeuroWorks, Persyst 15

Considering ambulatory EEG, where the ICER was dominant in the base case, applying the test failures reported by Koren et al. (2018) for encevis maintained similar cost savings to the base case, and a dominant ICER. Similarly, considering video EEG, where the ICER was dominant in the base case, applying the test failures reported by Koren et al. (2025) for encevis and Persyst maintained a similar cost saving and a dominant ICER. It is important to note that the EAG did not explore any impact of the test failure rate on time to review, report on, or interpret the EEG. However, given the low test failure rates explored, of 1.2% for video telemetry EEGs (encevis and Persyst) and 5.0% for ambulatory EEGs (encevis), this would mean 12 people, and 50 people, respectively, reverting to standard care. For 12 people, this would equate to 48 hours of extra review and reporting time (240 minutes each), and 12 hours of extra interpretation time (60 minutes each). Costs associated with this would be £3,168 for review and reporting at Band 7, and £1,884 for interpretation by a consultant, or £5,052 in total, or £5.05 per patient. The equivalent cost, based on a 5.0% failure rate would be £13,200 for review and reporting (200 hours), and £7,850 for interpretation (50 hours), or a total cost of £21,050 and £21.05 per patient. The incremental costs observed in the sensitivity analysis around test failure rates are sufficiently high to absorb this additional review, reporting and interpretation time that might be needed for small numbers of patients needing to revert to standard care.

For encevis, NeuroCenter, NeuroWorks, and Persyst, varying the prevalence of abnormalities on all types of EEG had little impact on the cost savings of the intervention, when compared with the comparator, and the ICER remained dominant.

BioEP

For BioEP, across all types of EEG, introducing an extra 2 minutes of time for the person reviewing the EEG to upload it for BioEP analysis increased the incremental costs and ICER further.

6.3.2.2 Parameter changes having moderate impact on ICERs (in favour of intervention)

encevis, NeuroCenter, NeuroWorks, Persyst 15

The model was most sensitive to the reduction in staff time and applying a higher utility to true positive results. Given a diagnosis of epilepsy is based on other clinical factors (and not the EEG alone), the EAG considered that the reduction in staff time was the most plausible of these to have an impact in practice. Assuming the diagnostic accuracy (in detection of IEDs and seizures in the case of encevis, NeuroCenter, NeuroWorks, Persyst 15) of the clinical experts with or without support of the technologies in review of routine EEGs remained the same, a reduction in staff time only demonstrated possible scenarios where the technologies supporting standard care would be considered cost-effective at a willingness to pay threshold of £20,000/QALY, Table 25. For example, to offset the cost per patient of Persyst 15, the staff time associated with review and interpretation of routine EEG would have to both reduce by 9.6%. For encevis this reduction would need to be 12.1% and for NeuroWorks, 18.7%. Given the lack of evidence for the current versions in a UK setting, and that evidence was identified which highlighted high false positive rates for the technologies, it is unclear whether these time savings are possible in the NHS. It is also unclear whether time savings associated with faster review and interpretation (the latter being carried out by different staff to those placing the electrodes on the patient and recording the EEG) would translate into freeing up EEG slots and reducing EEG waiting times in the NHS.

Table 25: Summary of threshold analysis of staff time savings to offset technology cost per EEG

EEG type	Intervention	Comparator review time, minutes	Intervention review time, minutes	Difference in review time, minutes	Comparator interpretation time, minutes	Intervention interpretation time, minutes	Difference in interpretation time, minutes	% change in both review and interpretation time	Intervention review time, minutes	Intervention interpretation time, minutes
Routine	encevis	30	17.6	-12.4	20	16.6	-3.4	-12.1%	26.4	17.6
	NeuroWorks	30	10.8	-19.2	20	14.7	-5.3	-18.7%	24.4	16.3
	Persyst 15 (year 1)	30	20.1	-9.9	20	17.3	-2.7	-9.6%	27.1	18.1
Sleep Deprived	NeuroWorks	40	20.8	-19.2	30	24.7	-5.3	-12.9%	34.8	26.1
	Persyst 15 (year 1)	40	30.1	-9.9	30	27.3	-2.7	-6.6%	37.4	28.0
Ambulatory	NeuroWorks	360	347.4	-12.6	120	114.7	-5.3	-2.0%	352.8	117.6
	Persyst 15 (year 1)	360	353.5	-6.5	120	117.2	-2.8	-1.1%	356.0	118.7
Telemetry	NeuroWorks	360	347.4	-12.6	120	114.7	-5.3	-2.0%	352.8	117.6
	Persyst 15 (year 1)	360	353.5	-6.5	120	117.2	-2.8	-1.1%	356.0	118.7

Abbreviations: EEG, electroencephalogram; QALY, quality-adjusted life years; WTP, willingness to pay threshold

BioEP

The EAG carried out further analysis for BioEP. In this it was assumed there were no inconclusive results on routine EEG (that is, BioEP was able to definitively support a diagnosis of epilepsy, or not), and the ICER reduced from £418,832 per QALY in the base case, to £287,427 per QALY. Assuming instead that specificity of BioEP was 100%, the ICER would reduce to £133,070. Combining these two univariate changes into the same analysis resulted in an ICER of £88,454, and incremental cost of £146.17 (incremental QALYs: 0.0017). In this best-case scenario, BioEP could support the identification of an additional 9 true positives not identified in the comparator arm. These patients may not now need further EEGs as they might have done if they had been incorrectly classified as false negative results. For the ICER to be no more than the £20,000 per QALY willingness to pay threshold, the incremental cost of BioEP would need to reduce to £33 per patient (from £146 in the base case). This also made other assumptions in favour of BioEP. These were 0 inconclusive results, and a specificity of 100%.

For the other types of EEG, reducing inconclusive results to 0 and assuming 100% specificity for BioEP, reduced the ICER, but not below a willingness to pay threshold of £20,000 per QALY. For sleep-deprived EEGs, with an ICER of £51,053, the incremental cost of BioEP would need to reduce from £142 to £56. For ambulatory EEGs, with an ICER of £24,415, the incremental cost of BioEP would need to reduce from £129 to £106. For video telemetry EEGs, with an ICER of £29,050, the incremental cost would need to reduce from £142 to £98.

For BioEP, increasing the prevalence of abnormalities on routine and sleep-deprived EEG reduced the ICER in favour of the intervention, but not close to a £20,000 per QALY willingness to pay threshold. For completeness, the EAG calculated the threshold incremental cost at which BioEP may be considered cost effective at a £20,000 per QALY willingness to pay threshold, when using the parameters used in the base case. For routine EEGs, with incremental QALYs of 0.00037 per patient, the incremental costs associated with BioEP would need to be less than £7 per patient for the technology to be considered cost effective. For sleep-deprived EEGs (incremental QALYs: 0.001397 per patient) incremental costs would need to be less than £28 per patient, for ambulatory EEGs (incremental QALYs: 0.003227 per

patient) incremental costs would need to be less than £65, and for video telemetry (incremental QALYs: 0.002994 per patient) incremental costs would need to be less than £60 per patient.

Following company factual accuracy consultation, the EAG modelled additional scenarios for BioEP utilising the existing economic model structure. For routine EEGs, the diagnostic sensitivity in detecting epilepsy on EEG was reduced to 44.5% and specificity was reduced to 79.6% in the comparator arm (pooled adult and child population from Bouma et al. 2016). Because the Bouma et al. (2016) meta-analysis focused on diagnosis of epilepsy, and not only on the identification of EEG abnormalities, it was not possible to distinguish between diagnostic accuracy for seizure detection and diagnostic accuracy for IED detection. Therefore, operationally in the economic model the prevalence of seizures and diagnostic accuracy for seizure detection were set to values that allowed the single values for diagnostic accuracy from Bouma et al. (2016) to be applied to the standard care sections of the decision tree. This approach resulted in BioEP having an incremental cost of £194.65, incremental QALYs of 0.021902, and ICER of £8,887 per QALY. The EAG notes however, that Bouma et al. (2016) pooled results from studies dating as far back as 1978, and studies from multiple countries and thus it may not reflect current NHS practice. Future comparative evidence (of standard care with and without BioEP) would reduce uncertainties in future economic evaluations using an NHS setting.

The EAG also explored changes to the diagnostic accuracy of BioEP based upon data from Tait et al. (2024); using a sensitivity of 61% and specificity of 75% (noting that this study reported the same specificity as used in the base case). The EAG found that when this change was made but when other parameters were kept the same as the base case, BioEP was dominated by the comparator arm, with incremental costs of £154.50 and a QALY loss of 0.000038 per patient. However, combining this change with changes to the diagnostic accuracy of standard care (from Bouma et al. 2016) described above, resulted in incremental costs of £188.91, incremental QALYs of 0.01344, and an ICER of £14,055. A key limitation of Tait et al. (2024) however is that it describes the use of BioEP unassisted by a clinician, so

it is unclear how the data from Tait et al (2024) apply to the intended use of the technology described in the scope when used in the NHS.

The EAG also notes the change in distribution of patients at nodes throughout the model. As expected, when the accuracy of standard care is reduced, a greater number of patients than in the base case are not diagnosed with epilepsy and are therefore eligible for BioEP (712, compared with 448 in the base case). When applying the reduced sensitivity of standard care from Bouma et al. (2016) on its own, the BioEP arm identifies 281 true positives compared with 156 in the comparator arm, fewer true negatives (257 versus 517), more false positives (218 versus 133), and fewer false negatives (4 versus 194). When comparing this with the base case results for BioEP, this equates to fewer true positives, a greater number of true negatives, fewer false positives, and a greater number of false negatives. When combining both changes in diagnostic accuracy, the ICER of £14,055 is associated with the detection of fewer true positives, the same number of true negatives and false positives, and a greater number of false negatives.

The EAG carried out threshold analysis around these two univariate changes, identifying that if diagnostic accuracy of standard care was fixed at that reported by Bouma et al. (2016), and specificity of BioEP was fixed at the 75% used in the base case, BioEP would need to demonstrate sensitivity higher than 43.3% to be considered cost-effective at a willingness to pay threshold of £20,000 per QALY. Conversely, with diagnostic accuracy of BioEP fixed at that reported by Tait et al. (2024), and specificity of standard care fixed at that reported by Bouma et al. (2016), the sensitivity of standard care would need to be below 73.1% for BioEP to be considered cost-effective at a willingness to pay threshold of £20,000 per QALY.

Overall, this analysis suggests that using BioEP to support epilepsy diagnosis may be cost-effective if the diagnostic accuracy of standard care was lower than estimated by clinical experts and could remain cost-effective with a modest reduction in sensitivity from the values used in the base case. The EAG also acknowledges that for this technology, modelling standard care with a single pair of diagnostic accuracy values (that is, not separately modelling seizure and IED detection, and instead likening it more to a definitive epilepsy diagnosis) may be most appropriate.

6.3.2.3 Parameter changes having moderate impact on ICERs (in favour of comparator)

encevis, NeuroCenter, NeuroWorks, Persyst 15

For routine EEGs ([Appendix B4](#)), applying the sensitivity and specificity of encevis from Kural et al. (2022) and the cost of encevis (from Table 21) resulted in an incremental cost saving of £46, meaning the intervention was dominant. Using sensitivity and specificity values from the same source for Persyst resulted in 0.008058 fewer QALYs than the comparator arm, alongside cost savings of £57 in year 1, and £50 in year 2 onwards. In this circumstance the ICER represents the comparison of the comparator versus the intervention. Adopting the comparator compared with the intervention resulted in ICERs of £7,043 and £6,229 at year 1 and year 2 respectively. In these cases, the loss of QALYs with the intervention would not be worth the cost savings.

For ambulatory EEGs, using the sensitivity from Reus et al. (2022a) for encevis and Persyst, and assuming perfect specificity led to a small reduction in QALYs in the intervention arm (encevis: 0.000034, Persyst: 0.000014) compared to the comparator arm. Alongside the cost savings, this equated to ICERs of £12,077,455 for the comparator versus encevis, and £30,327,418 (year 1) and £29,846,832 (year 2 onwards) for the comparator versus Persyst. In these cases, the ICERs are substantially above a £20,000 cost per QALY threshold meaning that the savings adopting the interventions more than compensated for the loss of QALYs.

BioEP

For BioEP, reducing the prevalence of abnormalities on routine EEG to 20% resulted in fewer QALYs in the intervention arm but at greater cost, and therefore the comparator being dominant. For sleep-deprived EEG, reducing the proportion of EEGs with abnormalities increased the ICER for the intervention compared with the comparator. For ambulatory and video telemetry EEG, both increasing and decreasing the proportion of EEGs with abnormalities present increased the ICER for the intervention compared with the comparator. This may be driven by the lower prevalence resulting in more EEGs being processed by, and incurring the cost of, BioEP, than in the base case, and the higher prevalence resulting in more positive

results (which thus incur treatment costs). For ambulatory EEGs, the base case ICER of £40,671 was achieved at an incremental cost of £131, and incremental QALYs of 0.003227. Decreasing the prevalence of abnormalities to 70% resulted in an ICER of £61,104 (incremental cost: £180, incremental QALY: 0.002938), and increasing the prevalence of abnormalities to 80% resulted in an ICER of £43,917 (incremental cost: £155, incremental QALY: 0.003517). For video telemetry EEGs, the base case ICER of £48,115 was achieved at an incremental cost of £144, and incremental QALYs of 0.002994. Decreasing the prevalence of abnormalities to 70% resulted in an ICER of £69,920 (incremental cost: £182, incremental QALY: 0.002596), and increasing the prevalence of abnormalities to 85% resulted in an ICER of £57,035 (incremental cost: £193, incremental QALY: 0.003392).

For BioEP, reducing the specificity for IED detection to 70% increased the ICER, for all types of EEG. The impact of this on the ICER for routine and sleep-deprived EEGs was greater than for ambulatory and video telemetry EEGs.

For BioEP, introducing 10 minutes of time for the reviewer to upload the EEG for analysis had a big impact on the ICER, in favour of the comparator, for all EEG types. A greater change in the ICER was seen in ambulatory and video telemetry EEG than in routine and sleep-deprived EEG.

At company factual accuracy consultation, the EAG added a further analysis, using the sensitivity of BioEP from Tait et al. (2024) of 61%, for all types of EEG. As mentioned in the previous section, for routine EEG, the comparator dominated BioEP because fewer QALYs were accrued in the intervention arm. This was because 3 fewer true positives and 2 additional false negatives were identified (the EAG notes the discrepancy in the numbers is because of rounding the terminal node occupancies to whole numbers). Similar redistribution of patients was observed for the other types of EEG (sleep-deprived: 4, ambulatory: 7, and telemetry: 7 false negatives). As a result, the ICER for sleep-deprived EEGs rose to £205,731 from £105,071 in the base case, with a reduction in incremental QALYs from 0.001397 to 0.000711 in the BioEP arm. For ambulatory EEGs, the ICER was £66,202 (up from £40,671 in the base case) and incremental QALYs reduced from 0.00323 to 0.00197. For telemetry EEGs, the ICER increased from £48,115 in the base case, to £78,280, with a corresponding reduction in incremental QALYs from 0.00299 to

0.00183. Although the EAG did not carry out further analysis around the diagnostic accuracy of standard care and BioEP for sleep-deprived, ambulatory, and video telemetry EEG, it is expected that similar plausibility of cost-effectiveness could be observed as for routine EEG, described in the previous section.

6.4 Summary and interpretation of the economic evidence

When used in a specialist setting to support the diagnosis of epilepsy the key value proposition of these technologies as identified by clinical experts, is the potential for reduction in the time taken to interpret the large amount of data generated by EEGs. The EAG also considered increased or equivalent accurate identification of IED or seizure events to be a plausible value proposition. The review, reporting and interpretation of EEGs needs specialist capacity which varies across the country, which can result in long waiting times for EEG assessment. The value propositions aim to ensure that people with epilepsy are diagnosed and managed in a timely manner, which has implications for patient wellbeing and potentially also the subsequent use of NHS resources. The technologies may have features to assist in review, report writing (future feature in some technologies) and interpretation, but still require specialist clinician review. Because of the clinical plausibility of the value propositions as expressed by several experts the EAG focused on the reduction on time needed to review, report and interpret an EEG, alongside a small gain in diagnostic sensitivity within its early economic model. Results from this modelling work should not be interpreted as evidence or lack of evidence of cost-effectiveness. Instead, this modelling work has highlighted key evidence gaps and key drivers (staff time associated with review and reporting with and without technologies, and the need for subsequent testing with and without the technologies). The EAG also note that the results are illustrative and do not suggest that diagnosis should be based on EEG only (which is not the case) as the majority of patients are diagnosed based on clinical history, presentation and other diagnostic testing. The EAG also notes that the results presented for the potential of reduced staff time to allow more EEG appointments to be made available are intended to be illustrative only, and the true impact of this is likely to vary depending on the specific workload, and types of EEG available, at each centre. That is, there is a wide range of potential time savings between shorter routine EEGs, and longer ambulatory or video telemetry EEGs, so

the time savings realised by centres offering all types of EEG are likely to be somewhere between the two.

Key findings:

- Because of the short time horizon of the developed model, incremental QALYs tended to be small. As a number of factors contribute to the diagnosis of epilepsy (clinical history, patient presentation; and not just the EEG in isolation), so the impact of the technologies on the diagnosis is not known; the EAG considered that this approach was an appropriate estimation, but that it would favour the standard care arm if the estimated incremental QALYs continued to be accrued over time.
- There was a lack of diagnostic accuracy evidence comparing clinical experts with and without the current versions of the technologies. Therefore, the EAG applied a baseline sensitivity and specificity to the standard care arm, advised by clinical experts ([Appendix D3](#)), which varied across 4 types of EEG and assumed a small improvement (0.1%) in sensitivity when the technologies were used to support the clinical expert. The EAG explored this alongside reducing the time taken to review, report on, and interpret EEGs. For all types of EEG, for encevis, NeuroCenter, NeuroWorks, and Persyst 15, the base case found the interventions to be cost saving over the comparator, and therefore dominant.
- The EAG used threshold analysis, in which the sensitivity and specificity of the comparator and interventions were assumed to be the same, to determine the necessary time savings for review and reporting, and interpretation of EEGs for the interventions to be cost effective. This was highest in routine EEG (19% with NeuroWorks) and lowest in ambulatory or telemetry EEG (1% with Persyst 15). Although it is unknown whether the necessary time savings could be achieved in practice in the NHS, they were small enough to seem plausible.
- From the economic modelling results, similar trends were observed across the four types of EEGs (routine, sleep-deprived, ambulatory, home video telemetry):
 - Key drivers in the model include the staff time saving associated when using the technologies, the throughput of the technologies (with higher

throughputs meaning equipment and licence costs can be split between more patients which in turn lowers the per patient cost), reducing sensitivity and specificity of the technologies (in line with published evidence) to below that of the comparator arm, increasing utility value associated with true positive results, decreasing inconclusive results for BioEP, and increasing and decreasing prevalence of abnormalities on EEG for BioEP.

- The economic model was not sensitive to the age of the population, treatment costs, band of staff involved in review, band of staff involved in interpretation, increasing and decreasing treatment costs, applying non-zero test failure rates from published evidence, increasing and decreasing prevalence of abnormalities on EEG for encephalitis, NeuroCenter, NeuroWorks and Persyst 15, and applying an additional 2 minutes of staff time for BioEP processing.
- A key limitation of the modelling stems from the lack of clinical evidence for each included technology, such that, in the base case, only costs varied between technologies with a small assumed increase in sensitivity associated with using the technologies alongside the experts. The QALYs estimated are speculative and results should be considered as if from a cost comparison analysis until evidence becomes available to support fully exploring the value propositions. A second notable limitation was that most model parameters were based on the views and opinions of clinical experts, with diverse experience from across the NHS. These experts advised on the theoretical improvements in diagnostic accuracy and time saving that the technologies may provide, and the ranges of the provided values were explored in sensitivity analysis.
- The EAG note that the economic model structure built does enable parameterisation for BioEP, however this does require careful interpretation. This is due to the different functionality of BioEP, which more closely represents the use of the technology to diagnose epilepsy, rather than to identify features on EEGs such as seizures or IEDs (which relate to the other 4 technologies).

- The EAG found, throughout their analysis, that all technologies (BioEP, encephalis, NeuroCenter, NeuroWorks, Persyst 15) have the potential to be cost-effective in the NHS in a range of scenarios.
- For all technologies, it would be beneficial to monitor how often the support of the technology contributes to making a diagnosis of epilepsy. This would help determine whether the technologies can impact subsequent management decisions and reduce uncertainty in future economic evaluations.

6.5 Future economic modelling

If data became available to support additional value propositions such as reduced waiting times for EEG, reduced waiting times for diagnosis or treatment or reduced need for subsequent EEGs, the EAG propose that the decision tree developed for this early use assessment could be incorporated within a more complex lifetime Markov model, like that illustrated in Figure 4. The current structure of the model, which considers seizure and IED detection separately, could also allow the staff time to review, report on, and interpret EEGs for each feature, to be varied independently, if the technologies could be used to support this approach. Future modelling could also explore whether early diagnosis leads to different uptake and responses to treatments (including changes in proportion of patients with drug-resistant epilepsy which may increase with earlier diagnosis). This could also capture additional NHS and social care costs which may differ if epilepsy was diagnosed and treated earlier.

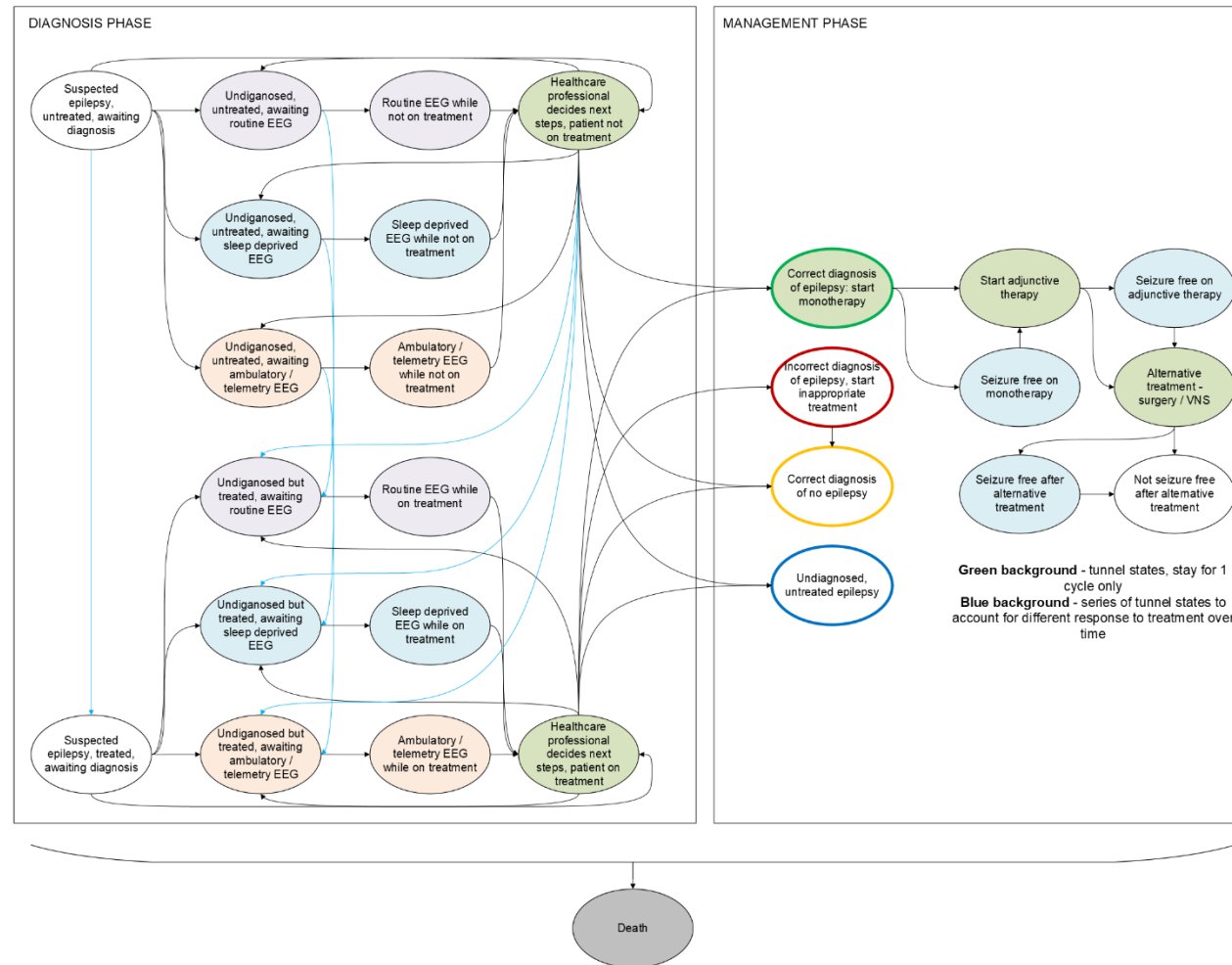
The EAG chose not to pursue this added complexity within this early use assessment because of clinical feedback received on the plausibility of those value propositions (see [section 6.2](#)). Furthermore, due to the lack of data, more complex economic analysis would have resulted in wide variation in results which may mask the benefits of the technology in reducing review and reporting times, when compared with the lengthy waiting time for EEG.

Because of the lack of evidence to support the economic modelling, as described throughout this report, the EAG also chose not to model different subgroups, such as age (other than by varying EEG costs and utilities accrued), and types of epilepsy.

The charity, Young Epilepsy, stated that most complex epilepsies start in people under the age of 2 years, and that some algorithms may not be able to identify all

types of seizures (for example those associated with infantile spasms). They therefore supported the prospect of modelling over a longer time horizon, and this, and subgroup analysis by age and type of epilepsy should be explored when more data become available.

Figure 4: Future conceptual economic model



7. Integration into the NHS

7.1 Existing use in the NHS

Three companies confirmed that their technologies are currently in use in the NHS (BioEP, NeuroWorks, Persyst), and two companies confirmed that their technology is available but not currently being used in the NHS (encevis, NeuroCenter). The use of these technologies is not currently captured in any UK national audits. The BSCN advised that this may be available from stock take reports from the NHS England.

7.2 Implementation considerations

One clinical expert advised that some of the technologies might introduce friction between the EEG acquisition and the review, for example because the data need to be exported and uploaded onto a server or run through the third-party software tool. The clinical expert stated that any technology that is not integrated with the clinical workflow used to record the EEG, or any technology that does not provide its own environment to review the EEG alongside the video may not yield the time savings suggested here, as staff time will be needed for a manual process of transferring EEGs on to the technologies. The Association of British Neurologists stated system level changes (including integration with existing EEG hardware, reporting software, hospital IT infrastructure, and electronic health records) would be needed to adopt the health technologies. The EAG note that for the technologies included in this early use assessment:

- BioEP is accessed through a secure web-based portal where the user manually selects and uploads, individual or in bulk, EEG files (EDF) for analysis. This technology accounts for patient sex and whether anti-seizure medication is being taken at the time of the EEG.
- encevis integrates with existing EEG acquisition systems and can read the EEG files from all major manufacturers (supports DICOM data, and native manufacture file formats).
- When used offline, NeuroCenter is hardware-agnostic and supported EDF+ natively, however online real-time detection requires the use of their own EEG platform. The company stated that other formats can be accommodated using

conversion tools, and that integration with other real-time systems is technically feasible depending on the hardware interface and data access provided by the manufacturer.

- SCORE-AI is a Natus exclusive feature and integrated within the Natus NeuroWorks EEG software. This technology requires age and ECG to run the analysis.
- Persyst is compatible and integrates with major EEG systems (for example: Natus, Micromed, Nihon Kohden, Deymed, Compumedics, Cadwell) and supports a range of EEG formats. The company stated that Persyst can be configured to process EEG during acquisition and can provide on-screen notifications and alerts.

All systems claim to integrate with major EEG acquisition systems ([Appendix C1](#)).

The Association of British Neurologists stated key barriers included data security, governance requirements under GDPR, concerns about algorithmic transparency, “black box” decision making, clinician scepticism, need for robust validation, and diagnostic accuracy evidence. They stated that clear regulatory approval, defined clinical responsibility and updated protocols would be required, as well as training for EEG technicians and clinicals on the supervised use of the technologies.

Similarly, the Association of Neurophysiological Scientists stated that hospitals need to ensure that each new software has:

- Data Protection Impact Assessments and data protection protocols
- Ongoing support from information governance, IT infrastructure and support.
- Ongoing assessment of diagnostic accuracy (following STARD reporting guidelines).
- Clinician training to maintain AI use.

The ANS stated that a barrier to adoption may be clinician bias against AI implementation.

Young Epilepsy also highlighted that affordability for smaller services should be considered.

7.3 Training requirements

Staff training for using the technologies differs between technologies ([Appendix C1](#)):

- BioEP: 5-minute mandatory training video which shows upload of EEG and interpretation of results. The company shared a draft report output from BioEP which included a link to the instructions for use, publications, training video and contact for support.
- encephalis: short on-site sessions or remote tutorial on system operation, interpretation of automated results and the use of artefact-reduction tools.
- NeuroCenter: on-site sessions, online modules, and integrated instructional materials are available, with most users becoming proficient within 1 hour of use.
- NeuroWorks: company stated that extensive training is not required due to the marking being displayed like a note and SCORE-AI providing 4 colour coded tags. They provide tooltips and clear explanations for the meaning of these indications. No additional information was provided.
- Persyst: user training for clinicians and technologies is provided as part of implementation.

Costs associated with maintenance and ongoing support are described in [Section 6.2.4](#).

7.4 Preferences and accessibility considerations

The EAG identified no evidence of clinical preferences or accessibility considerations for staff. Clinician acceptability and experience were described in [section 5.2.1](#) of this report. General feedback from patient and professional organisations (Young Epilepsy, the Association of British Neurologists, and the Association of Neurophysiological Scientists) have been summarised in [section 3.4](#), and equality issues in [section 3.5](#) in this report.

7.5 Sustainability considerations

A carbon reduction plan was shared by Neuronostics (BioEP) and Natus Medical (NeuroWorks). Persyst confirmed that a carbon reduction plan was not available (as of 29 Jan 2026). A carbon reduction plan was not disclosed by AIT (encevis) or CSS (NeuroCenter EEG).

8. Evidence gap analysis

8.1 Ongoing studies

A total of 6 ongoing studies were identified by 2 companies, these were supplemented by 2 additional studies identified by the EAG, Table 26. The EAG note that 4 ongoing studies for BioEP are conducted in a UK setting. Ongoing studies for NeuroCenter EEG and NeuroWorks are set in the Netherlands and Norway. The generalisability of results from non-UK settings should be considered. No ongoing studies were identified for encevis (AIT) or Persyst 15 (Persyst). The EAG note that only 2 ongoing studies explicitly stated the use of the technology (BioEP, SCORE-AI) alongside clinical expert review, which is in line with the decision problem of this early use assessment.

Table 26: Ongoing studies and their relevance to the decision problem (N=8)

Ongoing study	Alignment with scope	Indicated study end date	EAG comments
BioEP (6 studies)			
The Clinical Utility of BioEP in Diagnostic Decision Making in Epilepsy (CITADEL) [NCT06097195]	Population: Full match to scope Intervention: Full match to scope Comparator: Full match to scope Setting: Full match to scope Outcomes: Full match to scope	Estimated study completion date 01 July 2027	RCT (n=559); UK (N=13 NHS sites reported by company) Status: Recruiting. <u>Population</u> : 18 years and above presenting with first suspected seizure. <u>Intervention</u> : BioEP alongside standard care. <u>Outcomes</u> : Time to working diagnosis, accuracy of BioEP score in predicting subsequent confirmation of epilepsy.

Ongoing study	Alignment with scope	Indicated study end date	EAG comments
A Study to Assess utility of BioEP as an Early Prognostic Indicator for Predicting Anti-Seizure Medication (ASM) Efficacy (ECLIPSE) [NCT063254868]	Population: Full match to scope Intervention: Partial match to scope Comparator: None Setting: Full match to scope Outcomes: Partial match to scope	Estimated study completion date June 2027 (estimated primary completion date December 2026; final data collection date for the primary outcome measure)	Observational; UK (n=158); company reported N=6 NHS sites. Status: Not yet recruiting. <u>Population</u>: 18 years and above presenting with first suspected seizure. <u>Intervention</u>: Assumed BioEP alone (not alongside clinical expert). <u>Outcomes</u>: Relationship between BioEP and seizure frequency, change in BioEP at 12 months (from baseline) and global impression of change.
OASIS: RetrOspective Analysis on EEGs for Identifying Seizure Susceptibility in paediatricS Using biomarkerS (OASIS) [NCT06546410]	Population: Partial match to scope Intervention: Partial match to scope Comparator: Full match to scope Setting: Full match to scope Outcomes: Partial match to scope	Estimated study completion date January 2026 (Company RFE stated estimated completion date of April 2026)	Retrospective case-control, UK (n=500; however, Company RFE states n=540 in intervention, and n=540 in comparator arm); company reported N=8 NHS sites. Status: not yet recruiting. <u>Population</u>: aged 2 years to up to 18 years half with confirmed diagnosis of epilepsy (focal, generalised, other) for at least 1 year, half (control group) with differential diagnosis (functional seizures). <u>Intervention</u>: Assumed BioEP alone (not alongside clinical expert). <u>Outcomes</u>: validate a set of computational biomarkers for seizure susceptibility, time to diagnosis, number of appointments to diagnosis
A Retrospective Study to Validate BioEP as an Assessment Aid for Seizure Susceptibility (SOLITAIRE) [NCT06669364]	Population: Partial match to scope Intervention: Partial match to scope Comparator: Partial match to scope Setting: Full match to scope	The company confirmed that the anticipated study end date is July 2026.	Retrospective validation study (n=400); Location not reported Status: Not yet recruiting <u>Population</u>: Age 22 and above, routine EEG in outpatient setting following suspected seizure, 3 years passed since diagnosis (remained stable). Sleep-deprived EEG excluded. <u>Intervention</u>: Assumed BioEP alone (not alongside clinical expert).

Ongoing study	Alignment with scope	Indicated study end date	EAG comments
	Outcomes: Full match to scope		<u>Outcomes:</u> Diagnostic accuracy, number of clinical appointments to diagnosis
Internal USA study	Population: Partial match to scope Intervention: Partial match to scope Comparator: Full match to scope Setting: Full match to scope Outcomes: Not reported	May 2026	Internal training and validation (n=2000); US Status: Unknown <u>Population:</u> Older than 21 years, half with confirmed diagnosis of epilepsy (focal, generalised, other) for at least 1 year, half with differential diagnosis (functional seizures). <u>Intervention:</u> Assumed BioEP alone (not alongside clinical expert).
Real-world evaluation	Population: Partial match to scope Intervention: Partial match to scope Comparator: Full match to scope Setting: Full match to scope Outcomes: Not reported	May 2026	Service Evaluation (n=156); UK (N=1 centre) Status: unknown <u>Population:</u> Older than 18 years, half with confirmed diagnosis of epilepsy (focal, generalised, other) for at least 1 year, half with differential diagnosis (functional seizures). <u>Intervention:</u> Assumed BioEP alone (not alongside clinical expert).
NeuroCenter EEG (1 study)			
EASE study	Population: Full match to scope Intervention: Partial match to scope Comparator: Partial match to scope Outcomes: Full match to scope	2026	Company reported prospective comparative study; The Netherlands (N=not reported) Status: Recruitment completed, interim analysis performed [No results shared with the EAG] <u>Intervention:</u> Assumed DeepIED alone – other name for NeuroWorks (not alongside clinical expert).
NeuroWorks: SCORE-AI (1 study)			
Improving Diagnostics and Care After First Seizure (EPI-NY) [NCT06814665]	Population: Full match to scope	Jan 2029 (primary outcome Jan 2027)	Observational, prospective (n=200); Norway Status: Recruiting

Ongoing study	Alignment with scope	Indicated study end date	EAG comments
	Intervention: Full match to scope Comparator: Full match to scope Setting: Full match to scope Outcomes: Full match to scope		<u>Population:</u> Patient with suspected epileptic seizure (no age restriction defined). <u>Intervention:</u> AI assisted EEG analysis using SCORE-AI – which is included in the current version of NeuroWorks <u>Outcomes:</u> diagnostic accuracy

Abbreviations: ASM, anti-seizure medication; EAG, External Assessment Group; EEG, electroencephalogram; RCT, randomised controlled trial; RFE, request for evidence

8.2 Evidence gaps

The EAG summarised the evidence gaps across the technologies included in this early use assessment against the outcomes listed in the Final Scope, Table 27.

Assignment of green, amber and red status was as follows:

- **Green:** Evidence available in the current version of the technology
- **Amber:** Evidence available with predecessor version of the technology, or only non-comparative evidence available, or only evidence when used fully automated (no alongside clinical expert)
- **Red:** No evidence available.

Comparative evidence aligned to the final scope required there to be interpretation or diagnosis by the clinician alongside technology, as opposed to interpretation or diagnosis by the clinician without access to the technology. Data from studies using the fully automated state of a technology is outside of the scope for most outcomes. The EAG note that none of the ongoing studies identified in Table 26 fully address the evidence gaps or scope of the decision problem. However, the ongoing CITADEL study (see Table 26) being conducted across 6 NHS sites in the UK may help address some evidence gaps associated with the BioEP technology.

Table 27: Evidence gaps based on available evidence

Outcomes	BioEP	encevis	NeuroCenter EEG	NeuroWorks	Persyst 15
Diagnostic accuracy	Diagnosis epilepsy: AMBER	IED: AMBER Seizure: AMBER	RED	RED	IED: AMBER Seizure: AMBER
Technical failure rate to analyse EEG	RED	Ambulatory/telemetry EEG: GREEN	RED	RED	Telemetry EEG: AMBER
Lifetime number of EEG	RED	RED	RED	RED	RED
No. of people with diagnosed epilepsy	RED	RED	RED	RED	RED
Clinician EEG review and report turnaround time	RED	Ambulatory EEG: AMBER	Ambulatory EEG: AMBER	RED	Routine EEG: AMBER
Impact of software result on clinical decision-making	GREEN	RED	RED	RED	RED
Clinician acceptability and experience	RED	RED	RED	RED	AMBER
Time to diagnosis and treatment	RED	RED	RED	RED	RED
Mortality	RED	RED	RED	RED	RED
Morbidity	RED	RED	RED	RED	RED
Health-related quality of life	RED	RED	RED	RED	RED
Ability to participate in the community	RED	RED	RED	RED	RED
Patient acceptability, views, experience and satisfaction	RED	RED	RED	RED	RED
Costs of technology	GREEN	GREEN	GREEN	GREEN	GREEN
Cost of training	GREEN	GREEN	GREEN	GREEN	GREEN
Cost of further testing	RED	RED	RED	RED	RED
Cost of treatment and management	RED	RED	RED	RED	RED
Health service use and cost at different settings	RED	RED	RED	RED	RED

Key: **AMBER**, some evidence available not fully aligned with the decision problem (predecessor technologies, not used alongside a clinical expert); **GREEN**, evidence available and fully aligned with the decision problem; **RED**, no evidence available
Abbreviations: EEG; electroencephalogram; IED; interictal epileptiform discharge

The EAG note some clinical evidence gaps for the technologies relating to the decision problem for this early use assessment:

Population gaps:

- There is limited evidence in a prospective population with suspected epilepsy; therefore, the performance may differ when implemented in the NHS.
- No evidence was available for the subgroups of patients with conditions that make it difficult to interpret the EEG (such as neurodevelopmental conditions, neuropsychiatric disorders, cognitive impairment, learning disabilities or medication that could influence electrical activity in the brain). The EAG would also highlight that these subgroups appear underrepresented or not reported in training sets, therefore it remains unclear on algorithm performance in these subgroups. The EAG did identify evidence that the diagnostic performance depended on the type and duration of EEG; therefore, this information should be captured in future research as it may impact results.
- Nine studies included children, but only one study was exclusively conducted in children describing a specific use case in a neonatal intensive care unit. Generalisability of results to a paediatric population with suspected epilepsy remains unclear.
- No evidence was identified for sleep-deprived EEG. The type of EEG and duration should be captured in future research.

Intervention gaps:

- For 1 technology (NeuroWorks) and the latest version of Persyst (Persyst 15) results were only available for fully automated use. This does not reflect the instructions for use nor how these technologies would be used. Future research should focus on implementing the technology as per the instructions for use, and when used alongside clinical experts.
- Differences in performance between versions of technologies and technology settings have been identified in the literature. Limited evidence was available for the latest version of Persyst (Persyst 15); only an unpublished internal

report was shared by the company. The technology version and settings should be explicitly reported in future research.

Comparator gaps:

- No comparative evidence (standard care versus standard care with technology) was identified for NeuroCenter EEG, NeuroWorks, Persyst 15.
- Comparative evidence was not available for all types of EEG (routine EEG, sleep-deprived, ambulatory, telemetry EEG).

Outcome gaps:

- Limited evidence (other than BioEP) on whether the technology supporting the clinician contributed to the final clinical diagnosis was available.
- No evidence (for any technology) was identified for the following outcomes listed in the scope: lifetime number of EEGs, number of people with diagnosed epilepsy, time to diagnosis and treatment, morbidity, mortality, health-related quality of life, ability to participate in the community, patient acceptability, cost of further testing, cost of treatment and management, health service use and cost in different settings.
- Uncertain evidence on the technologies on the total EEG review time by NHS staff (which should include the technology processing, review including review of output of the technology, report). This may vary depending on how the technologies are integrated into NHS, IT and EEG acquisition systems. Future evidence should consider total staff time associated with EEG review and report with and without the technologies.

Other considerations:

- Setting: There was limited UK evidence (4 studies; 1 of which was a pre-print and had not yet undergone peer-review). UK evidence was only identified for BioEP and Persyst 14 (predecessor version of Persyst 15); the remaining technologies (including the latest version Persyst 15) have no UK evidence. The clinical experts highlighted that the training of EEG reviewers (clinical

physiologists in the NHS) in the UK is more extensive than some other countries. Therefore, the effect of the technologies reported in other countries may not be realised in the NHS if these technologies were implemented.

- Type of EEG: The volume of each type of EEG in patients with suspected epilepsy is unknown, therefore the throughput of each technology when implemented in the NHS is unknown (noting that this will impact costs).

8.3 Key areas for evidence generation

The EAG have considered priorities for future evidence generation (based on clinical evidence gaps, clinical expert input and key drivers of the early economic model) and have suggested research questions and study designs for the technologies in scope of this assessment. Additional subgroups could be explored further through retrospective curated clinical datasets, data linkage of clinical registries (such as the European EpiREG registry of rare and complex epilepsies), and routinely collected health data to monitor outcomes longitudinally. Additional outcomes such as detection latency (the time between expert-marked seizure onset and the time at which enough seizure was identified by the algorithm to generate a detection notification) were reported in some studies. The EAG note that this outcome may be clinically important when used in continuous EEG monitoring (such as intensive care units). However, due to the false positive rates when used fully automated, it is unclear how useful this use case would be if implemented in the NHS, and whether this could potentially increase staff time associated with review. This could be explored in future studies if considered relevant.

Table 28. All future research should use the technologies alongside clinical expert review (as per their intended use). Due to EEGs being used for other indications (for example diagnosis and monitoring of brain injury and sleep disorders), all future research should report clearly the population in which it was used (suspected epilepsy, or diagnosed epilepsy in cases where an EEG is evaluating the type of epilepsy, remission or response to medication), and results subgrouped by type of EEG. Due to identified differences in performance across different versions and settings of the technology, types of seizure, seizure durations, seizure onset locations, and patient age groups, these should also be captured in future research. Recommendations include further studies to investigate the claimed value propositions by the companies (reduced waiting times, increased diagnostic accuracy, reduced EEG review and reporting time). To better understand how many patients could benefit from these technologies (which would impact the additional cost incurred per patient, which was highlighted as a key driver in the economic model), the EAG has also outlined further studies to better understand the patient pathway to determine the number of each type of EEG conducted in the NHS and the number of subsequent EEGs required (after a first negative or inconclusive EEG). For the key drivers of the economic model, staff time was considered in recommendation number 5, and patient throughput in recommendation 1.

Additional subgroups could be explored further through retrospective curated clinical datasets, data linkage of clinical registries (such as the European [EpiREG registry](#) of rare and complex epilepsies), and routinely collected health data to monitor outcomes longitudinally. Additional outcomes such as detection latency (the time between expert-marked seizure onset and the time at which enough seizure was identified by the algorithm to generate a detection notification) were reported in some studies. The EAG note that this outcome may be clinically important when used in continuous EEG monitoring (such as intensive care units). However, due to the false positive rates when used fully automated, it is unclear how useful this use case would be if implemented in the NHS, and whether this could potentially increase staff time associated with review. This could be explored in future studies if considered relevant.

Table 28: Evidence generation recommendations

#	Value proposition associated with the technologies	Research question	Technologies	Recommended study design	Outcomes	Rationale for question/design
1.	Understanding the patient pathway in the NHS currently	a) What proportion of patients with suspected epilepsy are referred for EEG? b) What proportion of patients require further EEG testing? c) Pattern of care and hospital resource usage of those diagnosed with epilepsy with and without EEG or the technologies?	Standard care	Audit; potentially in collaboration with BSCN (could repeat to show trends over time which may be influenced by the introduction of the technologies) If prospective data collection is also used then further data on use of services and utilities could be collected	a) Primary EEG activity (total and by type) b) Secondary EEG activity (total and by type) c) Hospital resource usage, primary care costs etc, further testing, treatment and management costs; health state utilities	<u>Question:</u> a) It is unclear how many patients would benefit from the technologies as diagnosis and treatment of epilepsy can be made without EEG. Due to licence costs being spread across the patient volume, this would impact on the additional cost incurred per patient. Additionally b) It is unclear whether the output of the EEG could support clinical diagnosis such that subsequent EEGs are avoided (which may also reduce waiting times by freeing up capacity). c) Due to the high volume of A&E attendance highlighted in the audits in patients with a diagnosis of epilepsy, it is unclear whether having an EEG and receiving an earlier diagnosis of epilepsy may reduce NHS resource costs. <u>Design:</u> Pragmatic approach, national reach of the BSCN would account for variation across the NHS.
2.	Understanding the patient pathway in the NHS when the technologies are used	How do the technologies when used with clinical experts perform when used in the NHS?	All technologies (when used with clinical experts)	Prospective cohort (this could be relative comparison between technologies in scope which could inform relative effectiveness in future economic modelling)	Processing time, failure rate, inconclusive results (BioEP) by EEG type, clinician and patient acceptability, use of services and utilities	<u>Design:</u> Need to consider implementation outcomes when these technologies are in wider use in the NHS (requiring larger sample size than typical of diagnostic accuracy studies) as these may impact costs (and outcomes).
3.	Reduced waiting times, reduced time to diagnosis, reduced time to treatment	What is the impact of the technologies on EEG patient pathway timings (including wait time for EEG, time to diagnosis, time to treatment)?	All technologies (when used with clinical experts)	Before-and-after (audit; potentially in collaboration with BSCN, or added to reporting of diagnostic waiting times and activity reporting to NHSE)	Timings (waiting time, time to diagnosis, time to treatment) by EEG type, clinician and patient acceptability	<u>Question:</u> Claimed benefit of companies (see section 6.2 for discussion on clinical expert opinion on plausibility of this proposition) <u>Design:</u> Pragmatic approach, national reach of the BSCN would account for variation across the NHS across a broad set of EEGs used in the NHS in patients with suspected epilepsy.
4.	Improved diagnostic accuracy	What is the current sensitivity and specificity for detecting IED and seizures (4 technologies) and diagnosing epilepsy (1 technology) in a population of patients with suspected epilepsy in standard care and when standard care is supported by the technologies?	All technologies (when used with clinical experts)	Prospective diagnostic accuracy of clinicians with and without the technologies (parallel group) against a panel reference standard using a retrospective clinical case dataset (known diagnosis)	Diagnostic accuracy (including false positive rate) by EEG type and by subgroup Longer term follow-up could capture impact on care; use of services and utilities	<u>Question:</u> Claimed benefit of companies (see section 6.2 for discussion on clinical expert opinion on plausibility of this proposition) <u>Design:</u> Retrospective dataset can be used if there is a known diagnosis recorded, prospective parallel review by clinicians with and without technologies will enable capture of timings (non-parallel designs may introduce bias).
5.	Reduced staff time associated with EEG review and reporting	What is the impact of the technologies on EEG review and report time (separated by EEG type) for patients with suspected epilepsy? Did the EEG contribute to the epilepsy diagnosis and any impact on care over time?	All technologies (when used with clinical experts)	Could incorporate within parallel group diagnostic accuracy study described above.	Staff time and cost of different roles involved, clinician and patient acceptability and ease of use by EEG type, and other data required to populate the potential long-term model e.g. utilities	<u>Question:</u> Claimed benefit of companies (see section 6.2 for discussion on clinical expert opinion on plausibility of this proposition) <u>Design:</u> A formal parallel group study may be required if impact on subsequent epilepsy outcomes is needed,

Abbreviations: BSCN, British Society for Clinical Neurophysiology; EEG, electroencephalogram; IED, interictal epileptiform discharge; NHSE, NHS England;

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10. Appendices

Appendix A – Literature searching

Appendix A1: Search strategies

Clinical effectiveness searches

A summary of the databases searched for clinical effectiveness evidence and the search strategies used in each database are presented below. All searches were performed on 3rd February 2026.

Table: Summary of the clinical effectiveness searches performed

Database	Number of records retrieved
Embase	166
MEDLINE	60
CDSR	1
CENTRAL	7
INAHTA	0
Clinicaltrials.gov	14
WHO ICTRP	2
Subtotal – before removal of duplicates	250
Total records to screen after removal of duplicates	189 (17 trials, 172 non-trials)

The searches were built around product names (with limited additional topic requirements) and company names (with more stringent topic requirements) For example, for the Embase search, given below - the individual terms are searched separately in lines 5 to 22 (to show the numbers coming from each term). Most terms are 'and 1' (i.e. line 1) - very basic requirements to have some connection to EEG and epilepsy (EEG requiring a title or abstract mention or major subject heading, epilepsy - same, but also accepting an author keyword), however, the more general company terms also require lines 3 and 4 - stronger requirements to be about epilepsy specifically and some indication of relevance to software or AI. Stronger requirements including multiple mentions in the abstract and mentions in multiple fields or mention in a very 'strong' field like the title. Without this, because the basic requirements are relatively light, the quantity of irrelevant material (relating to, e.g. various research/products from AIT, etc) would be much higher.

Embase (on Ovid)

Line 29 represents the complete results – the subsequent lines are just splitting that according to criteria used in tagging and preparing the results for sifting. Line 32 are conference abstracts with a named product, line 33 are articles with a named product, line 31 are articles not mentioning a product but referring to a company (often in author institution) and fulfilling additional topic requirements making relevance at least moderately likely.

Embase <1974 to 2026 February 02>

1	((electroencephalogr* or eeg*).ti,ab. or exp *electroencephalogram/ or exp *electroencephalography/) and ((seizure* or epilep*).ti,ab,kf. or exp *seizure/ or exp *epilepsy/ or *epileptic patient/)	77099
2	(exp seizure/ or exp epilepsy/ or epileptic patient/ or (seizure* or epilep*).kf.) and (seizure* or epilep*).ab. /freq=2	209736
3	2 or (seizure* or epilep*).ti. or exp *seizure/ or exp *epilepsy/ or *epileptic patient/ or (seizure* or epilep*).ab. /freq=3	293165
4	(algorithm* or AI or artificial intelligen* or machine learning or large language or deep learning or automat* or software).ti,kf. or computer assisted diagnosis/ or artificial intelligence-assisted diagnosis/ or exp decision support system/ or exp *biomedical software/ or *software/ or *software validation/ or exp *machine learning/ or *computer model/ or exp *computer prediction/ or *data integration/ or *data visualization/ or exp *algorithm/ or exp *artificial intelligence/ or ((interpret* or decision*) adj3 (automat* or guided or support*)).mp.	901084
5	(BioEP or BioEP* or BioEPtm).mp. and 1	6
6	Neuronostics*.af. and 1 and 4 and 3	5
7	Encevis*.mp. and 1	18
8	episcan*.mp. and 1	18
9	deepspike*.mp. and 1	1
10	neurotrend*.mp. and 1	10
11	pureeeg*.mp. and 1	4
12	(Austrian Institute of Technology or ait).af. and 1 and 4 and 3	35
13	(neurocenter* or neurocentre*).mp. and 1	4
14	(DeepCRI or DeepCRIr or DeepCRI* or DeepIED*).mp. and 1	1
15	clinical science systems*.af. and 1 and 4 and 3	0
16	autoSCORE*.mp. and 1	0
17	(score-ai or score-air or score-aitm or scoreai*).mp. and 1	6
18	neuroworks*.mp. and 1	29
19	Natus*.af. and 1 and 4 and 3	32
20	(Persyst15* or Persyst14* or Persyst13* or Persyst* 15* or Persyst* 14* or Persyst* 13* or (Persyst* adj3 (P13 or P14 or P15 or "13" or "14" or "15"))).mp. and 1	37
21	Persyst* neonatal*.mp. and 1	3
22	Persyst*.af. and 1 and 4 and 3	46
23	5 or 7 or 8 or 9 or 10 or 11 or 13 or 14 or 16 or 17 or 18 or 20 or 21	130
24	6 or 12 or 15 or 19 or 22	110
25	limit 24 to conference abstract status	30
26	24 not 25	80
27	23 or 26	179
28	limit 27 to yr="2009 -Current"	176
29	28 not "clinicaltrials.gov".so.	166
30	29 and 23 [named product]	119
31	29 not 30 [NOT named product but named company plus more topic restrictions]	47
32	limit 30 to conference abstract status [named products - conf abs]	43
33	30 not 32 [named products - articles]	76

<https://ovidsp.ovid.com/ovidweb.cgi?T=JS&NEWS=N&PAGE=main&SHAREDSEARCHID=6apa8AOHLJWp7nVvXELYOaaN05Xp2k471HK5vjVQ4xHfZ0JOczdXGtYPg6YqTj8Xd>

Medline (on Ovid)

Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions <1946 to February 02, 2026>

1	((electroencephalogr* or eeg*).ti,ab. or exp *Electroencephalography/) and ((seizure* or epilep*).ti,ab,kf. or exp *Seizures/ or exp *Epilepsy/)	46438
2	(exp Seizures/ or exp Epilepsy/ or (seizure* or epilep*).kf.) and (seizure* or epilep*).ab. /freq=2	118292
3	2 or (seizure* or epilep*).ti. or exp *Seizures/ or exp *Epilepsy/ or (seizure* or epilep*).ab. /freq=3	197462
4	(algorithm* or AI or artificial intelligen* or machine learning or large language or deep learning or automat* or software).ti. or diagnosis, computer-assisted/ or image interpretation, computer-assisted/ or Decision Support Systems, Clinical/ or *software/ or *software validation/ or exp *algorithms/ or *data visualization/ or ((interpret* or decision*) adj3 (automat* or guided or support*)).mp.	646087
5	(BioEP or BioEP* or BioEPTm).mp. and 1	0
6	Neuronostics*.af. and 1 and 4 and 3	2
7	Encevis*.mp. and 1	9
8	episcan*.mp. and 1	7
9	deepspike*.mp. and 1	0
10	neurotrend*.mp. and 1	3
11	pureeeg*.mp. and 1	1
12	(Austrian Institute of Technology or ait).af. and 1 and 4 and 3	18
13	(neurocenter* or neurocentre*).mp. and 1	2
14	(DeepCRI or DeepCRIr or DeepCRI* or DeepIED*).mp. and 1	1
15	clinical science systems*.af. and 1 and 4 and 3	4
16	autoSCORE*.mp. and 1	0
17	(score-ai or score-air or score-aitm or scoreai*).mp. and 1	3
18	neuroworks*.mp. and 1	0
19	Natus*.af. and 1 and 4 and 3	2
20	(Persyst15* or Persyst14* or Persyst13* or Persyst* 15* or Persyst* 14* or Persyst* 13* or (Persyst* adj3 (P13 or P14 or P15 or "13" or "14" or "15"))).mp. and 1	12
21	Persyst* neonatal*.mp. and 1	2
22	Persyst*.af. and 1 and 4 and 3	27
23	5 or 7 or 8 or 9 or 10 or 11 or 13 or 14 or 16 or 17 or 18 or 20 or 21	36
24	6 or 12 or 15 or 19 or 22	48
25	23 or 24	63
26	limit 25 to yr="2009 -Current"	60
27	26 and 23 [named products]	36
28	26 not 27 [NOT named product but named company plus more topic restrictions]	24

<https://ovidsp.ovid.com/ovidweb.cgi?T=JS&NEWS=N&PAGE=main&SHAREDSEARCHID=51j5dx76TLG7hDSYOD44dKr5wY9UIPaeNPZmXxn3fsZEREkLHD0TPUsgiqft2GAxA>

Cochrane Library (on Wiley)(databases: CDSR, CENTRAL)

(BioEP OR BioEPr OR BioEPtm OR Encevis* OR Episcan* OR deepspike* OR neurotrend* OR pureeeg* OR neurocentre* OR neurocenter* OR DeepCRI OR DeepCRIr OR DeepCRIitm OR DeepIED* OR autoSCORE* OR score-ai OR score-air OR score-aitm OR scoreai* OR neuroworks* OR persyst* OR Neuronostics OR "Austrian Institute of Technology" OR "clinical science systems" OR natus*) AND (eeg OR electroencephalography OR electroencephalograph OR electroencephalogram) AND (epilep* OR seiz*)
in All Text

8 Results – 1 CDSR, 7 CENTRAL

INAHTA (available at: <https://database.inahta.org/>)

(BioEP OR BioEPr OR BioEPtm OR Encevis OR Encevisr OR Encevistm OR Episcan OR Episcanr OR Episcantm OR deepspike OR deepspiker OR deepspiketm OR neurotrend OR neurotrendr OR neurotrendtm OR pureeeg OR pureegr OR pureeegtm OR neurocentre OR neurocentrer OR neurocentretm OR neurocenter OR neurocenterr OR neurocentertm OR DeepCRI OR DeepCRIr OR DeepCRIitm OR DeepIED OR DeepIEDr OR DeepIEDtm OR autoSCORE OR autoSCOREr OR autoSCOREtm OR "score-ai" OR "score-air" OR "score-aitm" OR scoreai OR scoreair OR scoreaitm OR neuroworks OR neuroworks OR neuroworkstm OR persyst OR persystr OR persysttm OR Neuronostics OR neuronosticsr OR neuronosticstm OR "Austrian Institute of Technology" OR "Austrian Institute of Technologyr" OR "Austrian Institute of Technologytm" OR "clinical science systems" OR "clinical science systemsr" OR "clinical science systemstm" OR natus OR natusr OR natustm)) AND (eeg OR electroencephalography OR electroencephalograph OR electroencephalogram)

in All Fields

<https://database.inahta.org/search?limit=&terms=%28BioEP+OR+BioEPr+OR+BioEPtm+OR+Encevis+OR+Encevisr+OR+Encevistm+OR+Episcan+OR+Episcanr+OR+Episcantm+OR+deepspike+OR+deepspiker+OR+deepspiketm+OR+neurotrend+OR+neurotrendr+OR+neurotrendtm+OR+pureeeg+OR+pureegr+OR+pureeegtm+OR+neurocentre+OR+neurocentrer+OR+neurocentretm+OR+neurocenter+OR+neurocenterr+OR+neurocentertm+OR+DeepCRI+OR+DeepCRIr+OR+DeepCRIitm+OR+DeepIED+OR+DeepIEDr+OR+DeepIEDtm+OR+autoSCORE+OR+autoSCOREr+OR+autoSCOREtm+OR+%22score-ai%22+OR+%22score-air%22+OR+%22score-aitm%22+OR+scoreai+OR+scoreair+OR+scoreaitm+OR+neuroworks+OR+neuroworks+OR+neuroworkstm+OR+persyst+OR+persystr+OR+persysttm+OR+Neuronostics+OR+neuronosticsr+OR+neuronosticstm+OR+%22Austrian+Institute+of+Technology%22+OR+%22Austrian+Institute+of+Technologyr%22+OR+%22Austrian+Institute+of+Technologytm%22+OR+%22clinical+science+systems%22+OR+%22clinical+science+systems+OR+%22clinical+science+systemstm%22+OR+natus+OR+natusr+OR+natustm%29+%29+AND+%28eeg+OR+electroencephalography+OR+electroencephalograph+OR+electroencephalogram%29&client=user>

0 results

ClinicalTrials.gov (at <https://clinicaltrials.gov/>)

(BioEP OR BioEPr OR BioEPtm OR Encevis OR Encevisr OR Encevistm OR Episcan OR Episcanr OR Episcantm OR deepspike OR deepspiker OR deepspiketm OR neurotrend OR neurotrendr OR neurotrendtm OR pureeeg OR pureegr OR pureeegtm OR neurocentre OR neurocentrer OR neurocentretm OR neurocenter OR neurocenterr OR neurocentertm OR DeepCRI OR DeepCRIr OR DeepCRIitm OR DeepLED OR DeepLEDr OR DeepLEDtm OR autoSCORE OR autoSCOREr OR autoSCOREtm OR "score-ai" OR "score-air" OR "score-aitm" OR scoreai OR scoreair OR scoreaitm OR neuroworks OR neuroworks OR neuroworkstm OR persyst OR persysr OR persysttm OR Neuronostics OR neuronosticsr OR neuronosticstm OR "Austrian Institute of Technology" OR "Austrian Institute of Technologyr" OR "Austrian Institute of Technologytm" OR "clinical science systems" OR "clinical science systemsr" OR "clinical science systemstm" OR natus OR natusr OR natustm) AND (eeg OR electroencephalography OR electroencephalograph OR electroencephalogram) AND (epilepsy OR epileptic OR seizure OR seizures)

in Other Terms

[https://clinicaltrials.gov/search?term=\(BioEP%20OR%20BioEPr%20OR%20BioEPtm%20OR%20Encevis%20OR%20Encevisr%20OR%20Encevistm%20OR%20Episcan%20OR%20Episcanr%20OR%20Episcantm%20OR%20deepspike%20OR%20deepspiker%20OR%20deepspiketm%20OR%20neurotrend%20OR%20neurotrendr%20OR%20neurotrendtm%20OR%20pureeeg%20OR%20pureegr%20OR%20pureeegtm%20OR%20neurocentre%20OR%20neurocentrer%20OR%20neurocentretm%20OR%20neurocenter%20OR%20neurocenterr%20OR%20neurocentertm%20OR%20DeepCRI%20OR%20DeepCRIr%20OR%20DeepCRIitm%20OR%20DeepLED%20OR%20DeepLEDr%20OR%20DeepLEDtm%20OR%20autoSCORE%20OR%20autoSCOREr%20OR%20autoSCOREtm%20OR%20%22score-ai%22%20OR%20%22score-air%22%20OR%20%22score-aitm%22%20OR%20scoreai%20OR%20scoreair%20OR%20scoreaitm%20OR%20neuroworks%20OR%20neuroworks%20OR%20neuroworkstm%20OR%20persyst%20OR%20persysr%20OR%20persysttm%20OR%20Neuronostics%20OR%20neuronosticsr%20OR%20neuronosticstm%20OR%20%22Austrian%20Institute%20of%20Technology%22%20OR%20%22Austrian%20Institute%20of%20Technologyr%22%20OR%20%22Austrian%20Institute%20of%20Technologytm%22%20OR%20%22clinical%20science%20systems%22%20OR%20%22clinical%20science%20systems%22%20OR%20%22clinical%20science%20systemstm%22%20OR%20natus%20OR%20natusr%20OR%20natustm\)%20AND%20\(eeg%20OR%20electroencephalography%20OR%20electroencephalograph%20OR%20electroencephalogram\)%20AND%20\(epilepsy%20OR%20epileptic%20OR%20seizure%20OR%20seizures\)](https://clinicaltrials.gov/search?term=(BioEP%20OR%20BioEPr%20OR%20BioEPtm%20OR%20Encevis%20OR%20Encevisr%20OR%20Encevistm%20OR%20Episcan%20OR%20Episcanr%20OR%20Episcantm%20OR%20deepspike%20OR%20deepspiker%20OR%20deepspiketm%20OR%20neurotrend%20OR%20neurotrendr%20OR%20neurotrendtm%20OR%20pureeeg%20OR%20pureegr%20OR%20pureeegtm%20OR%20neurocentre%20OR%20neurocentrer%20OR%20neurocentretm%20OR%20neurocenter%20OR%20neurocenterr%20OR%20neurocentertm%20OR%20DeepCRI%20OR%20DeepCRIr%20OR%20DeepCRIitm%20OR%20DeepLED%20OR%20DeepLEDr%20OR%20DeepLEDtm%20OR%20autoSCORE%20OR%20autoSCOREr%20OR%20autoSCOREtm%20OR%20%22score-ai%22%20OR%20%22score-air%22%20OR%20%22score-aitm%22%20OR%20scoreai%20OR%20scoreair%20OR%20scoreaitm%20OR%20neuroworks%20OR%20neuroworks%20OR%20neuroworkstm%20OR%20persyst%20OR%20persysr%20OR%20persysttm%20OR%20Neuronostics%20OR%20neuronosticsr%20OR%20neuronosticstm%20OR%20%22Austrian%20Institute%20of%20Technology%22%20OR%20%22Austrian%20Institute%20of%20Technologyr%22%20OR%20%22Austrian%20Institute%20of%20Technologytm%22%20OR%20%22clinical%20science%20systems%22%20OR%20%22clinical%20science%20systems%22%20OR%20%22clinical%20science%20systemstm%22%20OR%20natus%20OR%20natusr%20OR%20natustm)%20AND%20(eeg%20OR%20electroencephalography%20OR%20electroencephalograph%20OR%20electroencephalogram)%20AND%20(epilepsy%20OR%20epileptic%20OR%20seizure%20OR%20seizures))

14 results

WHO ICTRP (at <https://trialsearch.who.int/>)

(BioEP OR BioEPr OR BioEPtm OR Encevis* OR Episcan* OR deepspike* OR neurotrend* OR pureeeg* OR neurocentre* OR neurocenter* OR DeepCRI OR DeepCRIr OR DeepCRIitm OR DeepLED* OR autoSCORE* OR score-ai OR score-air OR score-aitm OR scoreai* OR neuroworks* OR persyst* OR Neuronostics OR "Austrian Institute of Technology*" OR "clinical science systems*" OR natus*) AND (eeg OR electroencephalography OR electroencephalograph OR electroencephalogram) AND (epilep* OR seiz*)

in Basic search

3 results, 2 non-NCT

All clinical search: 250 results (Embase 166, Medline 60, CDSR 1, CENTRAL 7, INAHTA 0, Clinicaltrials.gov 14, ICTRP 2). After deduplication: 189 results (17 trials, 172 non-trials).

Economic searches

A summary of the databases searched for economic evidence and models and the search strategies used in each database are presented below. All searches were performed on 27th January 2026

Table: Summary of the searches for economic evidence

Database	Number of records retrieved
Embase	236
MEDLINE	169
IDEAS/REPEC	17
PEDE	10
CEA Registry	1
Number of records to screen	
Total – before duplicates removed	433
Total after duplicates removed	282 (90 Embase/Medline possibly UK results, 192 other results)

Embase (on Ovid)

Embase <1974 to 2026 January 23>

1	(electroencephalogr* or eeg*).ti,ab. or exp *electroencephalogram/ or exp *electroencephalography/	227236
2	(exp seizure/ or exp epilepsy/ or epileptic patient/ or (seizure* or epilep*).kf.) and (seizure* or epilep*).ab. /freq=2	209321
3	2 or (seizure* or epilep*).ti. or exp *seizure/ or exp *epilepsy/ or *epileptic patient/ or (seizure* or epilep*).ab. /freq=3	292701
4	3 and 1	67882
5	epilep*.ti. and (exp *seizure/ or exp *epilepsy/ or *epileptic patient/)	133363
6	(algorithm* or AI or artificial intelligen* or machine learning or large language or deep learning or automat* or software).ti. or computer assisted diagnosis/ or artificial intelligence-assisted diagnosis/ or exp decision support system/ or exp *biomedical software/ or *software/ or *software validation/ or exp *machine learning/ or *computer model/ or exp *computer prediction/ or *data integration/ or *data visualization/ or exp *algorithm/ or exp *artificial intelligence/ or ((interpret* or decision*) adj3 (automat* or guided or support*)).mp.	836862

7	(((*diagnosis/ or *clinical decision making/ or *diagnostic accuracy/ or *diagnostic test/ or *diagnostic test accuracy study/ or *differential diagnosis/ or *early diagnosis/) and (diagn* or detect* or pathway*).ab.) or (diagn* or detect* or refer* or pathway*).ti. or (diagn* or detect* or pathway*).ab. /freq=4	2814437
8	((gb or "g.b." or britain* or (british* not "british columbia") or uk or "u.k." or united kingdom* or (england* not "new england") or northern ireland* or northern irish* or scotland* or scottish* or ((wales or "south wales") not "new south wales") or welsh*).ti,ab,jx,in,ad. or nhs*.ti,ab,in,ad. or exp United Kingdom/) not ((exp "arctic and antarctic"/ or exp oceanic regions/ or exp western hemisphere/ or exp africa/ or exp asia/ or exp "australia and new zealand"/) not (exp united kingdom/ or europe/))	4073107
9	(economic* or cost*).ti. and economic*.ab. and (economic* or cost* or model*).ab. /freq=4	66770
10	9 or ((economic* or cost*) and (analy* or evaluat* or model* or effective* or benefit* or utility or direct or indirect or illness)).ti. or ((direct or indirect) adj3 utilit*).ti.	155996
11	*health economics/ or *device economics/ or exp *economic evaluation/ or *economic aspect/ or exp economic model/ or *healthcare cost/ or *"numbers needed to treat"/	178909
12	(*Economics/ or *Cost/ or *Budget/ or *disease burden/ or health economics/ or device economics/ or exp economic evaluation/) and (economic* or cost*).ab. /freq=2	193007
13	12 or ((economic* or cost*) adj3 (analy* or evaluat* or model* or effective* or benefit* or utilit* or direct or indirect or illness)).ab. /freq=2 or (economic* or cost*).ti.	403740
14	(4 or 5) and ((10 and 11) or ((10 or 11 or 13) and (6 or 7 or 8)))	561
15	3 and 8 and (6 or 7) and (10 or 11 or 13)	25
16	14 or 15	569
17	limit 16 to (english language and "remove clinical trial (clinicaltrials.gov) records" and yr="2015 -Current")	331
18	limit 17 to conference abstract status	95
19	17 not 18 [full results set]	236
20	8 and 19 [likely-UK-relevant results]	78
21	19 not 20 [non-UK results]	158

<https://ovidsp.ovid.com/ovidweb.cgi?T=JS&NEWS=N&PAGE=main&SHAREDSEARCHID=5GgK45ppWL76s1539ENxi3md1ORvNw19hyGD05NZayJAS02KInHpq833eYJ5EOq50>

MEDLINE (on Ovid)

Ovid MEDLINE(R) and Epub Ahead of Print, In-Process, In-Data-Review & Other Non-Indexed Citations, Daily and Versions <1946 to January 26, 2026>

1	(electroencephalogr* or eeg*).ti,ab. or exp *Electroencephalography/	164060
2	(exp Seizures/ or exp Epilepsy/ or (seizure* or epilep*).kf.) and (seizure* or epilep*).ab. /freq=2	118165
3	2 or (seizure* or epilep*).ti. or exp *Seizures/ or exp *Epilepsy/ or (seizure* or epilep*).ab. /freq=3	197285
4	3 and 1	40772
5	epilep*.ti. and (exp *Seizures/ or exp *Epilepsy/)	89450
6	(algorithm* or AI or artificial intelligen* or machine learning or large language or deep learning or automat* or software).ti. or diagnosis, computer-assisted/ or image interpretation, computer-assisted/ or Decision Support	644121

External assessment report: Software for EEG supporting epilepsy diagnosis
Date: April 2026

	Systems, Clinical/ or *software/ or *software validation/ or exp *algorithms/ or *data visualization/ or ((interpret* or decision*) adj3 (automat* or guided or support*)).mp.	
7	(((*diagnosis/ or exp *clinical decision-making/ or *diagnosis, differential/ or *early diagnosis/) and (diagn* or detect* or pathway*).ab.) or (diagn* or detect* or refer* or pathway*).ti. or (diagn* or detect* or pathway*).ab. /freq=4	2161088
8	((gb or "g.b." or britain* or (british* not "british columbia") or uk or "u.k." or united kingdom* or (england* not "new england") or northern ireland* or northern irish* or scotland* or scottish* or ((wales or "south wales") not "new south wales") or welsh* or nhs*).ti,ab,jw,in. or exp United Kingdom/) not ((exp africa/ or exp americas/ or exp antarctic regions/ or exp arctic regions/ or exp asia/ or exp australia/ or exp oceania/) not (exp united kingdom/ or europe/))	2814827
9	(economic* or cost*).ti. and economic*.ab. and (economic* or cost* or model*).ab. /freq=4	45497
10	9 or ((economic* or cost*) and (analy* or evaluat* or model* or effective* or benefit* or utility or direct or indirect or illness)).ti. or ((direct or indirect) adj3 utilit*).ti.	107662
11	exp *"costs and cost analysis"/ or *economics, hospital/ or *economics, medical/ or exp models, economic/ or *Numbers Needed To Treat/	112489
12	(*Economics/ or *Budgets/ or exp "costs and cost analysis"/ or economics, hospital/ or economics, medical/) and (economic* or cost*).ab. /freq=2	118645
13	12 or ((economic* or cost*) adj3 (analy* or evaluat* or model* or effective* or benefit* or utilit* or direct or indirect or illness)).ab. /freq=2 or (economic* or cost*).ti.	292644
14	(4 or 5) and ((10 and 11) or ((10 or 11 or 13) and (6 or 7 or 8)))	319
15	3 and 8 and (6 or 7) and (10 or 11 or 13)	23
16	14 or 15	326
17	limit 16 to (english language and yr="2015 -Current")	169
18	8 and 17 [likely-UK-relevant results]	74
19	17 not 18 [non-UK results]	95

<https://ovidsp.ovid.com/ovidweb.cgi?T=JS&NEWS=N&PAGE=main&SHAREDSEARCHID=6zNYwKhcgjIB6M1tgYPz38hE213nBELHZbCpXXWj9S22gPGgPi6V1Vm53QY4x3voV>

IDEAS/RePEc (at <https://ideas.repec.org/>)

(diagnosing|diagnosis|diagnostic|diagnose)+(eeg|electroencephalograph|electroencephalography|electroencephalogram|electroencephalograms)+(algorithm|algorithms|AI|"artificial intelligence"|"machine learning"|"large language"|"natural language"|"deep learning"|"rule based"|"rules based"|"decision support"|"decision aid"|software|guided)+(epilepsy|epileptic)

In abstract, 2015 onwards

17 results

PEDE (at <http://pede.ccb.sickkids.ca/pede/index.jsp>) (currently only available up to and including 2023)

diagnosing|diagnosis|diagnostic|diagnose AND epilepsy|epileptic

in Title/Abstract/Keyword fields

2015 onwards

10 results

CEA Registry (at Tufts, <https://cevr.tuftsmedicalcenter.org/databases/cea-registry>)

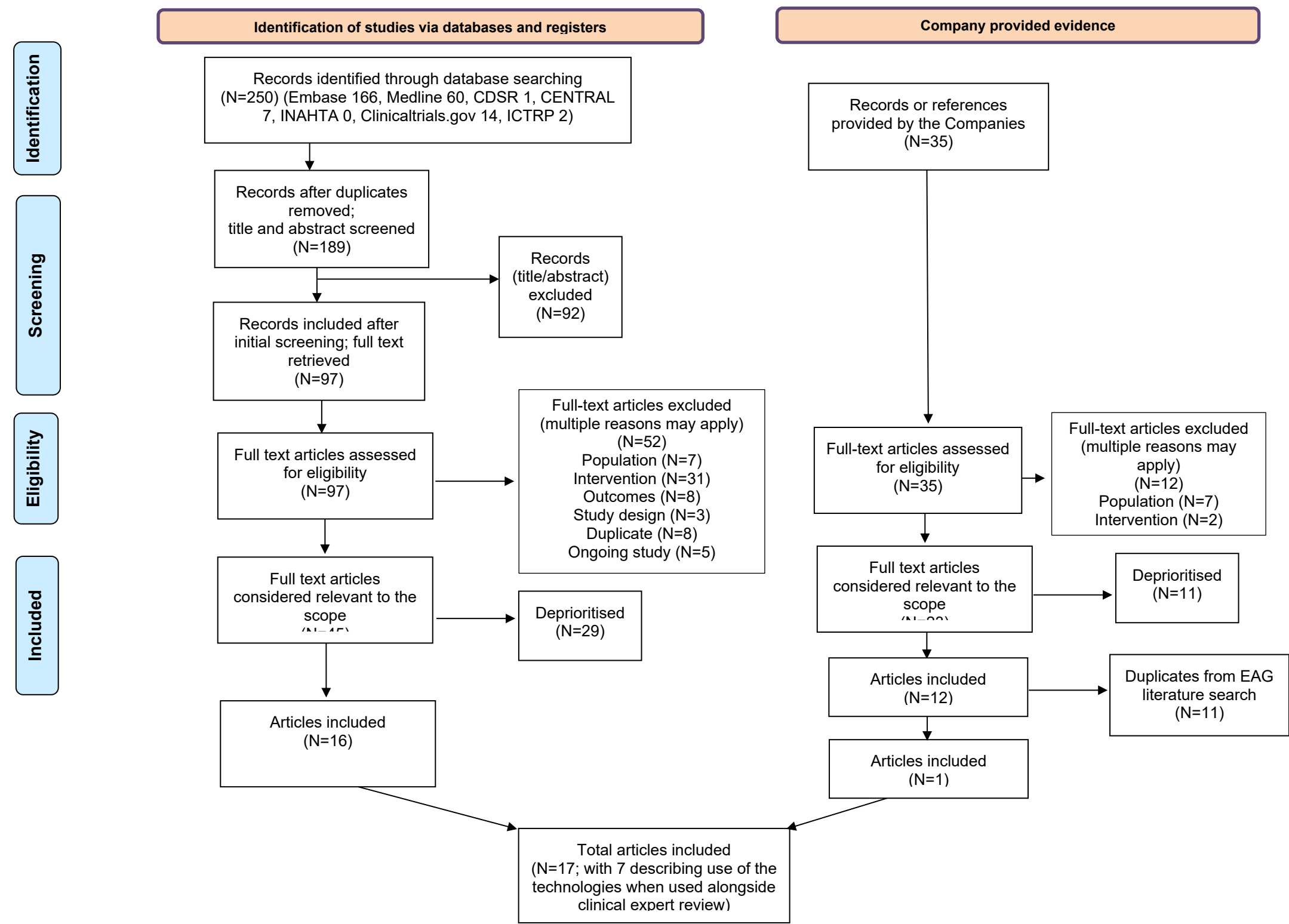
(search functions not working correctly, so only basic search available – with 'AND' assumed and 2015 onwards limit)

epilepsy eeg – 1 result; epilepsy diagnosis – 0 results

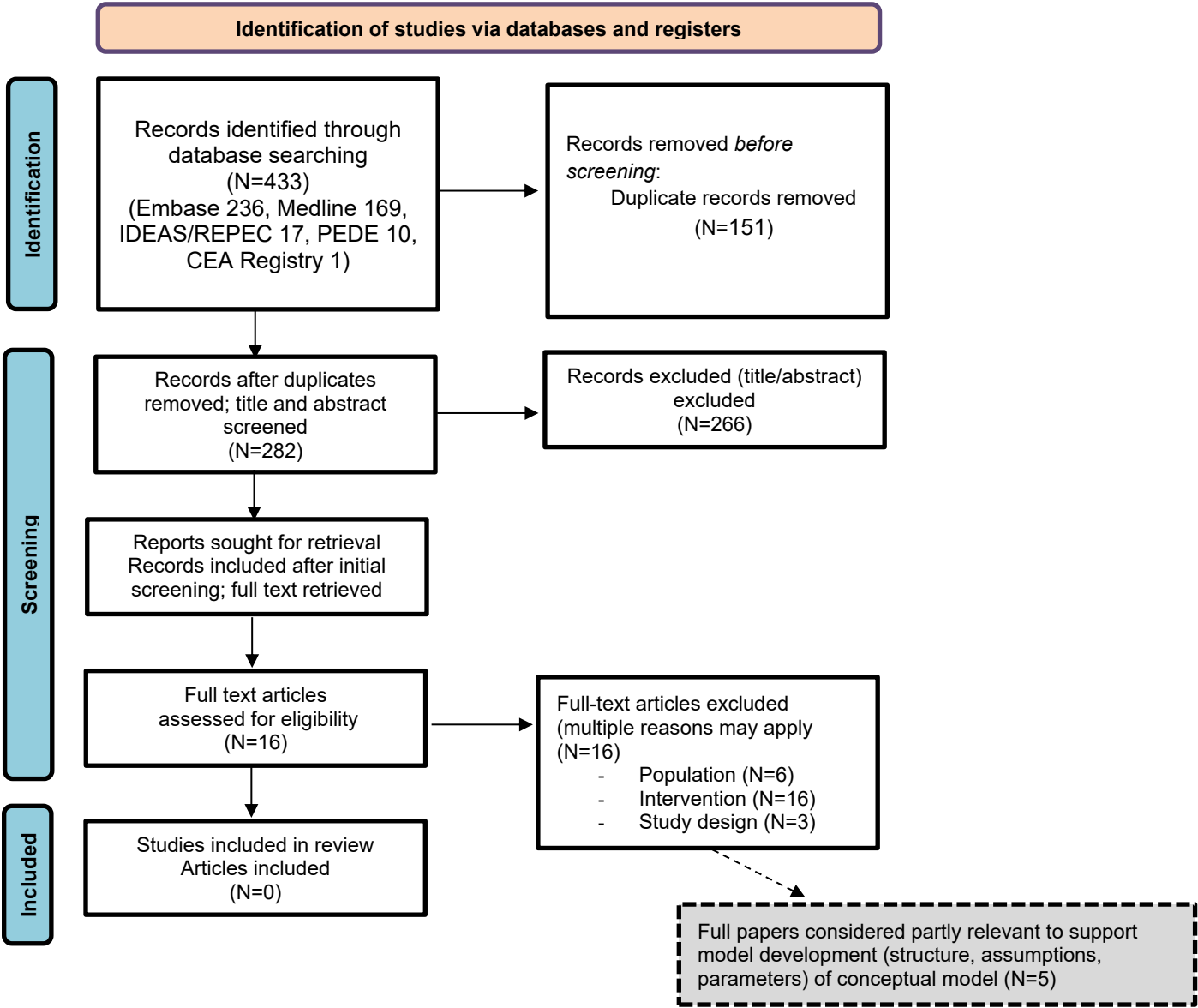
1 result overall

All economic searches: 433 results (Embase 236, Medline 169, IDEAS/REPEC 17, PEDE 10, CEA Registry 1). After deduplication: 282 results (90 Embase/Medline possibly UK results, 192 other results)

Appendix A2: PRISMA diagram: clinical evidence



Appendix A3: PRISMA diagram: economic evidence



Appendix A4: Study characteristics of included studies (N=17)

#	Study name, design and location	Participants	Intervention(s) and comparator	Outcomes measures	Funding and declaration of interests	EAG comments
1.	(Charles et al., 2026) Observational, retrospective UK (N=6 seizure clinics)	n=196 EEGs from 196 patients (66 with epilepsy). <i>Inclusion:</i> normal non-contributory first routine EEGs selected from 281 individuals (dataset reported in Tait et al. 2024). First awake EEG, from subjects experiencing at least one suspected seizure, and investigated for possible epilepsy, with final diagnosis (epilepsy or other), remained stable for 1 year. <i>Exclusion:</i> under 18 years of age, clinically contributory EEGs, EEGs containing non-epileptiform abnormalities, EEGs in non-compatible data formats, missing metadata. Recruitment period: same as Tait et al. 2024	<i>Intervention:</i> BioEP similarity score [maximum 20-minute EEG]; adjusted for sex and anti-seizure medication. <i>Comparator:</i> Modelling standard referral-based scheduling (random sampling). For diagnostic yield assumed sensitivity of 54% for second-line EEG investigations. <i>Reference standard:</i> Final diagnosis made following further clinical assessment, and stable at 1 year (no further details provided).	No. of EEGs patients seen after follow-up visits, diagnostic yield for epilepsy,	<i>Funding:</i> Innovate UK, NIHR, EPSRC and Epilepsy Research UK <i>Declaration of interest:</i> Multiple authors are employees, or cofounders, directors or shareholders of Neuronostics (BioEP).	Paper introduction states that the median sensitivity of first routine EEG in the diagnosis of epilepsy was 17.3% (Bouma et al., 2016). Overlap with Tait et al. 2024. Population is clinically non-contributory EEGs; which may represent how this technology may be used in practice. Subset of data (106/196) involved in re-training. 50/90 remaining were randomly selected to compare randomly ordered and reordered subsets. Study is not prospective and therefore unclear whether this technology would contribute to faster diagnosis.
2.	da Silva Lourenço (Clin Neurophysiol, 2023; 43-48) Diagnostic accuracy The Netherlands (N=1 centre)	n=100 EEGs (42 contained IEDs, 25 abnormal without IED, 33 normal) <i>Inclusion:</i> random selection of ambulatory EEGs from patients over 8 years of age, with report available. <i>Exclusions:</i> Not reported Recruitment period: Not reported	<i>Intervention:</i> Expert (N=1) review of the EEG with epoch flagged in NeuroCenter EEG. <i>Reference standard:</i> Original EEG report	Time to review EEGs, detection rate, diagnostic accuracy (sensitivity, specificity)	<i>Funding:</i> Epilepsiefonds Foundation (WAR16-08) <i>Declaration of interest:</i> One author is a co-founder of CSS; CSS did not offer funding and were not involved in the study.	No reporting of how long review of EEGs in the reference standard took; only a sentence in discussion which states that in clinic “visual analysis of an ambulatory recording takes on average 2-3 hours”.
3.	Duckworth (J Integrative Neurosci, 2024; 150) Retrospective case-control UK (N=1 hospital, NICU, PICU, CICU)	n=98 patients (49 cases, 49 controls) <i>Inclusion:</i> <44 weeks corrected gestational age at time of cEEG recording, inpatient at any of the 3 ICUs, eEEG duration >60 minutes <i>Exclusion:</i> NR Recruitment period: May 2019 to Dec 2022	<i>Intervention:</i> Persyst 14 (research version) [continuous videoEEG, 6 mins] <i>Comparator:</i> N/A <i>Reference standard:</i> Expert (clinical neurophysiologist, N=1)	Diagnostic accuracy (AUC, sensitivity, specificity)	<i>Funding:</i> None <i>Declaration of interest:</i> Multiple authors received personal fees from Natus, UCB, GW.	Authors state that the Persyst neonatal had not yet received regulatory approval as a medical device; however, was anticipated to be released in Persyst 15. Supplementary material states 4 different settings of Persyst used, majority used setting 1 (75% of cases, 71% controls); this may impact generalisability of results. The study used retrospective channel mapping to make cEEG recordings compatible with Persyst. This approach may reduce accuracy, especially in cases limited to a two-channel montage, but a post-hoc comparison showed no statistically significant

						difference between the settings.
4.	Janmohamed (J Clinical Neurophysiology, 2024; 618-624) Validation study Australia (N=2 hospitals), US (N=1 hospital)	n=125 EEGs from n=125 patients <i>Inclusion:</i> EEG recordings reported by accredited epilepsy specialists as having abnormalities consistent with genetic generalised epilepsy. <i>Exclusion:</i> NR Recruitment period: EEGs recorded in Australia centres between 2010 and 2020, EEG recordings randomly selected from a US dataset between 2000 and 2013 (Obeid & Picone, 2016).	<u>Intervention:</u> encevis 1.11.4 <u>Comparator:</u> Persyst 14 (3 settings: low sensitivity, default, and high sensitivity) [89% routine EEG <4 hours, 11% prolonged EEG >4 hours] <u>Reference standard:</u> pre-labelled agreement of at least 2 epileptologists, which was updated following review of software outputs (true positive extra markings).	Diagnostic accuracy, false detection rate. Time to review.	<i>Funding:</i> NR <i>Declaration of interest:</i> None	Reference standard was updated following software output (human reviewers missed some IEDs). Authors acknowledge that patients with genetic generalised epilepsy present with more distinct abnormalities of longer duration.
5.	Koren (Clin Neurophysiol, 2025; 178-188) Retrospective diagnostic accuracy; Austria (N=1 epilepsy monitoring unit).	n=81 patients <i>Inclusion:</i> patients with epilepsy who underwent long-term videoEEG (same dataset as used in Koren et al. 2021, Koren et al. 2023) who had experienced at least one seizure during their stay. Temporal lobe epilepsy: 56.3%. extratemporal lobe epilepsy: 38.8%, idiopathic generalised epilepsy 5%. <i>Exclusion:</i> NR Recruitment period: Between 2016 and 2019	<u>Intervention:</u> encevis 2.0 (settings: high sens, high spec), Persyst 14 (settings: default, high sens, high spec) [videoEEG. median 93 hr] fully automated <u>Comparator:</u> original EEG report <u>Reference standard:</u> Experts (N=2; arbitration by a third)	Seizure detection, false positive rate, detection delay	<i>Funding:</i> None. Both companies supported and paid for shipping costs of data drives. <i>Declaration of interest:</i> Multiple authors employees of AIT and Persyst	Same dataset used as in Koren et al. 2021.
6.	Koren (Frontiers in Neurol, 2018; 454) Feasibility study Austria (critical care setting)	<i>Inclusion:</i> consecutive monitored neurological critical care patients were randomly selected (MS Excel). 6 patients without any rhythmic or periodic EEG pattern were selected as negative control. First 24h of each cEEG for each patient was cut into 4 equal parts (therefore 80 cEEG lasting 6 hr each) <i>Exclusion:</i> patients with less than 19 surface electrodes due to operational wounds, less than 24 h cEEG duration, technical insufficient EEG data and training datasets. Recruitment period: NR	<u>Intervention:</u> NeuroTrend (encevis) with 4 EEG reviewers each with more than 5 years experience [continuous EEG, 6hs] <u>Reference standard:</u> Clinical neurophysiologists (N=2; arbitration by third electroencephalographer)	Training for those new to NeuroTrend, technical failure, review time, diagnostic accuracy (ictal EEG), rater agreement	<i>Funding:</i> FFG-Austrian Research Promotion Agency (826816, EpiMon) <i>Declaration of interests:</i> Multiple authors involved in the development of the NeuroTrend encevis technology.	Each reviewer was set a 5 min time limit for each dataset (could be extended to maximum 7 minutes) and had to complete predefined annotation sheets; this may not reflect use in NHS. Also reported sensitivity, specificity and agreement between 4 reviewers supported by NeuroTrend in burst suppression; however, this was not extracted by the EAG (outcomes out of scope).

7.	Kural (Epilepsia, 2022; 1064-1073) Diagnostic accuracy (retrospective) Denmark (N=2 hospitals)	n= 60 (30 with epilepsy, 30 without) <i>Inclusion:</i> patients 1 year or older, who had their diagnosis (epilepsy or non-epileptic paroxysmal events) based on video-EEG recordings of their habitual clinical episode, and who had sharp transients (epileptiform or not) recorded during a routine 20-min EEG). <i>Exclusion:</i> patients with inconclusive video-EEG, patients having both epileptic and non-epileptic seizures. Recruitment period: NR	<u>Intervention:</u> Spikenet, encephalospikes Deepspike, Persyst 13 [applied to 20-min routine EEG] with clinical interpretation <u>Comparator:</u> 3 experts (clinical neurophysiology) with more than 10 years experience [20-min EEG] <u>Reference standard:</u> consensus of 2 experts [videoEEG]	Sensitivity, specificity and accuracy at recording level.	<i>Funding:</i> National Institutes of Health (NIH; 1R01NS107291) <i>Declaration of interest:</i> several authors employed by AIT, one author is the founder of Beacon Biosignals (authors confirmed that company who played no part in the work); others none.	The paper also reported results from fully automated analysis of the 3 software, however as this outside their instructions for use the EAG has only reported results from the “hybrid” arm which included clinical interpretation of detections from the software as this better reflects how these technologies would be used in the NHS. SpikeNet is not an intervention in scope; therefore, results from this technology were not extracted. Results for Persyst on older version 13 (which company have stated is historical and not comparable in performance to Persyst 15); however, included for context. Authors acknowledge restricting to those who have undergone long-term videoEEG may be restrictive and that results may not be representative of the wide variety of IED morphologies encountered in standard practice. EAG noted that the diagnostic accuracy reported were similar across arms in a number of cases.
8.	Mansilla (Epilepsia, 2024; 3028-3037) [ISRCTN18025327] ; Retrospective diagnostic accuracy Canada (N=1; adult neurology setting)	n=104 patients <i>Inclusion:</i> consecutive patients with available routine 25-min EEG from patients with a diagnosis confirmed by an expert gold standard (recruited until 50% normal and 50% abnormal (12.5% in each of the four major classes, generalised epileptiform, focal epileptiform, focal non-epileptiform, diffuse non-epileptiform). <i>Exclusion:</i> Critically ill patients in the ICU, aged less than 15 years. Recruitment period: 20 October 2016 to 31 December 2022	<u>Intervention:</u> SCORE-AI (NeuroWorks) automated [25-min routine EEG] <u>Comparator:</u> 3 experts [25-min routine EEG] <u>Reference standard:</u> [VideoEEG]	Diagnostic accuracy	<i>Funding:</i> Canadian Institutes of Health Records (PJT-175056) <i>Declaration of interests</i> Several authors affiliated with Holberg EEG	The intervention was fully automated. This is outside the intended use and would not reflect how this is used in the NHS. However, this represents the little available evidence published stating NeuroWorks diagnostic accuracy.
9.	Persyst [Supplied by company_1] Internal performance testing	Spike detection n=50 EEGs, 277 EMU EEGs, and 14 non-spike EMU EEGs; seizure detection: 85 adults, 55 neonates <i>Inclusion:</i> subset of Persyst’s EEG	<u>Intervention:</u> Persyst 15 <u>Reference standard:</u> Experts	Artefact reduction, spike and seizure detection.	<i>Funding:</i> Persyst <i>Declaration of interests:</i> Supplied by Persyst	Limited detail provided, so unclear on alignment with scope, however this represents the limited information available on the version listed in Final Scope (Persyst 15).

		record library; no further detail provided <i>Exclusion:</i> NR Recruitment period:				
10.	Reus (Seizure, 2022; 13-17) Diagnostic accuracy (retrospective) The Netherlands (N=1 epilepsy monitoring unit)	n=286 EEGs from 283 patients (249 seizures analysed across 64 records) <i>Inclusion:</i> EEGs during seizures (through nurse observations and alarm buttons, through clinical physiologist review). Recruitment period: Aug 2019 to Jan 2020	<u>Intervention:</u> - Persyst version 14 - encevis version 1.9.2 - BESA version 2.0 All incongruent detections were reviewed by an expert (with more than 5 years experience in reviewing EEGs). [Median 20 hours EEG] <u>Comparator:</u> live observations (nurse observations or individual alarm button) and offline review (clinical physiologist) <u>Reference standard:</u> all seizure mentioned in the clinical report, plus true detections from algorithms as determined by consensus of 2 experts (1 clinical physiologist, 1 epileptologist)	Sensitivity of seizure detection, false positives per 24h. Follow up: N/A	<i>Funding:</i> None <i>Declaration of interests:</i> none declared, vendors provided trial licenses	The authors noted that encevis was the only package that uses the ECG channel for seizure detection; however the company has confirmed that ECG is <u>not</u> required for seizure detection as it is not part of the algorithm (Appendix C1). The EAG also note that NeuroWorks (SCORE-AI) does require ECG to run its analysis (Appendix C1). Authors acknowledge pragmatic reference standard; this approach prevented determination of specificity (only sensitivity reported). Only inconsistent detections were reviewed by an expert (may be consistent but wrong); therefore results may not be generalisable.
11.	Reus (Seizure, 2022b; 33-37) Diagnostic accuracy The Netherlands (N=1, epilepsy monitoring unit)	n=30 EEGs from 30 patients <i>Inclusion:</i> patients attending Epilepsy Monitoring Unit. <i>Exclusion:</i> aged under 16 years of age Recruitment period: Aug 2019 to Sept 2019	<u>Intervention:</u> - Persyst version 14 (2 settings: default and low sensitivity) - encevis version 1.9.2 - BESA version 2.0 [30-minute section of awake EEG] <u>Comparator:</u> 3 experts (2 clinical neurophysiologists, 1 physician assistant; each with more than 5 years EEG reviewing experience) and not involved in the initial case reporting <u>Reference standard:</u> 1 expert (at the time of the original reporting) and following automated detection if incongruent detection were made reviewed by 2 additional experts (1 clinical physiologist, 1 epileptologist)	Sensitivity of IED detection (per selection or per epoch), inter-rater agreement, general processing time reported in methods. Follow up: N/A	<i>Funding:</i> None <i>Declaration of interests:</i> none declared, vendors provided trial licenses	Likely overlap with patients reported in Reus et al. 2022) because of recruitment period and number of patients.
12.	Sharpe (J Clin Neurophysiol, 2019; 9-13) Qualitative study New Zealand	n=25 staff interviews (9 neurologists regarding use of Persyst); <i>Inclusion:</i> phone interviews with 25 research team members at 5 research sites (9 study neurologists, 11 neonatologists, site principal investigator, site coordinator, research nurse, respiratory therapist). Written questionnaires	<u>Intervention:</u> Persyst (authors report that the version used was not yet FDA approved for commercial use)	Perception of seizure detection algorithm (Persyst)	<i>Funding:</i> None <i>Declaration of interest:</i> None	Majority of reporting relates to feasibility of continuous video EEG monitoring related to a RCT trial of levetiracetam as a first-line treatment for neonatal seizures. Limited detail provided related to Persyst,

		from 6 EEG technicians from the commercial EEG monitoring company. <i>Exclusion:</i>				
13.	Tait (Epilepsia, 2024; 2459-2469) [NCT05384782] Validation study; UK (N=8 NHS sites)	n=281 patients <i>Inclusion:</i> Adult, suspected of having a seizure or epilepsy, one or more EEGs recorded with minimum of 19 channels, applied to 10-20 international system of placement, final diagnosis of epilepsy or a common alternative condition (e.g. syncope, non-epileptic attack disorder) determined by clinical expert which has remained stable for 1 year. <i>Exclusion:</i> incomplete or unreliable meta-data (age, sex, ethnicity, confirmed diagnosis), no non-contributory EEGs, unreadable data format. If 33% of epochs were impacted by artefacts a different 20-min window was selected else the EEG was excluded. Recruitment period: NR	<i>Intervention:</i> Not reported (assumed BioEP; shared by company) [20-min EEG] Fully automated <i>Reference standard:</i> Established clinical diagnosis (stable 1 year)	Diagnostic accuracy, impact of confounders on model output	<i>Funding:</i> Innovate UK (103939); EPSRC (EP/N014391/2; EP/T027703/1); NIHR (AI01646); Epilepsy Research UK (F2002) <i>Declaration of interests:</i> Multiple authors are employees or stakeholders of Neuronostics (BioEP).	Two-tier cross validation: 90% development set, 10% hold-out set. Paper also describes a confounder model which accounted for age, comorbidities, anti-seizure medication, sex. Subset reported in (Charles et al., 2026).
14.	Tittensor (MedRxiv, 2024) Preprint [PRISTINE study NCT05764252] Prospective diagnostic belief updating study; UK (N=1 nurse-led first-seizure clinic)	n=86 patients <i>Inclusion:</i> Adults aged over 18 years, suspected of seizure and referred for an EEG following clinical consultation. <i>Exclusion:</i> Known hepatic/renal encephalopathy, skull defects, participants unable to tolerate EEG. Recruitment period: between August 2023 and August 2024	<i>Intervention:</i> BioEP + expert <i>Comparator:</i> Expert (N=2; consultant nurse, independent clinician) based on clinical history, standard EEG, other standard test ordered during diagnostic decision-making	Impact on clinical decision making,	<i>Funding:</i> EPSRC (EP/N014391/2; EP/T027703/1, Epilepsy Research UK (F2002) <i>Declaration of interests:</i> Multiple authors were employees, co-founders, director, shareholders of Neuronostics.	This use directly reflects how it would be used in an NHS setting.
15.	Tsereteli (Epilepsia Open, 2025; 70193) Prospective real-world evaluation; Georgia (N=1 centre)	n=267 EEGs <i>Inclusion:</i> Prolonged EEG (>3hr). <i>Exclusion:</i> Standard short duration EEGs, recordings containing EEG-negative epileptic	<i>Intervention:</i> encevis (version not reported). Reviewers were blinded to videoEEG findings. <i>Reference standard:</i> 2 blinded experts (third neurophysiologist consulted in cases of disagreement)	Diagnostic accuracy (seizure and IED detection)	<i>Funding:</i> None <i>Declaration of interests:</i> None	The authors acknowledge that the algorithm is unable to annotate all types of IEDs which limited direct comparison of the sensitivity for specific IEDs. The EAG note that the authors did not specify which types of IEDs were not annotated.

		seizures were excluded. Recruitment period: From 2019 to 2023.				
16.	Tsereteli (Epilepsy & Beh, 2024; 100656); Prospective real-world evaluation; Georgia (N=1 epilepsy and sleep centre)	n=255 EEGs <i>Inclusion:</i> All EEGs longer than 4 hours, recordings that included at least one electroclinical epileptic seizure. <i>Exclusion:</i> Patients treated in ICU, recordings of patients with non-epileptic paroxysmal events such as psychogenic non-epileptic events, syncope, and parasomnia. Only electroclinical seizures lasting more than 5 seconds were considered in final analysis. Recruitment period: Between 2018 and 2021	<u>Intervention:</u> encevis v1.7 [videoEEG] reviewed by experts who were blinded to videoEEG <u>Comparator:</u> N/A <u>Reference standard:</u> 2 experts blinded to algorithm output	Diagnostic accuracy (seizure detection)	<i>Funding:</i> Not reported <i>Declaration of interests:</i> None	Potential overlap in patients recruited to Tsereteli et al. 2025.
17.	Tveit (JAMA Neurol, 2023; 805-812) [ISRCTN14307038] Clinical validation study Denmark, US (multi-centre), Norway (single centre), Denmark (comparison of AI)	Multi-centre test data set (n=100 EEGs) <i>Inclusion:</i> included a target distribution of 60 normal and 40 abnormal EEG recordings. 75 were randomly selected from the holdout data set, 25 were selected from a set of 150 anonymised EEGs from the Mayo Clinic. <i>Exclusion:</i> patients aged 3 months or younger, recordings from ICU. Recruitment period: NR Large single-centre test data set (n=9785 EEGs) <i>Inclusion:</i> large SCORE EEG dataset from single hospital in Norway <i>Exclusion:</i> Neonatal and ICU recordings. Recruitment period: NR Comparison with other AI models (n=60 patients) Same data as Kural et al. 2022	Multi-centre test data set <u>Intervention:</u> SCORE-AI (fixed and frozen model, and threshold values) <u>Comparator:</u> 11 experts (from different centres); age and sex was disclosed, other information was blinded. <u>Reference standard:</u> expert consensus (majority consensus of 11 experts) Large single-centre test data set <u>Intervention:</u> SCORE-AI Premium software, undefined [mean 31-minute EEG] <u>Comparator:</u> 1 physician per recording (from a pool of N=14 physicians scoring the EEGs in the dataset) <u>Reference standard:</u> pre-classified and publicly available dataset Comparison with other AI models (n=60 patients) <u>Intervention:</u> SCORE-AI <u>Comparator:</u> SpikeNet, encevis, Persyst. <u>Reference standard:</u> 3 experts external reference standard	Diagnostic accuracy, agreement between technology and humans and between humans	<i>Funding:</i> Infrastructure for the study was funded by Holberg EEG. <i>Declaration of interests:</i> Multiple authors stated as developer, shareholder, receiving consultancy fees, personal fees with Holberg EEG, Natus.	Intervention is SCORE-AI alone, however due to lack of evidence with expert have included.

Appendix A5: Deprioritised studies (N=33)

#	Source	Study	Publication type	Population	Intervention	Comparator	Outcomes	Justification for deprioritisation
1.	CSS and EAG Clinical literature search	da Silva Lourenço (Clin Neurophysiol, 2021; 1234-1240); The Netherlands	Full publication	n=116 (50 focal epilepsy, 49 generalised epilepsy, 67 controls) 4 datasets (A-D) applying temporal shifting and different montages	NeuroCenter EEG (assumed through author affiliations; also shared by company)	<u>Reference standard</u> : 2 experts	False positive detection rate, diagnostic accuracy (IED)	<u>Study design</u> : training optimisation (4 sets A-D).
2.	EAG Clinical literature search	Din (Crit Care Med, 2020; 545-552)	Full publication	n=19 critical ill children (continuous EEG)	Persyst 13, Persyst 11, ICTA-S, NB	6 EEG experts <u>Reference standard</u> : clinical neurophysiologist	Diagnostic accuracy (seizure), false positive rates	<u>Intervention</u> : Evidence available for seizure detection with later version of Persyst (Persyst 14) with expert, as per scope
3.	EAG Clinical literature search	Elezi (Clin Neurophysiol, 2022; 214-220)	Full publication	n=129 (n=47 patients offline retrospective n=82 prospective) patients in epilepsy monitoring unit	EpiScan (module within encephalis)	Not defined	Seizure detection, detection delays	<u>Intervention</u> : EpiScan is a module within encephalis; the EAG has already considered evidence of encephalis + expert (which is how the technology would be used in the NHS).
4.	Reference trawling	Furbass (Clin Neurophysiol,	Full publication	n=76 patients long-term EEG	DeepSpike (module within	2 experts removed false positives by visual inspection	IED detection, false positive detections.	<u>Intervention</u> : Fully automated (not supporting clinician);

#	Source	Study	Publication type	Population	Intervention	Comparator	Outcomes	Justification for deprioritisation
	(Kural et al. 2022)	2021; 1584-1592)			encevis) fully automated to characterise sub-cohorts of IED patterns			not how technology would be used. EAG already considered evidence of DeepSpike when used alongside expert.
5.	EAG Clinical literature search	Fürbass (Clin Neurophys, 2020; 1174-1179); Austria	Full publication	n=100 patients (54 with epilepsy of which 45 focal, 7 generalised, 2 both focal and generalised)	encevis with DeepSpike (fully automated)	<u>Reference standard</u> : Long-term video EEG reviewed by 2 experts	Diagnostic accuracy IED), false detection rate	<u>Intervention</u> : Fully automated (not supporting clinician); not how technology would be used. Note: authors state that specificity of DeepSpike algorithm is too low for unsupervised clinical application.
6.	EAG Clinical literature search	Furbass (Clin Neurophysiol, 2016; e55)	Abstract	Critical care patients (n=68)	NeuroTrend (fully automated)	<u>Reference standard</u> : 2 reviewers	Rhythmic and periodic pattern detection	<u>Intervention</u> : NeuroTrend (module of encevis) fully automated. Evidence of encevis alongside expert already considered by the EAG. <u>Abstract</u> : limited detail in methods and results

#	Source	Study	Publication type	Population	Intervention	Comparator	Outcomes	Justification for deprioritisation
7.	AIT, EAG Clinical literature search	Furbass (Clin Neurophysiol, 2015; 203-213); Austria	Full publication	Critical care patients (n=13)	Unnamed (shared by AIT, assumed encevis)	Original EEG report (one reviewer, different reviewer across EEG recordings).	Seizure detection	<u>Study design:</u> Larger more recent studies have reported the clinical outcomes following implementation of encevis. Narrative reporting of result was limited.
8.	EAG Clinical literature search	Furbass (Neurocrit Care, 2014; S100) ePoster 88	Abstract	143 routine and 21 long-term EEG from n=79 patients in an intermediate care unit.	NeuroTrend (module in encevis); fully automated	Manual review (N=NR)	Agreement for periodic patterns, rhythmic delta activity, spike-wave patterns.	<u>Intervention:</u> NeuroTrend (module of encevis) fully automated. Evidence of encevis alongside expert already considered by the EAG. <u>Abstract:</u> limited detail in methods and results
9.	EAG Clinical literature search	Furbass (Epilepsy Curr J, 2013) Abstract	Abstract	Continuous EEG from 71 patients (ICUs in N=3 clinics)	PureEEG for artefact reduction, unnamed computational algorithm (assume module of encevis)	Expert reviewer	Agreement for periodic patterns, rhythmic delta activity, spike-wave patterns.	<u>Intervention:</u> Unnamed computational algorithm (assumed module of encevis) with PureEEG (module of encevis) fully automated. Evidence of encevis alongside expert

#	Source	Study	Publication type	Population	Intervention	Comparator	Outcomes	Justification for deprioritisation
								already considered by the EAG. <u>Abstract</u> : limited detail in methods and results
10	EAG Clinical literature search	Furbass (Eur J Neurol, 2012; 43) Abstract SC202	Abstract	22,000 hours of uncut EEGs from 275 patients (including 96 patients with seizures)	EpiScan (module of encevis); enhanced for patients having irregular ictal morphology and ictal signal distortions	<u>Reference standard</u> : NR (assumed expert)	Diagnostic accuracy (seizure), false detection rate	<u>Intervention</u> : EpiScan (module of encevis) fully automated. Evidence of encevis alongside expert already considered by the EAG. <u>Abstract</u> : limited detail in methods and results
11	EAG Clinical literature searches	Furbass (Ann Int Conf IEEE EN Med Bio Sci, 2012; 1020-1023)	Full publication	22,000 hours of uncut EEGs from 275 patients (including 623 seizures); same population as described in Furbass (Eur J Neurol, 2012; 43) Abstract SC202	Epileptiform Wave Sequence (EWS) alone	EpiScan with Epileptiform Wave Sequence (EWS), <u>Reference standard</u> : EEG experts (n=NR)	Diagnostic accuracy (seizure), false detection rate	<u>Intervention</u> : Assumed EWS is an earlier version of encevis (paper describes development of hybrid algorithm approach) Date of publication: assume historic/development version

#	Source	Study	Publication type	Population	Intervention	Comparator	Outcomes	Justification for deprioritisation
12	Persyst	Ganguly (Neurology, 2022; e2224-e2232); US	Full publication	24-hour continuous EEG recordings performed in inpatient setting (n=85 EEG records)	Persyst 12, Persyst 13	<u>Reference standard</u> : Experts (n=2)	Diagnostic accuracy (seizure)	<u>Intervention</u> : Persyst 12 and Persyst 13 (Persyst 12 does not include AI; company confirmed results from both versions should be considered historical and not directly comparable to Persyst 15).
13	EAG Clinical literature searches	González Otarula (Neurology, 2019; E1540-E1546)	Full publication	Adult prolonged EEGs (>24 hours) (n=1,478 studies from 1,257 patients)	Persyst 12, Persyst 11, Gotman TM Event Detection	<u>Reference standard</u> : 2 neurophysiologist	Seizure detection	<u>Intervention</u> : Persyst 12 and Persyst 11 (fully automated). EAG has considered evidence of later versions used alongside experts.
14	Persyst	Haider (Neurology, 2016; 935-944)	Full publication	Patients undergoing continuous EEG in intensive care (n=15)	Persyst 11	<u>Reference standard</u> : Experts (n=9 neurophysiologists)	Diagnostic accuracy (seizure), review time	<u>Intervention</u> : Persyst 11 (company confirmed version should be considered historical and not directly comparable to Persyst 15)
15	AIT	Hartmann (Clin Neurophysiol, 2014; 479-490); NR	Full publication	Consecutive epilepsy patients (n=48)	PureEEG	Reviewers (n=2)	Amount of artefact	<u>Intervention</u> : PureEEG (paper states that this is intended to be a

#	Source	Study	Publication type	Population	Intervention	Comparator	Outcomes	Justification for deprioritisation
								pre-processor step to remove artefact prior to computational analyses of EEGs; this may be a single component/module of the encevis platform) <u>Outcomes:</u> None listed in scope
16	EAG Clinical literature searches	Hartmann (Epilepsy Currents, 2013; 206-207)	Abstract	Consecutive adults (n=43) undergoing long-term videoEEG for epilepsy diagnosis and pre-surgical evaluation.	EpiScan (module of encevis); fully automated	<u>Reference standard:</u> Experienced epileptologists (n=NR)	Diagnostic accuracy (seizure), false alarm rate per hour	<u>Intervention:</u> EpiScan (module of encevis) fully automated. Evidence of encevis alongside expert already considered by the EAG. <u>Abstract:</u> limited detail in methods and results
17	AIT, EAG Clinical literature search	Herta (Epilepsy Behav, 2015; 273-279); Austria	Full publication	Neurological ICU (n=68)	NeuroTrend v1.1 (authors state that NeuroTrend will be included within encevis software	<u>Reference standard:</u> Experts (n=2)	Inter-rater agreement, diagnostic accuracy (seizure)	<u>Study design:</u> Larger more recent studies have reported the clinical outcomes following implementation of encevis when used

#	Source	Study	Publication type	Population	Intervention	Comparator	Outcomes	Justification for deprioritisation
					package) [continuous videoEEG]			alongside clinical experts.
18	EAG Clinical literature search	Herta (Clin Neurophysiol, 2017; 1000-1007); Austria	Full publication	Neurological and neurosurgical adult ICU (n=83 continuous EEG)	NeuroTrend (used within encevis v1.3) [continuous EEG]	Expert (n=1)	Inter-rater agreement, diagnostic accuracy (seizure)	<u>Study design:</u> Larger more recent studies have reported the clinical outcomes following implementation of encevis when used alongside clinical experts.
19	Persyst	Kamitaki (Seizure, 2019; 290-295); US	Full publication	Epilepsy monitoring unit)	Persyst 11 [long-term videoEEG]	Reviewer (n=1) <u>Reference standard:</u> epileptologists (n=4)	Diagnostic accuracy (seizure)	<u>Intervention:</u> Persyst 11 (does not include AI; company confirmed results are historical and not directly comparable to Persyst 15).
20	AIT, EAG clinical literature search	Koren (Epilepsia, 2021; 426-438); with correction published in 2023 Austria	Full publication	Patients with epilepsy (n=81, Epilepsy monitoring unit)	encevis 1.7; Persyst 13, BESA 2.0 [videoEEG; mean 85 hours]	<u>Reference standard:</u> Original EEG report, Expert review (n=2, third for arbitration)	Diagnostic accuracy (seizure), detection delay	<u>Intervention:</u> Koren et al. 2025 reports outcomes using more recent versions of the technologies (encevis 2.0, Persyst 14).

#	Source	Study	Publication type	Population	Intervention	Comparator	Outcomes	Justification for deprioritisation
21	EAG clinical literature search	Kural (Clin Neurophysiol, 2023; e81)_Abstract	Abstract	30 patients with epilepsy, 30 with nonepileptic paroxysmal events.	encevis, SpikeNet, Persyst	<u>Reference standard</u> : Expert review of videoEEG of patient habitual clinical episodes	Diagnostic accuracy (IED)	<u>Abstract</u> : full paper discusses outcomes from the same population (n=60) in more detail: Kural (Epilepsia, 2022; 1064-1073)
22	EAG clinical literature search	Martin (J Clinical Neurophysiology, 2022; 235-239)	Full publication	Neonates undergoing monitoring for seizures (n=43) [videoEEG]	Persyst 12 + clinical expert	-	False positive detection (seizure) due to artefactual movement of the neonate.	<u>Intervention</u> : Koren et al. 2025 reports outcomes using more recent version of the technologies (Persyst 14).
23	EAG clinical literature search	Okujava (Epilepsia, 2021; 114)	Abstract	Prospective evaluation of long-term recordings (n=39) (4hrs and longer) at epilepsy and sleep centre	encevis	<u>Reference standard</u> : 2 experts	Diagnostic accuracy (seizure)	<u>Abstract</u> : Full papers available reporting results from encevis with more detail in methods and results
24	EAG Clinical literature search	Perko (J Clin Neurophysiol, 2012; 528)_Abstract	Abstract	Undefined	EpiScan (module within encevis)	"Clinical findings" not further specified.	Diagnostic accuracy (seizure), false positive rate	<u>Intervention</u> : EpiScan is a module within encevis; the EAG has already considered evidence of encevis + expert (which is how the technology would be used in the NHS).

#	Source	Study	Publication type	Population	Intervention	Comparator	Outcomes	Justification for deprioritisation
25	EAG Clinical literature search	Reus (2020, Seizure; 96-99)	Full publication	Adults in EMU with prolonged videoEEG (n=50 recordings)	Persyst 13 + expert	<u>Reference standard</u> : 2 of two clinical neurophysiologists and a physician assistant	IED and seizure detection	<u>Intervention</u> : Full papers have been included which include later version of Persyst (Persyst 14)
26	EAG Clinical literature search	Reus (J Clinical Neurophysiology, 2021; 198-201)	Full publication	Electrical status epilepticus during slow-wave sleep or follow-up of electrical status epilepticus during slow-wave sleep referral question in children or teenagers (n=44 patients, n=48 recordings)	Persyst 13 (3 settings)	Experts (n=2) <u>Reference standard</u> : consensus of experts	Spikes, spike-wave index	<u>Intervention</u> : Use of algorithms alone (fully automated). EAG has included evidence using later version of Persyst (Persyst 14) when used alongside experts (Duckworth et al. 2024; Reus et al. 2022a).
27	EAG Clinical literature search	Rommens (Epilepsy & Behav, 2018; 99-104)	Full publication	115 patients in epilepsy monitoring unit [videoEEG]	EpiScan (module of encevis);	Staff <u>Reference standard</u> : Not reported	Diagnostic accuracy (seizure), false detection rate, median latency of detections	<u>Intervention</u> : EpiScan (module of encevis) fully automated. Evidence of encevis alongside expert already considered by the EAG.
28	EAG clinical literature search	Scheuer (Clin Neurophysiol, 2017; 243-250)	Full publication	Archived records from adult epilepsy monitoring unit (n=40 records)	Persyst 11, 12, 13 (fully automated)	<u>Reference standard</u> : Experts (n=3) + Algorithm	Diagnostic accuracy (IED)	<u>Intervention</u> : Use of algorithms alone (fully automated). EAG has included evidence using later

#	Source	Study	Publication type	Population	Intervention	Comparator	Outcomes	Justification for deprioritisation
								version of Persyst (Persyst 14) when used alongside experts (Duckworth et al. 2024; Reus et al. 2022a).
29	Persyst, EAG clinical literature search	Scheuer (J Clin Neurophysiol, 2021; 439-447)	Full publication	120 EEGs >24hours, (100 with seizure activity); US (Epilepsy monitoring unit)	Persyst 13, Persyst 14	Experts (n=3) <u>Reference standard:</u> Expert consensus	Diagnostic accuracy (seizure) and false positive rates), detection latency (time between expert-marked seizure onset determined during post hoc seizure marking and time at which enough seizure was identified by the algorithm to generate a detection notification).	<u>Intervention:</u> Use of algorithms alone (fully automated). EAG has included evidence using later version of Persyst (Persyst 14) when used alongside experts (Duckworth et al. 2024; Reus et al. 2022a).
30	EAG clinical literature search	Sierra-Marcos (Clin Neurophysiol, 2015; 456-462)	Full publication	Routine and long-term EEG from adults and children over 1 year of age (n=98 recordings, n=98 patients)	Persyst 12	<u>Reference standard:</u> 2 neurophysiologists	Diagnostic accuracy (IED), false positive rate	<u>Intervention:</u> Use of algorithms alone (fully automated). EAG has included evidence using later

#	Source	Study	Publication type	Population	Intervention	Comparator	Outcomes	Justification for deprioritisation
								version of Persyst (Persyst 14) when used alongside experts (Duckworth et al. 2024; Reus et al. 2022a).
31	Persyst, EAG clinical literature search	Tjepkema-Cloostermans (Epilepsia, 2025; 184-194);	Full publication	Internal validation: 50 patients (22 with focal and generalised epilepsy) External validation: 174 EEGs (89 had IEDs)	Persyst 14 automated (no expert)	7 experts using a clinical EEG view applying manual labelling to IEDs (NeuroCenter EEG) [Note no mention of SCORE-AI or autoSCORE was described] <u>Reference standard:</u> agreement between experts	Detection rate (IED), false positive rate	<u>Intervention:</u> Use of algorithms alone (fully automated). EAG has included evidence using later version of Persyst (Persyst 14) when used alongside experts (Duckworth et al. 2024; Reus et al. 2022a).
32	EAG clinical literature search	Volkova (J Sleep Res, 2022; 177)_Abstract	Abstract	Children with electrical status epilepticus in sleep or continuous spike-wave-in sleep (n=10 patients)	Persyst 14	Experts (n=3)	Inter-rater agreement with and without Persyst	<u>Abstract:</u> limited information in methods and results <u>Intervention:</u> Persyst 14, Full papers have been included which include later version of Persyst (Persyst 14) and those that

#	Source	Study	Publication type	Population	Intervention	Comparator	Outcomes	Justification for deprioritisation
								use in combination with expert
33	Persyst	Zorlu (Clin Neurophysiol, 2018) [Abstract]; US	Abstract	Patients with continuous videoEEG with status epilepticus	Persyst (version not defined)	<u>Reference standard:</u> Epileptologist (n=NR)	Diagnostic accuracy (seizure detection)	<u>Abstract:</u> Deprioritised as full paper discussing seizure detection of Persyst 14 discussed in full publication by Duckworth (J Integrative Neurosci, 2024; 150).

Appendix A6: Excluded studies (N=70)

#	Technology	Source	Study	Publication type	Reasons for exclusion
1.	-	EAG literature search (economic)	Abend (J Clin Neurol, 2015; 486-494)	Full publication	<u>Intervention</u> : monitoring of status epilepticus
2.	-	EAG literature search (clinical)	Alamoudi (Frontiers in Neurosci, 2022; 993678)	Full publication	<u>Intervention</u> : not using technologies listed in scope
3.	NeuroCenter EEG	Clinical Science Systems	Beudel (Front Neurol, 2014; 97)	Full publication	<u>Population</u> : Post-anoxic encephalopathy <u>Outcome</u> : no outcomes related to epilepsy or seizure listed
4.	-	Neuronostics	Bouma (Eur J Neurol, 2016; 455-463)	Full publication	<u>Intervention</u> : not using technologies listed in scope
5.	-	EAG literature search (clinical)	Bruinsma (J Child Neurol, 2026; 60-67)	Full publication	<u>Outcome</u> : focus is on predicting epileptic spasms (not an outcome listed in scope)
6.	-	EAG literature search (economic)	Cai (Epilepsy and Behav, 2023; 109441)	Full publication	<u>Population</u> : real-time seizure detection for people with diagnosed epilepsy (not diagnosis)
7.	-	EAG literature search (clinical)	Chen (Front Neurol, 2025; 1455613)	Full publication	<u>Intervention</u> : Not devices in scope
8.	Persyst	EAG literature search (clinical)	Chen (Neurol, 2022; 3034)_Abstract	Full publication	<u>Intervention</u> : Persyst 14 in combination with technology not listed in scope
9.	NeuroCenter EEG	EAG literature search (clinical)	Cloostermans (Epilep Curr, 2011; Suppl1)	Abstract	<u>Population</u> : Monitoring adults in ICU (not specific to epilepsy; abstract: lacking detail)

#	Technology	Source	Study	Publication type	Reasons for exclusion
10	NeuroCenter EEG	EAG literature search (clinical)	da Silva Lourenço (Clin Neurophysiol, 2023; e104)_Abstract	Abstract	<u>Duplicate:</u> Information in abstract is included in full paper by da Silva Lourenço (Clin Neurophysiol, 2023; 43-48)
11	Not specified	Clinical Science Systems	da Silva Lourenço (Inform Med Unlocked, 2023; 101318)	Full publication	<u>Intervention:</u> technology not named
12	Not specified	Clinical Science Systems	da Silva Lourenço (Clin Neurophysiol, 2021; 1433-1443)	Full publication	<u>Study design:</u> review (descriptive review of technology development)
13	ElectroCap (n=15), NeuroCenter EEG (n=1)	Clinical Science Systems	de Vos (J Clin Neurophysiol, 2008; 77-82)	Full publication	<u>Population:</u> Patients with an acute hemispheric stroke patients <u>Outcomes:</u> no outcomes related to epilepsy or seizure listed
14	None	EAG literature search (clinical)	Dhaker (J Clinical Neurophysiology, 2022; 446-452)	Full publication	<u>Intervention:</u> Did not use any of the technologies listed in scope
15	Persist 13, Persyst 11, NB, ICTA-S	EAG literature search (clinical)	Din (J Clin Neurophysiol, 2019; 500_S5)	Abstract	<u>Duplicate:</u> Abstract of Din (Crit Care Med, 2020; 545-552) which was already considered by the EAG
16	Mixed	EAG literature search (clinical)	Diniz (Seizure, 2024; 80-86)	Full publication	<u>Intervention:</u> Mixed intervention (includes SCORE-AI, Persyst and many others not listed in scope) <u>Study design:</u> Systematic review, however only N=2 papers include technologies

#	Technology	Source	Study	Publication type	Reasons for exclusion
					listed in scope, both already included in the report.
17	Persyst (version undefined), BESA, convolutional neural network	EAG literature search (clinical)	Emami (NeuroImage, 2019; 101684)	Full publication	<u>Intervention:</u> Convolutional neural network-based analysis of scalp EEG plot images <u>Comparator:</u> Persyst (version undefined), BESA – not used with expert interpretation
18	-	EAG literature search (economic)	Fasaludeen (Seizure, 2025; 51-54)	Full publication	<u>Intervention:</u> trio-whole exome sequencing <u>Comparator:</u> proband-only targeted exome sequencing <u>Study design:</u> cost analysis only (no modelling)
19	Neurotrend (encevis)	AIT	Furbass (Clin Neurophysiol, 2016; 2038-2046)	Full publication	<u>Population:</u> critically ill neurological patients (not suspected of epilepsy) <u>Outcomes:</u> burst suppression (no outcomes related to epilepsy or seizure listed)
20	Not specified	EAG Literature search (Clinical)	Gleason (eClinicalMedicine, 2024; 102919)	Full publication	<u>Intervention:</u> AI tool unnamed <u>Outcome:</u> prediction of cerebral dysfunction, and sedation
21	-	EAG literature search (economic)	Gu (JAMA Dermatol, 2024; 631-640)	Full publication	<u>Population:</u> patients with newly diagnosed epilepsy <u>Intervention:</u> genetic testing to inform treatment

#	Technology	Source	Study	Publication type	Reasons for exclusion
22	Not specified	EAG Literature search (Clinical)	Hartmann (Epilepsia, 2023; S34-S39)	Full publication	<u>Intervention:</u> AI tool unnamed
23	NeuroCenter EEG	Clinical Science Systems	Hofmeijer (Neurology, 2015; 137-143)	Full publication	<u>Population:</u> post anoxic coma <u>Outcome:</u> no outcomes related to epilepsy or seizure listed
24	-	EAG literature search (clinical)	Hou (IEEE Trans Neural Sysm Rehab Eng, 2024; 350-357)	Full publication	<u>Intervention:</u> unnamed tech <u>Outcomes:</u> Quantification of hypsarrhythmia in infantile spasmodic EEG
25	-	EAG literature search (economic)	Howell (Epilepsia, 2018; 1177-1187)	Full publication	<u>Intervention:</u> genetic testing to inform diagnosis
26	-	EAG literature search (clinical)	ISRCTN14307038	Trial registration	<u>Duplicate:</u> full paper (Tveit (JAMA Neurol, 2023; 805-812) already considered by the EAG
27	-	EAG literature search (clinical)	ISRCTN18025327	Trial registration	<u>Duplicate:</u> full paper (Mansilla (Epilepsia, 2024; 3028-3037) already considered by the EAG
28	-	EAG literature search (clinical)	Japaridze (Epilepsia, 2023; S40-S46)	Full publication	<u>Intervention:</u> wearable EEG (not device listed in scope)
29	Not specified	EAG literature search (clinical)	Joshi (Biomed Signal Process Control, 2023; 104086)	Full publication	<u>Intervention:</u> not device listed in scope
30	Not specified	EAG literature search (clinical)	Karpychev (Front Human Neurosci, 2022; 984306)	Full publication	<u>Intervention:</u> not device listed in scope
31	SCORE-AI	EAG literature	King-Stephens (Epilep Curr, 2024; 111-113)	Commentary	<u>Study design:</u> Commentary on Tveit et al. 2023

#	Technology	Source	Study	Publication type	Reasons for exclusion
		search (clinical)			
32	-	EAG literature search (economic)	Kitwitee (World Neurosurg, 2017; 750-760)	Full publication	<u>Population:</u> drug-resistant epilepsy (pre-diagnosed) <u>Intervention:</u> video EEG followed by surgery
33	-	EAG literature search (economic)	Kitschen (Eur J Neurol, 2023; 749-761)	Full publication	<u>Study design:</u> systematic review, <u>Intervention:</u> primary evidence none related to diagnostic in epilepsy (and from management studies, none conducted in UK setting).
34	-	EAG literature search (clinical)	Klotz (Annal Neurol, 2021; 134-142)	Full publication	<u>Intervention:</u> not device in scope
35	-	EAG literature search (clinical)	Klunder (Clin Neurophysiol, 2025; 2110771)	Full publication	<u>Intervention:</u> not device in scope
36	-	EAG literature search (clinical)	Koren (Zeitschrift fur Epileptologie, 2017; S22_P4)	Abstract	<u>Duplicate:</u> Subset of Koren (Frontiers in Neurol, 2018; 454)
37	-	EAG literature search (clinical)	Lang (Studies Health Tech and Inform, 2024; 158-159)	Full publication	<u>Intervention:</u> home based EEG <u>Outcomes:</u> feasibility (spikes as outcome captured via encephalogram).
38	-	EAG literature search (economic)	Lavin (Epilepsy and Behav, 2020; 107262)	Full publication	<u>Intervention:</u> epilepsy virtual clinics <u>Study design:</u> review (no modelling)

#	Technology	Source	Study	Publication type	Reasons for exclusion
39	SpikeNet2	EAG literature search (clinical)	Li (NEJM AI, 2025; 1-13)	Full publication	<u>Intervention:</u> SpikeNet2 <u>Outcomes:</u> detection using SCORE-AI dataset (and comparison of performance with SCORE-AI fully automated)
40	-	EAG literature search (clinical)	Maeda (Epilepsia Open, 2025; 107-119)	Full paper	<u>Population:</u> children with diagnosed epilepsy <u>Intervention:</u> not device listed in scope <u>Outcome:</u> high-frequency oscillations and prediction of seizure control
41	-	EAG literature search (clinical)	Matsuo (J Clin Neurophysiol, 2016; 277-278)_Abstract	Abstract	<u>Intervention:</u> Persyst 13 (pre-release version) <u>Abstract:</u> minimal information available in methods and results
42	-	EAG literature search (clinical)	Munjal (J Child Neurol, 2022; 73-79)	Abstract	<u>Population:</u> No suspicion of epilepsy <u>Outcomes:</u> acute neurologic deterioration
43	-	EAG literature search (clinical)	NCT05384782	Trial registration	<u>Duplicate:</u> full paper (Tait (Epilepsia, 2024; 2459-2469) already considered by the EAG
44	-	EAG literature search (clinical)	NCT05764252	Trial registration	<u>Duplicate:</u> full paper (Tittensor (MedRxiv, 2024) Preprint) already considered by the EAG
45	-	EAG literature	NCT07350551	Trial registration	<u>Intervention:</u> intracranial EEG,

#	Technology	Source	Study	Publication type	Reasons for exclusion
		search (clinical)			does not mention any devices listed in Final Scope
46	-	EAG literature search (clinical)	Neidhart (Clin Translat Neurosci, 2025; no page)_Abstract	Abstract	<u>Study design</u> : review (refers to Tveit et al. 2023; which was considered by EAG)
47	-	EAG literature search (economic)	Ney (J Med Econom, 2021; 318-327)	Full publication	<u>Population</u> : status epilepticus <u>Intervention</u> : Ceribell (rapid EEG system)
48	Unnamed	EAG literature search (clinical)	Nouboue (Clin Neurophysiol, 2025; 2110793)	Full publication	<u>Intervention</u> : not specified
49	Unnamed	EAG literature search (clinical)	Pavel (Epilepsia, 2023; 456-468)	Full publication	<u>Intervention</u> : not specified
50	Unnamed (logistic regression, random forest and deep learning models)	Clinical Science Systems	Pham (Neurocrit Care, 2022; 248-258)	Full publication	<u>Population</u> : post anoxic coma <u>Outcome</u> : no outcomes related to epilepsy or seizure listed
51	-	EAG literature search (economic)	Plumpton (Epilepsia, 2015; 556-563)	Full publication	<u>Population</u> : newly diagnosed epilepsy <u>Intervention</u> : genetic testing (before initiation of carbamazepine)
52	-	EAG literature search (clinical)	Quon (Clin Neurophysiol, 2022; 1-8)	Full publication	<u>Intervention</u> : not device in scope (intracranial EEG)
53	-	EAG literature search (clinical)	Remvig (Clin Neurophysiol, 2022; 86-93)	Full publication	<u>Intervention</u> : Episight

#	Technology	Source	Study	Publication type	Reasons for exclusion
54	-	EAG literature search (clinical)	Rijnders (Med Bio Eng Compy, 2022; 1675-1689)	Full publication	<u>Intervention:</u> Not specified
55	Unnamed (logistic regression, random forest and deep learning models)	Clinical Science Systems	Ruijter (Ann Neurol, 2019; 203-214)	Full publication	<u>Population:</u> post anoxic coma <u>Outcome:</u> no outcomes related to epilepsy or seizure listed
56	Unnamed (Matlab code; under development)	Clinical Science Systems	Ruijter (Neurophysiol, 2018; 1534-1543)	Full publication	<u>Population:</u> post anoxic coma <u>Outcome:</u> no outcomes related to epilepsy or seizure listed
57	-	EAG literature search (clinical)	Ryu (Child Nervous System, 2021; 2239-2244)	Full publication	<u>Intervention:</u> not specified
58	-	EAG literature search (clinical)	Sathyanarayana (J Clin Neurophysiol, 2024; 72-82)	Full publication	<u>Population:</u> children with epilepsy pre and post-medication <u>Intervention:</u> not specified
59	Persyst 14	EAG literature search (clinical)	Shi (Brain, 2024; 2496-2506)	Full publication	<u>Population:</u> Patients with drug-refractory epilepsy, who underwent surgery, undergoing intracranial evaluation
60	Persyst	EAG literature search (clinical)	Swartz (World J Ped Cong Heart Surg, 2025; 21-29)	Full publication	<u>Population:</u> children with suspected neurological injury <u>Outcome:</u> A:D changes prior to neurologic injury.
61	-	EAG literature search (clinical)	Tait (medRxiv, 2023; no page)	Pre-print	<u>Intervention:</u> not specified. <u>Duplicate:</u> may have overlap with Tait et al. 2024 (same trial)

#	Technology	Source	Study	Publication type	Reasons for exclusion
					registration number referenced)
62	-	EAG literature search (economic)	Tanoto (Epilepsy and Behav, 2024; 109787)	Full publication	<u>Population:</u> newly diagnosed epilepsy <u>Intervention:</u> genetic testing (before initiation of carbamazepine)
63	-	EAG literature search (clinical)	Tapani (Comp Bio Med, 2022; 105399)	Full publication	<u>Intervention:</u> not specified
64	-	EAG literature search (clinical)	Tokatly Latzer (Pediatric Neurology, 2025; 78-85)	Full publication	<u>Intervention:</u> not specified
65	-	EAG literature search (clinical)	Tsereteli (Epilepsia, 2022; 39)_Abstract	Abstract	<u>Duplicate:</u> Assumed overlap with full paper Tsereteli (Epilepsy & Beh, 2024; 100656) <u>Abstract:</u> limited detail in methods and results
66	Unnamed	Clinical Science Systems	van Leeuwen (Clin Neurophysiol, 2019; 77-84)	Full publication	<u>Outcome:</u> no outcomes specifically related to diagnosis epilepsy or seizure listed (categorised as broadly normal/abnormal)
67	Unnamed	Clinical Science Systems	van Putten (Clin Neurophysiol, 2005; 2480-2489)	Full publication	<u>Intervention:</u> not specified (unclear which related to the commercial product by NeuroCenter; this paper may be describing early development of the product) <u>Outcome:</u> looking at predictive factors related to seizures

#	Technology	Source	Study	Publication type	Reasons for exclusion
68	-	EAG literature search (clinical)	Weisholtz (Epilepsy Behavior, 2024; 109728)	Full publication	<u>Intervention:</u> no device
69	-	EAG literature search (clinical)	You (Comp Meth Prog Biomed, 2022; 106542)	Full publication	<u>Intervention:</u> anomaly detecting variational autoencoder (AnoVAE) algorithm

Appendix B – Economic evidence

Appendix B1: Summary of economic papers used to support development of a conceptual economic model

#	Study (year)	Country	Population [details]	Study description	Key results	Information useful to development of conceptual model
1.	Bonnon (J Neurol Neurosurg Psych, 2026; 25-32)	UK	Drug-resistant epilepsy [762 adults assessed for resective surgery; data from 10 epilepsy surgical centres]	Compares resective epilepsy surgery with medical management. De novo cost-utility analysis with a one-year decision tree followed by a lifetime Markov model from UK NHS and personal social services perspective.	The total lifetime cost of epilepsy treatment for people who had surgical treatment was £56,911, compared with £32,490 for medical management. Total QALYs per person for surgery were 15.91 and 13.76 for medical management. Resective epilepsy surgery was shown to be cost-effective with an ICER of £11,348 per QALY gained.	Includes presurgical assessment costs and probability of proceeding to resection (n=762), which could be used in future Markov model. Utilities for being or not being seizure free, as reported also in NG217, were used.
2.	Laskier (Epilepsia, 2023; 843-856)	UK	Drug-resistant focal seizures [adults, min. two prior antiseizure medicines]	Markov cohort model over a lifetime from UK NHS perspective. Cenobamate adjunctive therapy compared with brivaracetam, eslicarbazepine, lacosamide, and perampanel. Network meta-analysis informed relative efficacy. Subsequent states included	Cenobamate led to cost savings of £51,967 (versus brivaracetam), £21,080 (compared to eslicarbazepine), £33,619 (compared to lacosamide), and £28,296 (compared to perampanel). Increased QALYs of 1.047 (brivaracetam), 0.598 (eslicarbazepine), 0.776 (lacosamide), and 0.703 (compared to perampanel) per individual over a lifetime time	Markov model intended to capture health states according to seizure frequency reduction and movement of individuals to subsequent ASM therapy, vagus nerve stimulation, and surgery. Not used to support development of model but could be revisited in future if conceptual Markov model is adopted.

#	Study (year)	Country	Population [details]	Study description	Key results	Information useful to development of conceptual model
				other anti-seizure medications (ASMs), surgery, and vagus nerve stimulation (VNS) Costs and outcomes were discounted at 3.5% per annum, in line with the NICE reference case.	horizon. Cenobamate also dominated the four drugs across most sensitivity analyses. Differences were due to reduced seizure frequency with cenobamate relative to comparators.	
3.	Raspin (J Med Econom, 2021; 1037-1051)	UK	Drug-resistant epilepsy [not suitable for resective surgery]	Estimate costs and QALYs associated with adding VNS to ASM. Cohort state-transition model with five health states defined by percentage seizure reduction (100 % seizure-free, 75–99 % reduction, 50–74 % reduction, less than 50 % reduction, and no improvement) Three-month cycle with transitions across these bands. Ten-year horizon. English NHS and personal social services perspective. Costs included device, implantation, programming, battery replacement, anti-seizure medical (ASM), adverse events, and seizure-related resource use, modelling of	Base case: VNS plus ASM had an estimated incremental cost-effectiveness ratio (ICER) of £17,771 per QALY gained compared to ASMs alone. The cost-effective ICER was driven by relative reductions in expected seizure frequency and the differences in health care resource use associated therewith. Sensitivity analyses found that the amount of resource use per epilepsy-related health state was a key driver of the cost component.	Health states defined by seizure reduction bands (derived from RCTs), explicit modelling of device replacement and discontinuation, inclusion of adverse events and seizure-burden costs. Not used to support development of model but could be revisited in future if conceptual Markov model is adopted.

#	Study (year)	Country	Population [details]	Study description	Key results	Information useful to development of conceptual model
				VNS explantation and battery replacement curves		
4.	Tinelli (J Autism Devel Disord, 2024; 2733-2741)	England, Ireland, Italy, Spain	Autistic with epilepsy, focal seizures [children]	Decision-analytic model adapted from NICE methods. Simulation modelling to estimate the economic impact of ASM for each of 4 study countries from the healthcare system perspective. Monotherapy first then adjunctive therapy for non-responders. Fifteen-year horizon. Healthcare provider perspective in four countries plus a scenario including family costs in Ireland. QALYs as outcome with 3.5 % discount rate. Scenario analysis for Ireland explored out-of-pocket expenditure, lost earnings and informal (unpaid) care costs.	Most cost-effective first-line monotherapy carbamazepine. For add-on therapy oxcarbazepine most cost-effective in England and Spain, gabapentin most cost-effective in Ireland and Italy. Family costs in Ireland scenario exceeded provider expenditure.	Adaptation of the modelling approach used in NG217 (2021), which did contribute costs and utilities to this report.
5.	Marson (Lancet, 2021; 1375-1386); SANAD II study [ISRCTN30294119]	UK	Epilepsy [newly diagnosed generalised or unclassifiable, age five years and older].	Open-label, phase 4, multicentre non-inferiority RCT. Valproate versus levetiracetam as first-line. Cost-utility analysis alongside the trial with	Levetiracetam did not meet non-inferiority for time to 12-month remission. Cost-utility analysis showed levetiracetam dominated by valproate with negative incremental net health benefit and	Trial-based costs and QALYs for first-line treatment in generalised epilepsy. Highlights need to model remission endpoints in UK setting and outcomes

#	Study (year)	Country	Population [details]	Study description	Key results	Information useful to development of conceptual model
				QALYs and costs, n=520 patients, N=69 UK centres, 2 years follow up.	only 0.17 probability of being cost-effective at £20,000 per QALY. Findings inform treatment choice especially considering childbearing potential and valproate risks.	suitable for model inputs and assumptions. Not used to support development of model but could be revisited in future if conceptual Markov model is adopted.

Appendix B2: EAG Model validation

AdViSHE tool

Part A: Validation of the conceptual model (2 questions)

Part A discusses techniques for validating the conceptual model. A conceptual model describes the underlying system (e.g., progression of disease) using a mathematical, logical, verbal, or graphical representation. Please indicate where the conceptual model and its underlying assumptions are described and justified.

See section 6.2.1 and 6.2.2 of the EAG report.

A1/ Face validity testing (conceptual model):

Have experts been asked to judge the appropriateness of the conceptual model?

If yes, please provide information on the following aspects:

- Who are these experts?
- What is your justification for considering them experts?
- To what extent do they agree that the conceptual model is appropriate?

If no, please indicate why not.

Expert opinion sought on value propositions and key outcomes (NICE Scoping workshop); which were integrated in the decision problem outlined in the scope. Experts sought and ratified by NICE (range of expertise and geographical location across the UK). Further expert meeting held during development of the model and approach changed significantly as a result. Further questions asked to experts to parameterize the decision tree (all documented in Appendix D).

A2/ Cross validity testing (conceptual model):

Has this model been compared to other conceptual models found in the literature or clinical textbooks? If yes, please indicate where this comparison is reported. If no, please indicate why not.

Because this was a conceptual model for an early-use assessment, the focus was on internal validation.

Part B: Input data validation (2 questions)

Part B discusses techniques to validate the data serving as input in the model. These techniques are applicable to all types of models commonly used in HE modelling. Please indicate where the description and justification of the following aspects are given:

- search strategy;
- data sources, including descriptive statistics;
- reasons for inclusion of these data sources;
- reasons for exclusion of other available data sources;
- assumptions that have been made to assign values to parameters for which no data was available;
- distributions and parameters to represent uncertainty;
- data adjustments: mathematical transformations (e.g., logarithms, squares); treatment of outliers; treatment of missing data; data synthesis (indirect treatment comparison, network meta-analysis); calibration; etc.

B1/ Face validity testing (input data):

Have experts been asked to judge the appropriateness of the input data?

If yes, please provide information on the following aspects:

- Who are these experts?
- What is your justification for considering them experts?
- To what extent do they agree that the conceptual model is appropriate?

If no, please indicate why not.

Opinion sought from experts on key parameters where data were not available from the clinical evidence (documented in Appendix D).

B2/ Model fit testing:

When input parameters are based on regression models, have statistical tests been performed? If yes, please indicate where the description, the justification and the outcomes of these tests are reported. If no, please indicate why not.

No regression models were used by the EAG during development. Due to lack of clinical evidence, parameterisation was mostly based on assumption and clinical expert opinion (and explored further in sensitivity analysis).

Part C: Validation of the computerized model (4 questions)

C1/ External Review:

Has the computerized model been examined by modelling experts?

If yes, please provide information on the following aspects:

- Who are these experts?
- What is your justification for considering them experts?
- To what extent do they agree that the conceptual model is appropriate?

If no, please indicate why not.

Model was reviewed by Professor Luke Vale (LV), Professor of Health Economics and an expert in economic evaluation and health technology assessment. The model structure was reviewed during development and revisions were made to structure and possible transitions. The model is consistent with existing models for similar technologies in other disease areas, including those used to inform existing NICE guidelines. Estimation and consideration of costs, utilities and probabilities of traversing specific branches in the decision tree seem reasonable. As the focus was on the identification of key uncertainties the sensitivity analyses conducted were appropriate.

C2/ Extreme value testing:

Has the model been run for specific, extreme sets of parameter values in order to detect any coding errors?

If yes, please indicate where these tests and their outcomes are reported.

If no, please indicate why not.

Extreme value testing was performed across parameters used in the decision tree. The following parameters were varied:

- Prevalence of EEG abnormalities and seizures during EEG
- Sensitivity and specificity of technologies for seizure and IED detection
- Proportion of cases for which the technology would fail
- Costs (no cost/doubled cost)
- Time taken for EEG review, reporting, and interpretation
- Utilities assigned to terminal nodes
- Proportion of cases for which BioEP would give an inconclusive result

C3/ Testing of traces:

Have patients been tracked through the model to determine whether its logic is correct?

If yes, please indicate where these tests and their outcomes are reported. If no, please indicate why not.

Response: Terminal node occupancies at the end of each run reviewed by 2 modellers (RO/SG), QA'd by lead health economist (LV) to ensure cohort branches as expected. Extreme testing reviewed (0%, 100%) to ensure cohort movement as

expected also. Tabular output of terminal node occupancies included in report Appendix B3.

C4/ Unit testing:

Have individual sub-modules of the computerized model been tested?

If yes, please provide information on the following aspects: - Was a protocol that describes the tests, criteria, and acceptance norms defined beforehand? - Please indicate where these tests and their outcomes are reported. If no, please indicate why not.

Response: Decision tree was calculated manually for set values of sensitivity and specificity (SG) to ensure that the subgroup reaching terminal nodes was as expected. However, note that '*rdecision*' includes over 1300 internal validation checks. Output reviewed for "warning" (RO/SG)

Part D: Operational validation (4 questions)

Part D discusses techniques used to validate the model outcomes.

D1/ Face validity testing (model outcomes):

Have experts been asked to judge the appropriateness of the model outcomes?

If yes, please provide information on the following aspects:

- Who are these experts?
- What is your justification for considering them experts?
- To what extent did they conclude that the model outcomes are reasonable?

If no, please indicate why not.

Draft report with initial results (including terminal node occupancy, QALYs, costs) shared with NICE 10/03/2026, for expert feedback. No major concerns raised.

D2/ Cross validation testing (model outcomes):

Have the model outcomes been compared to the outcomes of other models that address similar problems?

If yes, please provide information on the following aspects:

- Are these comparisons based on published outcomes only, or did you have access to the alternative model?
 - Can the differences in outcomes between your model and other models be explained?
 - Please indicate where this comparison is reported, including a discussion of the comparability with your model.
- If no, please indicate why not.

Development of conceptual model focused on internal validation. Due to lack of published clinical evidence full parameterisation was not possible, therefore multiple assumed values used. The model was designed and run to demonstrate key uncertainties and highlight missing data. Therefore, comparing results with other published economic models not considered appropriate. Results of this modelling should be interpreted with caution.

D3/ Validation against outcomes using alternative input data:

Have the model outcomes been compared to the outcomes obtained when using alternative input data?

If yes, please indicate where these tests and their outcomes are reported. If no, please indicate why not.

Sensitivity and specificity reported by Kural et al. (2022) applied in sensitivity analysis for routine EEG. Sensitivity reported by Reus et al. (2021) applied in sensitivity analysis for ambulatory EEG. Results are reported in [Appendix B4](#).

D4/ Validation against empirical data:

Have the model outcomes been compared to empirical data?

If yes, please provide information on the following aspects:

- Are these comparisons based on summary statistics, or patient-level datasets?
- Have you been able to explain any difference between the model outcomes and empirical data?
- Please indicate where this comparison is reported. If no, please indicate why not.

D4.A/ Comparison against the data sources on which the model is based (dependent validation).

Response: The EAG did not generate any empirical data to compare the model against
D4.B/ Comparison against a data source that was not used to build the model (independent validation).
Response: The EAG did not generate any empirical data to compare the model against

Part E: Other validation techniques (1 question)

E1/ Other validation techniques:

Have any other validation techniques been performed? If yes, indicate where the application and outcomes are reported, or else provide a short summary here.
Response: The EAG did not perform any further validation techniques.

Appendix B3: EAG Model output (terminal node occupancies)

Routine EEG

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Base case, Routine EEG + encephalogram cost	1,000	552	448	0	341	439	211	9
Base case, Routine EEG + NeuroCenter cost	1,000	552	448	0	341	439	211	9
Base case, Routine EEG + NeuroWorks cost	1,000	552	448	0	341	439	211	9
Base case, Routine EEG + Persyst (y1) cost	1,000	552	448	0	341	439	211	9
Base case, Routine EEG + Persyst (y2+) cost	1,000	552	448	0	341	439	211	9
Base case, Routine EEG + BioEP cost	448	631	218	151	347	218	284	0
Comparator (standard care)	500	276	224	-	170	219	106	5
Routine EEG + encephalogram cost + 500 per year	500	276	224	0	170	219	106	5
Routine EEG + NeuroCenter cost + 500 per year	500	276	224	0	170	219	106	5
Routine EEG + NeuroWorks cost + 500 per year	500	276	224	0	170	219	106	5

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Routine EEG + Persyst (y1) cost + 500 per year	500	276	224	0	170	219	106	5
Routine EEG + Persyst (y2+) cost + 500 per year	500	276	224	0	170	219	106	5
Routine EEG + BioEP cost + 500 per year	224	315	109	76	173	109	142	0
Comparator (standard care)	2,000	1,104	896	-	681	878	422	19
Routine EEG + encephalogram cost + 2000 per year	2,000	1,104	896	0	682	878	422	18
Routine EEG + NeuroCenter cost + 2000 per year	2,000	1,104	896	0	682	878	422	18
Routine EEG + NeuroWorks cost + 2000 per year	2,000	1,104	896	0	682	878	422	18
Routine EEG + Persyst (y1) cost + 2000 per year	2,000	1,104	896	0	682	878	422	18
Routine EEG + Persyst (y2+) cost + 2000 per year	2,000	1,104	896	0	682	878	422	18
Routine EEG + BioEP cost + 2000 per year	896	1,261	437	302	693	436	568	0
Comparator (standard care)	4,000	2,208	1,792	-	1,363	1,755	845	37
Routine EEG + encephalogram cost + 4000 per year	4,000	2,209	1,791	0	1,364	1,755	845	36
Routine EEG + NeuroCenter cost + 4000 per year	4,000	2,209	1,791	0	1,364	1,755	845	36

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Routine EEG + NeuroWorks cost + 4000 per year	4,000	2,209	1,791	0	1,364	1,755	845	36
Routine EEG + Persyst (y1) cost + 4000 per year	4,000	2,209	1,791	0	1,364	1,755	845	36
Routine EEG + Persyst (y2+) cost + 4000 per year	4,000	2,209	1,791	0	1,364	1,755	845	36
Routine EEG + BioEP cost + 4000 per year	1,792	2,523	873	604	1,387	873	1,136	1
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + encephalogram cost + b6 rev	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroCenter cost + b6 rev	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroWorks cost + b6 rev	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y1) cost + b6 rev	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y2+) cost + b6 rev	1,000	552	448	0	341	439	211	9
Routine EEG + BioEP cost + b6 rev	448	631	218	151	347	218	284	0
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + encephalogram cost + b8c interp	1,000	552	448	0	341	439	211	9

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Routine EEG + NeuroCenter cost + b8c interp	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroWorks cost + b8c interp	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y1) cost + b8c interp	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y2+) cost + b8c interp	1,000	552	448	0	341	439	211	9
Routine EEG + BioEP cost + b8c interp	448	631	218	151	347	218	284	0
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + encephvis cost + b8a interp	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroCenter cost + b8a interp	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroWorks cost + b8a interp	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y1) cost + b8a interp	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y2+) cost + b8a interp	1,000	552	448	0	341	439	211	9
Routine EEG + BioEP cost + b8a interp	448	631	218	151	347	218	284	0
Comparator (standard care)	1,000	552	448	-	341	439	211	9

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Routine EEG + encephalogram cost + adult EEG cost	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroCenter cost + adult EEG cost	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroWorks cost + adult EEG cost	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y1) cost + adult EEG cost	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y2+) cost + adult EEG cost	1,000	552	448	0	341	439	211	9
Routine EEG + BioEP cost + adult EEG cost	448	631	218	151	347	218	284	0
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + encephalogram cost + child EEG cost	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroCenter cost + child EEG cost	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroWorks cost + child EEG cost	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y1) cost + child EEG cost	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y2+) cost + child EEG cost	1,000	552	448	0	341	439	211	9

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Routine EEG + BioEP cost + child EEG cost	448	631	218	151	347	218	284	0
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + BioEP cost + BioEP extra rev 2m	448	631	218	151	347	218	284	0
Routine EEG + BioEP cost + BioEP extra rev 10m	448	631	218	151	347	218	284	0
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + encephis cost + higher u_tp	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroCenter cost + higher u_tp	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroWorks cost + higher u_tp	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y1) cost + higher u_tp	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y2+) cost + higher u_tp	1,000	552	448	0	341	439	211	9
Routine EEG + BioEP cost + higher u_tp	448	631	218	151	347	218	284	0
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + encephis cost + child u_fp, u_tn	1,000	552	448	0	341	439	211	9

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Routine EEG + NeuroCenter cost + child u_fp, u_tn	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroWorks cost + child u_fp, u_tn	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y1) cost + child u_fp, u_tn	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y2+) cost + child u_fp, u_tn	1,000	552	448	0	341	439	211	9
Routine EEG + BioEP cost + child u_fp, u_tn	448	631	218	151	347	218	284	0
Comparator (standard care)	1,000	550	450	-	329	429	221	21
Routine EEG + encevis cost + Kural sens and spec	1,000	433	567	0	329	546	104	21
Routine EEG + Persyst (y1) cost + Kural sens and spec	1,000	362	638	0	277	566	84	73
Routine EEG + Persyst (y2+) cost + Kural sens and spec	1,000	362	638	0	277	566	84	73
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + encevis cost + b7 interp	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroCenter cost + b7 interp	1,000	552	448	0	341	439	211	9

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Routine EEG + NeuroWorks cost + b7 interp	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y1) cost + b7 interp	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y2+) cost + b7 interp	1,000	552	448	0	341	439	211	9
Routine EEG + BioEP cost + b7 interp	448	631	218	151	347	218	284	0
Comparator (standard care)	1,000	581	419	-	341	410	241	9
Routine EEG + encephis cost + lower IED spec	1,000	581	419	0	341	410	241	9
Routine EEG + NeuroCenter cost + lower IED spec	1,000	581	419	0	341	410	241	9
Routine EEG + NeuroWorks cost + lower IED spec	1,000	581	419	0	341	410	241	9
Routine EEG + Persyst (y1) cost + lower IED spec	1,000	581	419	0	341	410	241	9
Routine EEG + Persyst (y2+) cost + lower IED spec	1,000	581	419	0	341	410	241	9
Routine EEG + BioEP cost + lower IED spec	419	669	190	141	347	190	322	0
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + BioEP cost + fewer inconclusive 5%	448	665	313	22	349	313	315	0

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Routine EEG + BioEP cost + fewer inconclusive 10%	448	659	296	45	349	296	310	0
Routine EEG + BioEP cost + fewer inconclusive 20%	448	647	263	90	348	263	299	0
Comparator (standard care)	1,000	455	545	-	195	540	260	5
Routine EEG + encephalogram cost + different abnormality prev 20%	1,000	455	545	0	195	540	260	5
Routine EEG + NeuroCenter cost + different abnormality prev 20%	1,000	455	545	0	195	540	260	5
Routine EEG + NeuroWorks cost + different abnormality prev 20%	1,000	455	545	0	195	540	260	5
Routine EEG + Persyst (y1) cost + different abnormality prev 20%	1,000	455	545	0	195	540	260	5
Routine EEG + Persyst (y2+) cost + different abnormality prev 20%	1,000	455	545	0	195	540	260	5
Routine EEG + BioEP cost + different abnormality prev 20%	545	548	269	184	198	269	350	0
Comparator (standard care)	1,000	649	351	-	487	338	162	13

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Routine EEG + encevis cost + different abnormality prev 50%	1,000	650	350	0	487	338	162	13
Routine EEG + NeuroCenter cost + different abnormality prev 50%	1,000	650	350	0	487	338	162	13
Routine EEG + NeuroWorks cost + different abnormality prev 50%	1,000	650	350	0	487	338	162	13
Routine EEG + Persyst (y1) cost + different abnormality prev 50%	1,000	650	350	0	487	338	162	13
Routine EEG + Persyst (y2+) cost + different abnormality prev 50%	1,000	650	350	0	487	338	162	13
Routine EEG + BioEP cost + different abnormality prev 50%	351	714	168	118	495	168	218	0
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + encevis cost + different seizure prev 0.6%	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroCenter cost + different seizure prev 0.6%	1,000	552	448	0	341	439	211	9

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Routine EEG + NeuroWorks cost + different seizure prev 0.6%	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y1) cost + different seizure prev 0.6%	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y2+) cost + different seizure prev 0.6%	1,000	552	448	0	341	439	211	9
Routine EEG + BioEP cost + different seizure prev 0.6%	448	631	218	151	347	218	284	0
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + encephis cost + different seizure prev 2%	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroCenter cost + different seizure prev 2%	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroWorks cost + different seizure prev 2%	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y1) cost + different seizure prev 2%	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y2+) cost + different seizure prev 2%	1,000	552	448	0	341	439	211	9

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Routine EEG + BioEP cost + different seizure prev 2%	448	631	218	151	347	218	284	0
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + encevis cost + lower treatment cost	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroCenter cost + lower treatment cost	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroWorks cost + lower treatment cost	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y1) cost + lower treatment cost	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y2+) cost + lower treatment cost	1,000	552	448	0	341	439	211	9
Routine EEG + BioEP cost + lower treatment cost	448	631	218	151	347	218	284	0
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + encevis cost + higher treatment cost	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroCenter cost + higher treatment cost	1,000	552	448	0	341	439	211	9
Routine EEG + NeuroWorks cost + higher treatment cost	1,000	552	448	0	341	439	211	9

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Routine EEG + Persyst (y1) cost + higher treatment cost	1,000	552	448	0	341	439	211	9
Routine EEG + Persyst (y2+) cost + higher treatment cost	1,000	552	448	0	341	439	211	9
Routine EEG + BioEP cost + higher treatment cost	448	631	218	151	347	218	284	0
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + BioEP cost + 100% unsupportive/inconclusive have SD EEG	448	631	218	151	347	218	284	0
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + BioEP cost + 75% unsupportive/inconclusive have SD EEG	448	631	218	151	347	218	284	0
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + BioEP cost + 50% unsupportive/inconclusive have SD EEG	448	631	218	151	347	218	284	0
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + BioEP cost + 100%	448	631	218	151	347	218	284	0

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
unsupportive/inconclusive have telemetry								
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + BioEP cost + 75% unsupportive/inconclusive have telemetry	448	631	218	151	347	218	284	0
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + BioEP cost + 50% unsupportive/inconclusive have telemetry	448	631	218	151	347	218	284	0
Comparator (standard care)	1,000	552	448	-	341	439	211	9
Routine EEG + BioEP cost + Tait et al. (2024) sensitivity	448	628	221	151	344	218	284	2
Comparator (standard care)	1,000	288	712	-	156	517	133	194
Routine EEG + BioEP cost + comparator IED accuracy from Bouma et al. 2016	712	499	261	240	281	257	218	4
Routine EEG + BioEP cost + comparator IED accuracy from Bouma et al. 2016 + intervention sens from Tait et al.	712	453	308	240	234	257	218	50

Sleep-deprived EEG

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Comparator (standard care)	1,000	714	286	-	584	270	130	16
Base case, Sleep-deprived EEG + encephalogram cost	1,000	715	285	0	585	270	130	15
Base case, Sleep-deprived EEG + NeuroCenter cost	1,000	715	285	0	585	270	130	15
Base case, Sleep-deprived EEG + NeuroWorks cost	1,000	715	285	0	585	270	130	15
Base case, Sleep-deprived EEG + Persyst (y1) cost	1,000	715	285	0	585	270	130	15
Base case, Sleep-deprived EEG + Persyst (y2+) cost	1,000	715	285	0	585	270	130	15
Base case, Sleep-deprived EEG + BioEP cost	286	769	135	96	594	134	175	0
Comparator (standard care)	500	357	143	-	292	135	65	8
Sleep-deprived EEG + encephalogram cost + 500 per year	500	357	143	0	292	135	65	8
Sleep-deprived EEG + NeuroCenter cost + 500 per year	500	357	143	0	292	135	65	8
Sleep-deprived EEG + NeuroWorks cost + 500 per year	500	357	143	0	292	135	65	8

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Sleep-deprived EEG + Persyst (y1) cost + 500 per year	500	357	143	0	292	135	65	8
Sleep-deprived EEG + Persyst (y2+) cost + 500 per year	500	357	143	0	292	135	65	8
Sleep-deprived EEG + BioEP cost + 500 per year	143	385	67	48	297	67	87	0
Comparator (standard care)	2,000	1,429	571	-	1,169	540	260	31
Sleep-deprived EEG + encephalogram cost + 2000 per year	2,000	1,430	570	0	1,170	540	260	30
Sleep-deprived EEG + NeuroCenter cost + 2000 per year	2,000	1,430	570	0	1,170	540	260	30
Sleep-deprived EEG + NeuroWorks cost + 2000 per year	2,000	1,430	570	0	1,170	540	260	30
Sleep-deprived EEG + Persyst (y1) cost + 2000 per year	2,000	1,430	570	0	1,170	540	260	30
Sleep-deprived EEG + Persyst (y2+) cost + 2000 per year	2,000	1,430	570	0	1,170	540	260	30
Sleep-deprived EEG + BioEP cost + 2000 per year	571	1,538	269	193	1,189	269	350	1
Comparator (standard care)	4,000	2,857	1,143	-	2,337	1,080	520	63
Sleep-deprived EEG + encephalogram cost + 4000 per year	4,000	2,859	1,141	0	2,339	1,080	520	61

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Sleep-deprived EEG + NeuroCenter cost + 4000 per year	4,000	2,859	1,141	0	2,339	1,080	520	61
Sleep-deprived EEG + NeuroWorks cost + 4000 per year	4,000	2,859	1,141	0	2,339	1,080	520	61
Sleep-deprived EEG + Persyst (y1) cost + 4000 per year	4,000	2,859	1,141	0	2,339	1,080	520	61
Sleep-deprived EEG + Persyst (y2+) cost + 4000 per year	4,000	2,859	1,141	0	2,339	1,080	520	61
Sleep-deprived EEG + BioEP cost + 4000 per year	1,143	3,077	538	385	2,378	537	699	1
Comparator (standard care)	1,000	714	286	-	584	270	130	16
Sleep-deprived EEG + encephalogram cost + b6 rev	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroCenter cost + b6 rev	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroWorks cost + b6 rev	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y1) cost + b6 rev	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y2+) cost + b6 rev	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + BioEP cost + b6 rev	286	769	135	96	594	134	175	0

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Comparator (standard care)	1,000	714	286	-	584	270	130	16
Sleep-deprived EEG + encephalogram cost + b8c interp	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroCenter cost + b8c interp	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroWorks cost + b8c interp	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y1) cost + b8c interp	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y2+) cost + b8c interp	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + BioEP cost + b8c interp	286	769	135	96	594	134	175	0
Comparator (standard care)	1,000	714	286	-	584	270	130	16
Sleep-deprived EEG + encephalogram cost + b8a interp	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroCenter cost + b8a interp	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroWorks cost + b8a interp	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y1) cost + b8a interp	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y2+) cost + b8a interp	1,000	715	285	0	585	270	130	15

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Sleep-deprived EEG + BioEP cost + b8a interp	286	769	135	96	594	134	175	0
Comparator (standard care)	1,000	714	286	-	584	270	130	16
Sleep-deprived EEG + encephalogram cost + adult EEG cost	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroCenter cost + adult EEG cost	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroWorks cost + adult EEG cost	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y1) cost + adult EEG cost	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y2+) cost + adult EEG cost	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + BioEP cost + adult EEG cost	286	769	135	96	594	134	175	0
Comparator (standard care)	1,000	714	286	-	584	270	130	16
Sleep-deprived EEG + encephalogram cost + child EEG cost	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroCenter cost + child EEG cost	1,000	715	285	0	585	270	130	15

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Sleep-deprived EEG + NeuroWorks cost + child EEG cost	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y1) cost + child EEG cost	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y2+) cost + child EEG cost	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + BioEP cost + child EEG cost	286	769	135	96	594	134	175	0
Comparator (standard care)	1,000	714	286	-	584	270	130	16
Sleep-deprived EEG + BioEP cost + BioEP extra rev 2m	286	769	135	96	594	134	175	0
Sleep-deprived EEG + BioEP cost + BioEP extra rev 10m	286	769	135	96	594	134	175	0
Comparator (standard care)	1,000	714	286	-	584	270	130	16
Sleep-deprived EEG + encevis cost + higher u_tp	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroCenter cost + higher u_tp	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroWorks cost + higher u_tp	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y1) cost + higher u_tp	1,000	715	285	0	585	270	130	15

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Sleep-deprived EEG + Persyst (y2+) cost + higher u_tp	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + BioEP cost + higher u_tp	286	769	135	96	594	134	175	0
Comparator (standard care)	1,000	714	286	-	584	270	130	16
Sleep-deprived EEG + encephalogram cost + child u_fp, u_tn	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroCenter cost + child u_fp, u_tn	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroWorks cost + child u_fp, u_tn	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y1) cost + child u_fp, u_tn	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y2+) cost + child u_fp, u_tn	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + BioEP cost + child u_fp, u_tn	286	769	135	96	594	134	175	0
Comparator (standard care)	1,000	714	286	-	584	270	130	16
Sleep-deprived EEG + encephalogram cost + b7 interp	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroCenter cost + b7 interp	1,000	715	285	0	585	270	130	15

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Sleep-deprived EEG + NeuroWorks cost + b7 interp	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y1) cost + b7 interp	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y2+) cost + b7 interp	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + BioEP cost + b7 interp	286	769	135	96	594	134	175	0
Comparator (standard care)	1,000	732	268	-	584	252	148	16
Sleep-deprived EEG + encevis cost + lower IED spec	1,000	733	267	0	585	252	148	15
Sleep-deprived EEG + NeuroCenter cost + lower IED spec	1,000	733	267	0	585	252	148	15
Sleep-deprived EEG + NeuroWorks cost + lower IED spec	1,000	733	267	0	585	252	148	15
Sleep-deprived EEG + Persyst (y1) cost + lower IED spec	1,000	733	267	0	585	252	148	15
Sleep-deprived EEG + Persyst (y2+) cost + lower IED spec	1,000	733	267	0	585	252	148	15
Sleep-deprived EEG + BioEP cost + lower IED spec	268	793	117	90	594	117	198	0
Comparator (standard care)	1,000	714	286	-	584	270	130	16

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Sleep-deprived EEG + BioEP cost + fewer inconclusive 5%	286	793	193	14	599	192	194	0
Sleep-deprived EEG + BioEP cost + fewer inconclusive 10%	286	789	183	29	598	182	191	0
Sleep-deprived EEG + BioEP cost + fewer inconclusive 20%	286	780	162	57	596	162	184	0
Comparator (standard care)	1,000	649	351	-	487	338	162	13
Sleep-deprived EEG + encephalogram cost + different abnormality prev 50%	1,000	650	350	0	487	338	162	13
Sleep-deprived EEG + NeuroCenter cost + different abnormality prev 50%	1,000	650	350	0	487	338	162	13
Sleep-deprived EEG + NeuroWorks cost + different abnormality prev 50%	1,000	650	350	0	487	338	162	13
Sleep-deprived EEG + Persyst (y1) cost + different abnormality prev 50%	1,000	650	350	0	487	338	162	13
Sleep-deprived EEG + Persyst (y2+) cost + different abnormality prev 50%	1,000	650	350	0	487	338	162	13
Sleep-deprived EEG + BioEP cost + different abnormality prev 50%	351	714	168	118	495	168	218	0
Comparator (standard care)	1,000	779	221	-	682	203	98	18

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Sleep-deprived EEG + encephalogram cost + different abnormality prev 70%	1,000	780	220	0	682	203	98	18
Sleep-deprived EEG + NeuroCenter cost + different abnormality prev 70%	1,000	780	220	0	682	203	98	18
Sleep-deprived EEG + NeuroWorks cost + different abnormality prev 70%	1,000	780	220	0	682	203	98	18
Sleep-deprived EEG + Persyst (y1) cost + different abnormality prev 70%	1,000	780	220	0	682	203	98	18
Sleep-deprived EEG + Persyst (y2+) cost + different abnormality prev 70%	1,000	780	220	0	682	203	98	18
Sleep-deprived EEG + BioEP cost + different abnormality prev 70%	221	825	101	74	693	101	131	0
Comparator (standard care)	1,000	714	286	-	584	270	130	16
Sleep-deprived EEG + encephalogram cost + different seizure prev 0.6%	1,000	714	286	0	584	270	130	16
Sleep-deprived EEG + NeuroCenter cost + different seizure prev 0.6%	1,000	714	286	0	584	270	130	16

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Sleep-deprived EEG + NeuroWorks cost + different seizure prev 0.6%	1,000	714	286	0	584	270	130	16
Sleep-deprived EEG + Persyst (y1) cost + different seizure prev 0.6%	1,000	714	286	0	584	270	130	16
Sleep-deprived EEG + Persyst (y2+) cost + different seizure prev 0.6%	1,000	714	286	0	584	270	130	16
Sleep-deprived EEG + BioEP cost + different seizure prev 0.6%	286	769	135	96	594	134	175	0
Comparator (standard care)	1,000	714	286	-	584	270	130	16
Sleep-deprived EEG + encephalogram cost + different seizure prev 4%	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroCenter cost + different seizure prev 4%	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroWorks cost + different seizure prev 4%	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y1) cost + different seizure prev 4%	1,000	715	285	0	585	270	130	15

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Sleep-deprived EEG + Persyst (y2+) cost + different seizure prev 4%	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + BioEP cost + different seizure prev 4%	286	769	135	96	594	134	175	0
Comparator (standard care)	1,000	714	286	-	584	270	130	16
Sleep-deprived EEG + encephalogram cost + lower treatment cost	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroCenter cost + lower treatment cost	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroWorks cost + lower treatment cost	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y1) cost + lower treatment cost	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y2+) cost + lower treatment cost	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + BioEP cost + lower treatment cost	286	769	135	96	594	134	175	0
Comparator (standard care)	1,000	714	286	-	584	270	130	16
Sleep-deprived EEG + encephalogram cost + higher treatment cost	1,000	715	285	0	585	270	130	15

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Sleep-deprived EEG + NeuroCenter cost + higher treatment cost	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + NeuroWorks cost + higher treatment cost	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y1) cost + higher treatment cost	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + Persyst (y2+) cost + higher treatment cost	1,000	715	285	0	585	270	130	15
Sleep-deprived EEG + BioEP cost + higher treatment cost	286	769	135	96	594	134	175	0
Comparator (standard care)	1,000	714	286	-	584	270	130	16
Sleep-deprived EEG + BioEP cost + Tait et al. (2024) sensitivity	286	765	138	96	591	134	175	4

Ambulatory EEG

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Comparator (standard care)	1,000	801	199	-	719	169	81	31

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Base case, Ambulatory EEG + encevis cost	1,000	801	199	0	720	169	81	30
Base case, Ambulatory EEG + NeuroCenter cost	1,000	801	199	0	720	169	81	30
Base case, Ambulatory EEG + NeuroWorks cost	1,000	801	199	0	720	169	81	30
Base case, Ambulatory EEG + Persyst (y1) cost	1,000	801	199	0	720	169	81	30
Base case, Ambulatory EEG + Persyst (y2+) cost	1,000	801	199	0	720	169	81	30
Base case, Ambulatory EEG + BioEP cost	199	848	85	67	739	84	109	1
Comparator (standard care)	500	400	100	-	360	84	41	15
Ambulatory EEG + encevis cost + 500 per year	500	401	99	0	360	84	41	15
Ambulatory EEG + NeuroCenter cost + 500 per year	500	401	99	0	360	84	41	15
Ambulatory EEG + NeuroWorks cost + 500 per year	500	401	99	0	360	84	41	15
Ambulatory EEG + Persyst (y1) cost + 500 per year	500	401	99	0	360	84	41	15
Ambulatory EEG + Persyst (y2+) cost + 500 per year	500	401	99	0	360	84	41	15

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Ambulatory EEG + BioEP cost + 500 per year	100	424	42	34	369	42	55	0
Comparator (standard care)	2,000	1,601	399	-	1,439	338	162	61
Ambulatory EEG + encephalogram cost + 2000 per year	2,000	1,603	397	0	1,440	338	162	60
Ambulatory EEG + NeuroCenter cost + 2000 per year	2,000	1,603	397	0	1,440	338	162	60
Ambulatory EEG + NeuroWorks cost + 2000 per year	2,000	1,603	397	0	1,440	338	162	60
Ambulatory EEG + Persyst (y1) cost + 2000 per year	2,000	1,603	397	0	1,440	338	162	60
Ambulatory EEG + Persyst (y2+) cost + 2000 per year	2,000	1,603	397	0	1,440	338	162	60
Ambulatory EEG + BioEP cost + 2000 per year	399	1,696	170	134	1,477	168	218	2
Comparator (standard care)	4,000	3,203	797	-	2,878	675	325	122
Ambulatory EEG + encephalogram cost + 4000 per year	4,000	3,205	795	0	2,880	675	325	120
Ambulatory EEG + NeuroCenter cost + 4000 per year	4,000	3,205	795	0	2,880	675	325	120

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Ambulatory EEG + NeuroWorks cost + 4000 per year	4,000	3,205	795	0	2,880	675	325	120
Ambulatory EEG + Persyst (y1) cost + 4000 per year	4,000	3,205	795	0	2,880	675	325	120
Ambulatory EEG + Persyst (y2+) cost + 4000 per year	4,000	3,205	795	0	2,880	675	325	120
Ambulatory EEG + BioEP cost + 4000 per year	797	3,392	340	269	2,955	336	437	4
Comparator (standard care)	1,000	801	199	-	719	169	81	31
Ambulatory EEG + encephalogram cost + b8c interp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + NeuroCenter cost + b8c interp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + NeuroWorks cost + b8c interp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + Persyst (y1) cost + b8c interp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + Persyst (y2+) cost + b8c interp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + BioEP cost + b8c interp	199	848	85	67	739	84	109	1
Comparator (standard care)	1,000	801	199	-	719	169	81	31

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Ambulatory EEG + encephalogram cost + b8a interp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + NeuroCenter cost + b8a interp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + NeuroWorks cost + b8a interp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + Persyst (y1) cost + b8a interp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + Persyst (y2+) cost + b8a interp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + BioEP cost + b8a interp	199	848	85	67	739	84	109	1
Comparator (standard care)	1,000	801	199	-	719	169	81	31
Ambulatory EEG + BioEP cost + BioEP extra rev 2m	199	848	85	67	739	84	109	1
Ambulatory EEG + BioEP cost + BioEP extra rev 10m	199	848	85	67	739	84	109	1
Comparator (standard care)	1,000	801	199	-	719	169	81	31
Ambulatory EEG + encephalogram cost + higher u_tp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + NeuroCenter cost + higher u_tp	1,000	801	199	0	720	169	81	30

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Ambulatory EEG + NeuroWorks cost + higher u_tp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + Persyst (y1) cost + higher u_tp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + Persyst (y2+) cost + higher u_tp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + BioEP cost + higher u_tp	199	848	85	67	739	84	109	1
Comparator (standard care)	1,000	801	199	-	719	169	81	31
Ambulatory EEG + encephis cost + child u_fp, u_tn	1,000	801	199	0	720	169	81	30
Ambulatory EEG + NeuroCenter cost + child u_fp, u_tn	1,000	801	199	0	720	169	81	30
Ambulatory EEG + NeuroWorks cost + child u_fp, u_tn	1,000	801	199	0	720	169	81	30
Ambulatory EEG + Persyst (y1) cost + child u_fp, u_tn	1,000	801	199	0	720	169	81	30
Ambulatory EEG + Persyst (y2+) cost + child u_fp, u_tn	1,000	801	199	0	720	169	81	30
Ambulatory EEG + BioEP cost + child u_fp, u_tn	199	848	85	67	739	84	109	1
Comparator (standard care)	1,000	779	221	-	716	188	62	34

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Ambulatory EEG + encephalogram cost + Reus sens	1,000	779	221	0	716	188	62	34
Ambulatory EEG + Persyst (y1) cost + Reus sens	1,000	779	221	0	716	188	62	34
Ambulatory EEG + Persyst (y2+) cost + Reus sens	1,000	779	221	0	716	188	62	34
Comparator (standard care)	1,000	801	199	-	719	169	81	31
Ambulatory EEG + encephalogram cost + Koren 2018 test failure	1,000	801	199	0	720	169	81	30
Comparator (standard care)	1,000	812	188	-	719	158	93	31
Ambulatory EEG + encephalogram cost + lower IED spec	1,000	813	187	0	720	158	93	30
Ambulatory EEG + NeuroCenter cost + lower IED spec	1,000	813	187	0	720	158	93	30
Ambulatory EEG + NeuroWorks cost + lower IED spec	1,000	813	187	0	720	158	93	30
Ambulatory EEG + Persyst (y1) cost + lower IED spec	1,000	813	187	0	720	158	93	30
Ambulatory EEG + Persyst (y2+) cost + lower IED spec	1,000	813	187	0	720	158	93	30
Ambulatory EEG + BioEP cost + lower IED spec	188	863	74	63	739	73	124	1

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Comparator (standard care)	1,000	801	199	-	719	169	81	31
Ambulatory EEG + encephalogram cost + lower interp time	1,000	801	199	0	720	169	81	30
Ambulatory EEG + NeuroCenter cost + lower interp time	1,000	801	199	0	720	169	81	30
Ambulatory EEG + NeuroWorks cost + lower interp time	1,000	801	199	0	720	169	81	30
Ambulatory EEG + Persyst (y1) cost + lower interp time	1,000	801	199	0	720	169	81	30
Ambulatory EEG + Persyst (y2+) cost + lower interp time	1,000	801	199	0	720	169	81	30
Ambulatory EEG + BioEP cost + lower interp time	199	848	85	67	739	84	109	1
Comparator (standard care)	1,000	801	199	-	719	169	81	31
Ambulatory EEG + BioEP cost + fewer inconclusive 5%	199	868	122	10	747	120	121	1
Ambulatory EEG + BioEP cost + fewer inconclusive 10%	199	865	115	20	746	114	119	1
Ambulatory EEG + BioEP cost + fewer inconclusive 20%	199	858	102	40	743	101	115	1
Comparator (standard care)	1,000	769	231	-	671	203	98	29

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Ambulatory EEG + encephalogram cost + different abnormality prevalence 70%	1,000	770	230	0	672	203	98	28
Ambulatory EEG + NeuroCenter cost + different abnormality prevalence 70%	1,000	770	230	0	672	203	98	28
Ambulatory EEG + NeuroWorks cost + different abnormality prevalence 70%	1,000	770	230	0	672	203	98	28
Ambulatory EEG + Persyst (y1) cost + different abnormality prevalence 70%	1,000	770	230	0	672	203	98	28
Ambulatory EEG + Persyst (y2+) cost + different abnormality prevalence 70%	1,000	770	230	0	672	203	98	28
Ambulatory EEG + BioEP cost + different abnormality prevalence 70%	231	821	102	78	689	101	131	1
Comparator (standard care)	1,000	832	168	-	767	135	65	33
Ambulatory EEG + encephalogram cost + different abnormality prevalence 80%	1,000	833	167	0	768	135	65	32
Ambulatory EEG + NeuroCenter cost + different abnormality prevalence 80%	1,000	833	167	0	768	135	65	32

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Ambulatory EEG + NeuroWorks cost + different abnormality prev 80%	1,000	833	167	0	768	135	65	32
Ambulatory EEG + Persyst (y1) cost + different abnormality prev 80%	1,000	833	167	0	768	135	65	32
Ambulatory EEG + Persyst (y2+) cost + different abnormality prev 80%	1,000	833	167	0	768	135	65	32
Ambulatory EEG + BioEP cost + different abnormality prev 80%	168	875	68	56	788	67	87	1
Comparator (standard care)	1,000	801	199	-	719	169	81	31
Ambulatory EEG + encephalogram cost + b7 interp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + NeuroCenter cost + b7 interp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + NeuroWorks cost + b7 interp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + Persyst (y1) cost + b7 interp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + Persyst (y2+) cost + b7 interp	1,000	801	199	0	720	169	81	30
Ambulatory EEG + BioEP cost + b7 interp	199	848	85	67	739	84	109	1

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Comparator (standard care)	1,000	807	193	-	726	169	81	24
Ambulatory EEG + encephalogram cost + different seizure prev 30%	1,000	808	192	0	726	169	81	24
Ambulatory EEG + NeuroCenter cost + different seizure prev 30%	1,000	808	192	0	726	169	81	24
Ambulatory EEG + NeuroWorks cost + different seizure prev 30%	1,000	808	192	0	726	169	81	24
Ambulatory EEG + Persyst (y1) cost + different seizure prev 30%	1,000	808	192	0	726	169	81	24
Ambulatory EEG + Persyst (y2+) cost + different seizure prev 30%	1,000	808	192	0	726	169	81	24
Ambulatory EEG + BioEP cost + different seizure prev 30%	193	850	85	65	741	84	109	1
Comparator (standard care)	1,000	801	199	-	719	169	81	31
Ambulatory EEG + encephalogram cost + lower treatment cost	1,000	801	199	0	720	169	81	30
Ambulatory EEG + NeuroCenter cost + lower treatment cost	1,000	801	199	0	720	169	81	30

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Ambulatory EEG + NeuroWorks cost + lower treatment cost	1,000	801	199	0	720	169	81	30
Ambulatory EEG + Persyst (y1) cost + lower treatment cost	1,000	801	199	0	720	169	81	30
Ambulatory EEG + Persyst (y2+) cost + lower treatment cost	1,000	801	199	0	720	169	81	30
Ambulatory EEG + BioEP cost + lower treatment cost	199	848	85	67	739	84	109	1
Comparator (standard care)	1,000	801	199	-	719	169	81	31
Ambulatory EEG + encephis cost + higher treatment cost	1,000	801	199	0	720	169	81	30
Ambulatory EEG + NeuroCenter cost + higher treatment cost	1,000	801	199	0	720	169	81	30
Ambulatory EEG + NeuroWorks cost + higher treatment cost	1,000	801	199	0	720	169	81	30
Ambulatory EEG + Persyst (y1) cost + higher treatment cost	1,000	801	199	0	720	169	81	30
Ambulatory EEG + Persyst (y2+) cost + higher treatment cost	1,000	801	199	0	720	169	81	30

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Ambulatory EEG + BioEP cost + higher treatment cost	199	848	85	67	739	84	109	1
Comparator (standard care)	1,000	801	199	-	719	169	81	31
Ambulatory EEG + BioEP cost + Tait et al. (2024) sensitivity	199	841	92	67	732	84	109	8

Video telemetry EEG

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Comparator (standard care)	1,000	820	180	-	747	152	73	28
Base case, Video telemetry EEG + encevis cost	1,000	820	180	0	747	152	73	28
Base case, Video telemetry EEG + NeuroCenter cost	1,000	820	180	0	747	152	73	28
Base case, Video telemetry EEG + NeuroWorks cost	1,000	820	180	0	747	152	73	28
Base case, Video telemetry EEG + Persyst (y1) cost	1,000	820	180	0	747	152	73	28
Base case, Video telemetry EEG + Persyst (y2+) cost	1,000	820	180	0	747	152	73	28
Base case, Video telemetry EEG + BioEP cost	180	863	76	61	765	76	98	1

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Comparator (standard care)	500	410	90	-	373	76	37	14
Video telemetry EEG + encevis cost + 500 per year	500	410	90	0	374	76	37	14
Video telemetry EEG + NeuroCenter cost + 500 per year	500	410	90	0	374	76	37	14
Video telemetry EEG + NeuroWorks cost + 500 per year	500	410	90	0	374	76	37	14
Video telemetry EEG + Persyst (y1) cost + 500 per year	500	410	90	0	374	76	37	14
Video telemetry EEG + Persyst (y2+) cost + 500 per year	500	410	90	0	374	76	37	14
Video telemetry EEG + BioEP cost + 500 per year	90	431	38	30	382	38	49	0
Comparator (standard care)	2,000	1,640	360	-	1,493	304	146	57
Video telemetry EEG + encevis cost + 2000 per year	2,000	1,641	359	0	1,495	304	146	55
Video telemetry EEG + NeuroCenter cost + 2000 per year	2,000	1,641	359	0	1,495	304	146	55
Video telemetry EEG + NeuroWorks cost + 2000 per year	2,000	1,641	359	0	1,495	304	146	55

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Video telemetry EEG + Persyst (y1) cost + 2000 per year	2,000	1,641	359	0	1,495	304	146	55
Video telemetry EEG + Persyst (y2+) cost + 2000 per year	2,000	1,641	359	0	1,495	304	146	55
Video telemetry EEG + BioEP cost + 2000 per year	360	1,726	153	121	1,529	151	197	2
Comparator (standard care)	4,000	3,279	721	-	2,987	607	292	113
Video telemetry EEG + encevis cost + 4000 per year	4,000	3,282	718	0	2,989	607	292	111
Video telemetry EEG + NeuroCenter cost + 4000 per year	4,000	3,282	718	0	2,989	607	292	111
Video telemetry EEG + NeuroWorks cost + 4000 per year	4,000	3,282	718	0	2,989	607	292	111
Video telemetry EEG + Persyst (y1) cost + 4000 per year	4,000	3,282	718	0	2,989	607	292	111
Video telemetry EEG + Persyst (y2+) cost + 4000 per year	4,000	3,282	718	0	2,989	607	292	111
Video telemetry EEG + BioEP cost + 4000 per year	721	3,451	306	243	3,058	302	393	4
Comparator (standard care)	1,000	820	180	-	747	152	73	28
Video telemetry EEG + encevis cost + b8c interp	1,000	820	180	0	747	152	73	28

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Video telemetry EEG + NeuroCenter cost + b8c interp	1,000	820	180	0	747	152	73	28
Video telemetry EEG + NeuroWorks cost + b8c interp	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y1) cost + b8c interp	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y2+) cost + b8c interp	1,000	820	180	0	747	152	73	28
Video telemetry EEG + BioEP cost + b8c interp	180	863	76	61	765	76	98	1
Comparator (standard care)	1,000	820	180	-	747	152	73	28
Video telemetry EEG + encephalogram cost + b8a interp	1,000	820	180	0	747	152	73	28
Video telemetry EEG + NeuroCenter cost + b8a interp	1,000	820	180	0	747	152	73	28
Video telemetry EEG + NeuroWorks cost + b8a interp	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y1) cost + b8a interp	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y2+) cost + b8a interp	1,000	820	180	0	747	152	73	28
Video telemetry EEG + BioEP cost + b8a interp	180	863	76	61	765	76	98	1
Comparator (standard care)	1,000	820	180	-	747	152	73	28

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Video telemetry EEG + BioEP cost + BioEP extra rev 2m	180	863	76	61	765	76	98	1
Video telemetry EEG + BioEP cost + BioEP extra rev 10m	180	863	76	61	765	76	98	1
Comparator (standard care)	1,000	820	180	-	747	152	73	28
Video telemetry EEG + encevis cost + higher u_tp	1,000	820	180	0	747	152	73	28
Video telemetry EEG + NeuroCenter cost + higher u_tp	1,000	820	180	0	747	152	73	28
Video telemetry EEG + NeuroWorks cost + higher u_tp	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y1) cost + higher u_tp	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y2+) cost + higher u_tp	1,000	820	180	0	747	152	73	28
Video telemetry EEG + BioEP cost + higher u_tp	180	863	76	61	765	76	98	1
Comparator (standard care)	1,000	820	180	-	747	152	73	28
Video telemetry EEG + encevis cost + child u_fp, u_tn	1,000	820	180	0	747	152	73	28
Video telemetry EEG + NeuroCenter cost + child u_fp, u_tn	1,000	820	180	0	747	152	73	28

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Video telemetry EEG + NeuroWorks cost + child u_fp, u_tn	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y1) cost + child u_fp, u_tn	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y2+) cost + child u_fp, u_tn	1,000	820	180	0	747	152	73	28
Video telemetry EEG + BioEP cost + child u_fp, u_tn	180	863	76	61	765	76	98	1
Comparator (standard care)	1,000	820	180	-	747	152	73	28
Video telemetry EEG + encevis cost + Koren 2025 test failure	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y1) cost + Koren 2025 test failure	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y2+) cost + Koren 2025 test failure	1,000	820	180	0	747	152	73	28
Comparator (standard care)	1,000	820	180	-	747	152	73	28
Video telemetry EEG + encevis cost + b7 interp	1,000	820	180	0	747	152	73	28
Video telemetry EEG + NeuroCenter cost + b7 interp	1,000	820	180	0	747	152	73	28

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Video telemetry EEG + NeuroWorks cost + b7 interp	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y1) cost + b7 interp	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y2+) cost + b7 interp	1,000	820	180	0	747	152	73	28
Video telemetry EEG + BioEP cost + b7 interp	180	863	76	61	765	76	98	1
Comparator (standard care)	1,000	830	170	-	747	142	83	28
Video telemetry EEG + encevis cost + lower IED spec	1,000	831	169	0	747	142	83	28
Video telemetry EEG + NeuroCenter cost + lower IED spec	1,000	831	169	0	747	142	83	28
Video telemetry EEG + NeuroWorks cost + lower IED spec	1,000	831	169	0	747	142	83	28
Video telemetry EEG + Persyst (y1) cost + lower IED spec	1,000	831	169	0	747	142	83	28
Video telemetry EEG + Persyst (y2+) cost + lower IED spec	1,000	831	169	0	747	142	83	28
Video telemetry EEG + BioEP cost + lower IED spec	170	876	67	57	765	66	111	1
Comparator (standard care)	1,000	820	180	-	747	152	73	28

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Video telemetry EEG + encephalogram cost + lower interp time	1,000	820	180	0	747	152	73	28
Video telemetry EEG + NeuroCenter cost + lower interp time	1,000	820	180	0	747	152	73	28
Video telemetry EEG + NeuroWorks cost + lower interp time	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y1) cost + lower interp time	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y2+) cost + lower interp time	1,000	820	180	0	747	152	73	28
Video telemetry EEG + BioEP cost + lower interp time	180	863	76	61	765	76	98	1
Comparator (standard care)	1,000	820	180	-	747	152	73	28
Video telemetry EEG + BioEP cost + fewer inconclusive 5%	180	881	110	9	772	108	109	1
Video telemetry EEG + BioEP cost + fewer inconclusive 10%	180	878	104	18	771	103	107	1
Video telemetry EEG + BioEP cost + fewer inconclusive 20%	180	872	92	36	768	91	103	1
Comparator (standard care)	1,000	772	228	-	674	203	98	26

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Video telemetry EEG + encephalogram cost + different abnormality prev 70%	1,000	772	228	0	675	203	98	25
Video telemetry EEG + NeuroCenter cost + different abnormality prev 70%	1,000	772	228	0	675	203	98	25
Video telemetry EEG + NeuroWorks cost + different abnormality prev 70%	1,000	772	228	0	675	203	98	25
Video telemetry EEG + Persyst (y1) cost + different abnormality prev 70%	1,000	772	228	0	675	203	98	25
Video telemetry EEG + Persyst (y2+) cost + different abnormality prev 70%	1,000	772	228	0	675	203	98	25
Video telemetry EEG + BioEP cost + different abnormality prev 70%	228	822	102	77	691	101	131	1
Comparator (standard care)	1,000	868	132	-	819	101	49	31
Video telemetry EEG + encephalogram cost + different abnormality prev 85%	1,000	868	132	0	820	101	49	30
Video telemetry EEG + NeuroCenter cost + different abnormality prev 85%	1,000	868	132	0	820	101	49	30

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Video telemetry EEG + NeuroWorks cost + different abnormality prev 85%	1,000	868	132	0	820	101	49	30
Video telemetry EEG + Persyst (y1) cost + different abnormality prev 85%	1,000	868	132	0	820	101	49	30
Video telemetry EEG + Persyst (y2+) cost + different abnormality prev 85%	1,000	868	132	0	820	101	49	30
Video telemetry EEG + BioEP cost + different abnormality prev 85%	132	904	51	45	839	50	66	1
Comparator (standard care)	1,000	826	174	-	753	152	73	22
Video telemetry EEG + encevis cost + different seizure prev 40%	1,000	827	173	0	754	152	73	21
Video telemetry EEG + NeuroCenter cost + different seizure prev 40%	1,000	827	173	0	754	152	73	21
Video telemetry EEG + NeuroWorks cost + different seizure prev 40%	1,000	827	173	0	754	152	73	21
Video telemetry EEG + Persyst (y1) cost + different seizure prev 40%	1,000	827	173	0	754	152	73	21

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Video telemetry EEG + Persyst (y2+) cost + different seizure prev 40%	1,000	827	173	0	754	152	73	21
Video telemetry EEG + BioEP cost + different seizure prev 40%	174	865	76	58	767	76	98	1
Comparator (standard care)	1,000	820	180	-	747	152	73	28
Video telemetry EEG + encephalogram cost + inpatient cost	1,000	820	180	0	747	152	73	28
Video telemetry EEG + NeuroCenter cost + inpatient cost	1,000	820	180	0	747	152	73	28
Video telemetry EEG + NeuroWorks cost + inpatient cost	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y1) cost + inpatient cost	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y2+) cost + inpatient cost	1,000	820	180	0	747	152	73	28
Video telemetry EEG + BioEP cost + inpatient cost	180	863	76	61	765	76	98	1
Comparator (standard care)	1,000	820	180	-	747	152	73	28
Video telemetry EEG + encephalogram cost + lower treatment cost	1,000	820	180	0	747	152	73	28

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Video telemetry EEG + NeuroCenter cost + lower treatment cost	1,000	820	180	0	747	152	73	28
Video telemetry EEG + NeuroWorks cost + lower treatment cost	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y1) cost + lower treatment cost	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y2+) cost + lower treatment cost	1,000	820	180	0	747	152	73	28
Video telemetry EEG + BioEP cost + lower treatment cost	180	863	76	61	765	76	98	1
Comparator (standard care)	1,000	820	180	-	747	152	73	28
Video telemetry EEG + encephvis cost + higher treatment cost	1,000	820	180	0	747	152	73	28
Video telemetry EEG + NeuroCenter cost + higher treatment cost	1,000	820	180	0	747	152	73	28
Video telemetry EEG + NeuroWorks cost + higher treatment cost	1,000	820	180	0	747	152	73	28

Scenario	n, patients	Diagnosis supported	Diagnosis unsupported	Inconclusive (BioEP only)	True positives	True negatives	False positives	False negatives
Video telemetry EEG + Persyst (y1) cost + higher treatment cost	1,000	820	180	0	747	152	73	28
Video telemetry EEG + Persyst (y2+) cost + higher treatment cost	1,000	820	180	0	747	152	73	28
Video telemetry EEG + BioEP cost + higher treatment cost	180	863	76	61	765	76	98	1
Comparator (standard care)	1,000	820	180	-	747	152	73	28
Video telemetry EEG + BioEP cost + Tait et al. (2024) sensitivity	180	856	83	61	758	76	98	7

Appendix B4: EAG model - Results from sensitivity analysis

Routine EEG

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Comparator (standard care)	1,000	-	341	439	211	9	£969.81	0.866	-	-	-
Base case, Routine EEG + encevis cost	1,000	0	341	439	211	9	£938.23	0.866	-£31.58	0.000057	Dominant
Base case, Routine EEG + NeuroCenter cost	1,000	0	341	439	211	9	£940.10	0.866	-£29.71	0.000057	Dominant
Base case, Routine EEG + NeuroWorks cost	1,000	0	341	439	211	9	£943.10	0.866	-£26.71	0.000057	Dominant
Base case, Routine EEG + Persyst (y1) cost	1,000	0	341	439	211	9	£936.39	0.866	-£33.42	0.000057	Dominant
Base case, Routine EEG + Persyst (y2+) cost	1,000	0	341	439	211	9	£942.95	0.866	-£26.86	0.000057	Dominant
Base case, Routine EEG + BioEP cost	448	151	347	218	284	0	£1,124.59	0.867	£154.77	0.00037	£418,832
Comparator (standard care)	500	-	170	219	106	5	£969.81	0.866	-	-	-
Routine EEG + encevis cost + 500 per year	500	0	170	219	106	5	£947.10	0.866	-£22.71	0.000057	Dominant
Routine EEG + NeuroCenter cost + 500 per year	500	0	170	219	106	5	£950.85	0.866	-£18.96	0.000057	Dominant
Routine EEG + NeuroWorks cost + 500 per year	500	0	170	219	106	5	£956.85	0.866	-£12.96	0.000057	Dominant
Routine EEG + Persyst (y1) cost + 500 per year	500	0	170	219	106	5	£943.43	0.866	-£26.38	0.000057	Dominant
Routine EEG + Persyst (y2+) cost + 500 per year	500	0	170	219	106	5	£956.55	0.866	-£13.26	0.000057	Dominant
Routine EEG + BioEP cost + 500 per year	224	76	173	109	142	0	£1,158.06	0.867	£188.25	0.00037	£509,414
Comparator (standard care)	2,000	-	681	878	422	19	£969.81	0.866	-	-	-
Routine EEG + encevis cost + 2000 per year	2,000	0	682	878	422	18	£933.79	0.866	-£36.02	0.000057	Dominant
Routine EEG + NeuroCenter cost + 2000 per year	2,000	0	682	878	422	18	£934.73	0.866	-£35.08	0.000057	Dominant
Routine EEG + NeuroWorks cost + 2000 per year	2,000	0	682	878	422	18	£936.23	0.866	-£33.58	0.000057	Dominant
Routine EEG + Persyst (y1) cost + 2000 per year	2,000	0	682	878	422	18	£932.87	0.866	-£36.94	0.000057	Dominant
Routine EEG + Persyst (y2+) cost + 2000 per year	2,000	0	682	878	422	18	£936.15	0.866	-£33.66	0.000057	Dominant
Routine EEG + BioEP cost + 2000 per year	896	302	693	436	568	0	£1,113.43	0.867	£143.62	0.00037	£388,637
Comparator (standard care)	4,000	-	1,363	1,755	845	37	£969.81	0.866	-	-	-
Routine EEG + encevis cost + 4000 per year	4,000	0	1,364	1,755	845	36	£931.57	0.866	-£38.24	0.000057	Dominant
Routine EEG + NeuroCenter cost + 4000 per year	4,000	0	1,364	1,755	845	36	£932.04	0.866	-£37.77	0.000057	Dominant
Routine EEG + NeuroWorks cost + 4000 per year	4,000	0	1,364	1,755	845	36	£932.79	0.866	-£37.02	0.000057	Dominant

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Routine EEG + Persyst (y1) cost + 4000 per year	4,000	0	1,364	1,755	845	36	£931.11	0.866	-£38.70	0.000057	Dominant
Routine EEG + Persyst (y2+) cost + 4000 per year	4,000	0	1,364	1,755	845	36	£932.75	0.866	-£37.06	0.000057	Dominant
Routine EEG + BioEP cost + 4000 per year	1,792	604	1,387	873	1,136	1	£1,046.48	0.867	£76.67	0.00037	£207,472
Comparator (standard care)	1,000	-	341	439	211	9	£969.81	0.866	-	-	-
Routine EEG + encephalogram cost + b6 rev	1,000	0	341	439	211	9	£934.23	0.866	-£35.58	0.000057	Dominant
Routine EEG + NeuroCenter cost + b6 rev	1,000	0	341	439	211	9	£936.10	0.866	-£33.71	0.000057	Dominant
Routine EEG + NeuroWorks cost + b6 rev	1,000	0	341	439	211	9	£939.10	0.866	-£30.71	0.000057	Dominant
Routine EEG + Persyst (y1) cost + b6 rev	1,000	0	341	439	211	9	£932.39	0.866	-£37.42	0.000057	Dominant
Routine EEG + Persyst (y2+) cost + b6 rev	1,000	0	341	439	211	9	£938.95	0.866	-£30.86	0.000057	Dominant
Routine EEG + BioEP cost + b6 rev	448	151	347	218	284	0	£1,124.59	0.867	£154.77	0.00037	£418,832
Comparator (standard care)	1,000	-	341	439	211	9	£969.81	0.866	-	-	-
Routine EEG + encephalogram cost + b8c interp	1,000	0	341	439	211	9	£947.23	0.866	-£22.58	0.000057	Dominant
Routine EEG + NeuroCenter cost + b8c interp	1,000	0	341	439	211	9	£949.10	0.866	-£20.71	0.000057	Dominant
Routine EEG + NeuroWorks cost + b8c interp	1,000	0	341	439	211	9	£952.10	0.866	-£17.71	0.000057	Dominant
Routine EEG + Persyst (y1) cost + b8c interp	1,000	0	341	439	211	9	£945.39	0.866	-£24.42	0.000057	Dominant
Routine EEG + Persyst (y2+) cost + b8c interp	1,000	0	341	439	211	9	£951.95	0.866	-£17.86	0.000057	Dominant
Routine EEG + BioEP cost + b8c interp	448	151	347	218	284	0	£1,124.59	0.867	£154.77	0.00037	£418,832
Comparator (standard care)	1,000	-	341	439	211	9	£969.81	0.866	-	-	-
Routine EEG + encephalogram cost + b8a interp	1,000	0	341	439	211	9	£952.06	0.866	-£17.75	0.000057	Dominant
Routine EEG + NeuroCenter cost + b8a interp	1,000	0	341	439	211	9	£953.93	0.866	-£15.88	0.000057	Dominant
Routine EEG + NeuroWorks cost + b8a interp	1,000	0	341	439	211	9	£956.93	0.866	-£12.88	0.000057	Dominant
Routine EEG + Persyst (y1) cost + b8a interp	1,000	0	341	439	211	9	£950.22	0.866	-£19.59	0.000057	Dominant
Routine EEG + Persyst (y2+) cost + b8a interp	1,000	0	341	439	211	9	£956.78	0.866	-£13.03	0.000057	Dominant
Routine EEG + BioEP cost + b8a interp	448	151	347	218	284	0	£1,124.59	0.867	£154.77	0.00037	£418,832
Comparator (standard care)	1,000	-	341	439	211	9	£963.72	0.866	-	-	-
Routine EEG + encephalogram cost + adult EEG cost	1,000	0	341	439	211	9	£932.14	0.866	-£31.58	0.000057	Dominant
Routine EEG + NeuroCenter cost + adult EEG cost	1,000	0	341	439	211	9	£934.01	0.866	-£29.71	0.000057	Dominant
Routine EEG + NeuroWorks cost + adult EEG cost	1,000	0	341	439	211	9	£937.01	0.866	-£26.71	0.000057	Dominant
Routine EEG + Persyst (y1) cost + adult EEG cost	1,000	0	341	439	211	9	£930.30	0.866	-£33.42	0.000057	Dominant

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Routine EEG + Persyst (y2+) cost + adult EEG cost	1,000	0	341	439	211	9	£936.86	0.866	-£26.86	0.000057	Dominant
Routine EEG + BioEP cost + adult EEG cost	448	151	347	218	284	0	£1,118.50	0.867	£154.77	0.00037	£418,832
Comparator (standard care)	1,000	-	341	439	211	9	£1,019.25	0.866	-	-	-
Routine EEG + encevis cost + child EEG cost	1,000	0	341	439	211	9	£987.67	0.866	-£31.58	0.000057	Dominant
Routine EEG + NeuroCenter cost + child EEG cost	1,000	0	341	439	211	9	£989.54	0.866	-£29.71	0.000057	Dominant
Routine EEG + NeuroWorks cost + child EEG cost	1,000	0	341	439	211	9	£992.54	0.866	-£26.71	0.000057	Dominant
Routine EEG + Persyst (y1) cost + child EEG cost	1,000	0	341	439	211	9	£985.83	0.866	-£33.42	0.000057	Dominant
Routine EEG + Persyst (y2+) cost + child EEG cost	1,000	0	341	439	211	9	£992.39	0.866	-£26.86	0.000057	Dominant
Routine EEG + BioEP cost + child EEG cost	448	151	347	218	284	0	£1,174.03	0.867	£154.77	0.00037	£418,832
Comparator (standard care)	1,000	-	341	439	211	9	£969.81	0.866	-	-	-
Routine EEG + BioEP cost + BioEP extra rev 2m	448	151	347	218	284	0	£1,126.02	0.867	£156.21	0.00037	£422,710
Routine EEG + BioEP cost + BioEP extra rev 10m	448	151	347	218	284	0	£1,131.75	0.867	£161.94	0.00037	£438,225
Comparator (standard care)	1,000	-	341	439	211	9	£969.81	0.888	-	-	-
Routine EEG + encevis cost + higher u_tp	1,000	0	341	439	211	9	£938.23	0.888	-£31.58	0.000077	Dominant
Routine EEG + NeuroCenter cost + higher u_tp	1,000	0	341	439	211	9	£940.10	0.888	-£29.71	0.000077	Dominant
Routine EEG + NeuroWorks cost + higher u_tp	1,000	0	341	439	211	9	£943.10	0.888	-£26.71	0.000077	Dominant
Routine EEG + Persyst (y1) cost + higher u_tp	1,000	0	341	439	211	9	£936.39	0.888	-£33.42	0.000077	Dominant
Routine EEG + Persyst (y2+) cost + higher u_tp	1,000	0	341	439	211	9	£942.95	0.888	-£26.86	0.000077	Dominant
Routine EEG + BioEP cost + higher u_tp	448	151	347	218	284	0	£1,124.59	0.889	£154.77	0.000755	£204,941
Comparator (standard care)	1,000	-	341	439	211	9	£969.81	0.88	-	-	-
Routine EEG + encevis cost + child u_fp, u_tn	1,000	0	341	439	211	9	£938.23	0.881	-£31.58	0.000057	Dominant
Routine EEG + NeuroCenter cost + child u_fp, u_tn	1,000	0	341	439	211	9	£940.10	0.881	-£29.71	0.000057	Dominant
Routine EEG + NeuroWorks cost + child u_fp, u_tn	1,000	0	341	439	211	9	£943.10	0.881	-£26.71	0.000057	Dominant
Routine EEG + Persyst (y1) cost + child u_fp, u_tn	1,000	0	341	439	211	9	£936.39	0.881	-£33.42	0.000057	Dominant
Routine EEG + Persyst (y2+) cost + child u_fp, u_tn	1,000	0	341	439	211	9	£942.95	0.881	-£26.86	0.000057	Dominant
Routine EEG + BioEP cost + child u_fp, u_tn	448	151	347	218	284	0	£1,124.59	0.881	£154.77	0.00037	£418,832
Comparator (standard care)	1,000	-	329	429	221	21	£969.61	0.864	-	-	-
Routine EEG + encevis cost + Kural sens and spec	1,000	0	329	546	104	21	£923.55	0.865	-£46.06	0.00117	Dominant
Routine EEG + Persyst (y1) cost + Kural sens and spec	1,000	0	277	566	84	73	£912.86	0.856	-£56.75	-0.008058	£7,043 for comparator versus intervention

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Routine EEG + Persyst (y2+) cost + Kural sens and spec	1,000	0	277	566	84	73	£919.42	0.856	-£50.19	-0.008058	£6,229 for comparator versus intervention
Comparator (standard care)	1,000	-	341	439	211	9	£969.81	0.866	-	-	-
Routine EEG + encevis cost + b7 interp	1,000	0	341	439	211	9	£953.40	0.866	-£16.41	0.000057	Dominant
Routine EEG + NeuroCenter cost + b7 interp	1,000	0	341	439	211	9	£955.27	0.866	-£14.54	0.000057	Dominant
Routine EEG + NeuroWorks cost + b7 interp	1,000	0	341	439	211	9	£958.27	0.866	-£11.54	0.000057	Dominant
Routine EEG + Persyst (y1) cost + b7 interp	1,000	0	341	439	211	9	£951.56	0.866	-£18.25	0.000057	Dominant
Routine EEG + Persyst (y2+) cost + b7 interp	1,000	0	341	439	211	9	£958.12	0.866	-£11.69	0.000057	Dominant
Routine EEG + BioEP cost + b7 interp	448	151	347	218	284	0	£1,124.59	0.867	£154.77	0.00037	£418,832
Comparator (standard care)	1,000	-	341	410	241	9	£973.42	0.866	-	-	-
Routine EEG + encevis cost + lower IED spec	1,000	0	341	410	241	9	£941.84	0.866	-£31.58	0.000057	Dominant
Routine EEG + NeuroCenter cost + lower IED spec	1,000	0	341	410	241	9	£943.71	0.866	-£29.71	0.000057	Dominant
Routine EEG + NeuroWorks cost + lower IED spec	1,000	0	341	410	241	9	£946.71	0.866	-£26.71	0.000057	Dominant
Routine EEG + Persyst (y1) cost + lower IED spec	1,000	0	341	410	241	9	£940.00	0.866	-£33.42	0.000057	Dominant
Routine EEG + Persyst (y2+) cost + lower IED spec	1,000	0	341	410	241	9	£946.56	0.866	-£26.86	0.000057	Dominant
Routine EEG + BioEP cost + lower IED spec	419	141	347	190	322	0	£1,139.40	0.866	£165.98	0.000282	£588,019
Comparator (standard care)	1,000	-	341	439	211	9	£969.81	0.866	-	-	-
Routine EEG + BioEP cost + fewer inconclusive 5%	448	22	349	313	315	0	£1,128.79	0.867	£158.98	0.00053	£300,248
Routine EEG + BioEP cost + fewer inconclusive 10%	448	45	349	296	310	0	£1,128.06	0.867	£158.25	0.000502	£315,467
Routine EEG + BioEP cost + fewer inconclusive 20%	448	90	348	263	299	0	£1,126.59	0.867	£156.78	0.000446	£351,612
Comparator (standard care)	1,000	-	195	540	260	5	£957.81	0.881	-	-	-
Routine EEG + encevis cost + different abnormality prev 20%	1,000	0	195	540	260	5	£926.21	0.881	-£31.60	0.000032	Dominant
Routine EEG + NeuroCenter cost + different abnormality prev 20%	1,000	0	195	540	260	5	£928.08	0.881	-£29.73	0.000032	Dominant
Routine EEG + NeuroWorks cost + different abnormality prev 20%	1,000	0	195	540	260	5	£931.08	0.881	-£26.73	0.000032	Dominant
Routine EEG + Persyst (y1) cost + different abnormality prev 20%	1,000	0	195	540	260	5	£924.37	0.881	-£33.44	0.000032	Dominant
Routine EEG + Persyst (y2+) cost + different abnormality prev 20%	1,000	0	195	540	260	5	£930.93	0.881	-£26.88	0.000032	Dominant

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Routine EEG + BioEP cost + different abnormality prev 20%	545	184	198	269	350	0	£1,088.47	0.881	£130.66	-0.000268	Dominated
Comparator (standard care)	1,000	-	487	338	162	13	£981.81	0.851	-	-	-
Routine EEG + encephalogram cost + different abnormality prev 50%	1,000	0	487	338	162	13	£950.25	0.851	-£31.56	0.000081	Dominant
Routine EEG + NeuroCenter cost + different abnormality prev 50%	1,000	0	487	338	162	13	£952.12	0.851	-£29.69	0.000081	Dominant
Routine EEG + NeuroWorks cost + different abnormality prev 50%	1,000	0	487	338	162	13	£955.12	0.851	-£26.69	0.000081	Dominant
Routine EEG + Persyst (y1) cost + different abnormality prev 50%	1,000	0	487	338	162	13	£948.41	0.851	-£33.40	0.000081	Dominant
Routine EEG + Persyst (y2+) cost + different abnormality prev 50%	1,000	0	487	338	162	13	£954.97	0.851	-£26.84	0.000081	Dominant
Routine EEG + BioEP cost + different abnormality prev 50%	351	118	495	168	218	0	£1,175.04	0.852	£193.22	0.001007	£191,801
Comparator (standard care)	1,000	-	341	439	211	9	£969.81	0.866	-	-	-
Routine EEG + encephalogram cost + different seizure prev 0.6%	1,000	0	341	439	211	9	£938.22	0.866	-£31.58	0.000057	Dominant
Routine EEG + NeuroCenter cost + different seizure prev 0.6%	1,000	0	341	439	211	9	£940.09	0.866	-£29.71	0.000057	Dominant
Routine EEG + NeuroWorks cost + different seizure prev 0.6%	1,000	0	341	439	211	9	£943.09	0.866	-£26.71	0.000057	Dominant
Routine EEG + Persyst (y1) cost + different seizure prev 0.6%	1,000	0	341	439	211	9	£936.38	0.866	-£33.42	0.000057	Dominant
Routine EEG + Persyst (y2+) cost + different seizure prev 0.6%	1,000	0	341	439	211	9	£942.94	0.866	-£26.86	0.000057	Dominant
Routine EEG + BioEP cost + different seizure prev 0.6%	448	151	347	218	284	0	£1,124.57	0.867	£154.77	0.000374	£414,121
Comparator (standard care)	1,000	-	341	439	211	9	£969.82	0.866	-	-	-
Routine EEG + encephalogram cost + different seizure prev 2%	1,000	0	341	439	211	9	£938.24	0.866	-£31.58	0.000056	Dominant
Routine EEG + NeuroCenter cost + different seizure prev 2%	1,000	0	341	439	211	9	£940.11	0.866	-£29.71	0.000056	Dominant
Routine EEG + NeuroWorks cost + different seizure prev 2%	1,000	0	341	439	211	9	£943.11	0.866	-£26.71	0.000056	Dominant
Routine EEG + Persyst (y1) cost + different seizure prev 2%	1,000	0	341	439	211	9	£936.40	0.866	-£33.42	0.000056	Dominant
Routine EEG + Persyst (y2+) cost + different seizure prev 2%	1,000	0	341	439	211	9	£942.96	0.866	-£26.86	0.000056	Dominant

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Routine EEG + BioEP cost + different seizure prev 2%	448	151	347	218	284	0	£1,124.62	0.867	£154.80	0.000359	£431,089
Comparator (standard care)	1,000	-	341	439	211	9	£923.50	0.866	-	-	-
Routine EEG + encephalogram cost + lower treatment cost	1,000	0	341	439	211	9	£891.89	0.866	-£31.61	0.000057	Dominant
Routine EEG + NeuroCenter cost + lower treatment cost	1,000	0	341	439	211	9	£893.76	0.866	-£29.74	0.000057	Dominant
Routine EEG + NeuroWorks cost + lower treatment cost	1,000	0	341	439	211	9	£896.76	0.866	-£26.74	0.000057	Dominant
Routine EEG + Persyst (y1) cost + lower treatment cost	1,000	0	341	439	211	9	£890.05	0.866	-£33.45	0.000057	Dominant
Routine EEG + Persyst (y2+) cost + lower treatment cost	1,000	0	341	439	211	9	£896.61	0.866	-£26.89	0.000057	Dominant
Routine EEG + BioEP cost + lower treatment cost	448	151	347	218	284	0	£1,071.66	0.867	£148.17	0.00037	£400,948
Comparator (standard care)	1,000	-	341	439	211	9	£2,099.73	0.866	-	-	-
Routine EEG + encephalogram cost + higher treatment cost	1,000	0	341	439	211	9	£2,068.79	0.866	-£30.94	0.000057	Dominant
Routine EEG + NeuroCenter cost + higher treatment cost	1,000	0	341	439	211	9	£2,070.66	0.866	-£29.07	0.000057	Dominant
Routine EEG + NeuroWorks cost + higher treatment cost	1,000	0	341	439	211	9	£2,073.66	0.866	-£26.07	0.000057	Dominant
Routine EEG + Persyst (y1) cost + higher treatment cost	1,000	0	341	439	211	9	£2,066.95	0.866	-£32.78	0.000057	Dominant
Routine EEG + Persyst (y2+) cost + higher treatment cost	1,000	0	341	439	211	9	£2,073.51	0.866	-£26.22	0.000057	Dominant
Routine EEG + BioEP cost + higher treatment cost	448	151	347	218	284	0	£2,415.74	0.867	£316.00	0.00037	£855,126
Routine EEG + BioEP cost + 100% unsupportive/inconclusive have SD EEG	448	151	347	218	284	0	£1,256.08	0.867	£126.74	0.00037	£342,968
Comparator (standard care)	1,000	-	341	439	211	9	£1,089.46	0.866	-	-	-
Routine EEG + BioEP cost + 75% unsupportive/inconclusive have SD EEG	448	151	347	218	284	0	£1,223.21	0.867	£133.75	0.00037	£361,934
Comparator (standard care)	1,000	-	341	439	211	9	£1,049.57	0.866	-	-	-
Routine EEG + BioEP cost + 50% unsupportive/inconclusive have SD EEG	448	151	347	218	284	0	£1,190.33	0.867	£140.76	0.00037	£380,900
Comparator (standard care)	1,000	-	341	439	211	9	£1,359.94	0.866	-	-	-
Routine EEG + BioEP cost + 100% unsupportive/inconclusive have telemetry	448	151	347	218	284	0	£1,446.16	0.867	£86.21	0.00037	£233,302
Comparator (standard care)	1,000	-	341	439	211	9	£1,262.41	0.866	-	-	-
Routine EEG + BioEP cost + 75% unsupportive/inconclusive have telemetry	448	151	347	218	284	0	£1,365.77	0.867	£103.35	0.00037	£279,685
Comparator (standard care)	1,000	-	341	439	211	9	£1,164.88	0.866	-	-	-

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Routine EEG + BioEP cost + 50% unsupportive/inconclusive have telemetry	448	151	347	218	284	0	£1,285.37	0.867	£120.49	0.00037	£326,067
Comparator (standard care)	1,000	-	341	439	211	9	£969.81	0.866	-	-	-
Routine EEG + BioEP cost + Tait et al. (2024) sensitivity	448	151	344	218	284	2	£1,124.31	0.866	£154.50	-0.000038	Dominated
Comparator (standard care)	1,000	-	156	517	133	194	£937.28	0.833	-	-	-
Routine EEG + BioEP cost + comparator IED accuracy from Bouma et al. 2016	712	240	281	257	218	4	£1,131.92	0.855	£194.65	0.021902	£8,887
Routine EEG + BioEP cost + comparator IED accuracy from Bouma et al. 2016 + intervention sens from Tait et al.	712	240	234	257	218	50	£1,126.18	0.847	£188.91	0.01344	£14,055

Sleep-deprived EEG

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Comparator (standard care)	1,000	-	584	270	130	16	£989.86	0.841	-	-	-
Base case, Sleep-deprived EEG + encevis cost	1,000	0	585	270	130	15	£941.63	0.841	-£48.22	0.000096	Dominant
Base case, Sleep-deprived EEG + NeuroCenter cost	1,000	0	585	270	130	15	£943.50	0.841	-£46.35	0.000096	Dominant
Base case, Sleep-deprived EEG + NeuroWorks cost	1,000	0	585	270	130	15	£946.50	0.841	-£43.35	0.000096	Dominant
Base case, Sleep-deprived EEG + Persyst (y1) cost	1,000	0	585	270	130	15	£939.79	0.841	-£50.06	0.000096	Dominant
Base case, Sleep-deprived EEG + Persyst (y2+) cost	1,000	0	585	270	130	15	£946.35	0.841	-£43.50	0.000096	Dominant
Base case, Sleep-deprived EEG + BioEP cost	286	96	594	134	175	0	£1,136.62	0.842	£146.76	0.001397	£105,071
Comparator (standard care)	500	-	292	135	65	8	£989.86	0.841	-	-	-
Sleep-deprived EEG + encevis cost + 500 per year	500	0	292	135	65	8	£950.50	0.841	-£39.35	0.000096	Dominant
Sleep-deprived EEG + NeuroCenter cost + 500 per year	500	0	292	135	65	8	£954.25	0.841	-£35.60	0.000096	Dominant
Sleep-deprived EEG + NeuroWorks cost + 500 per year	500	0	292	135	65	8	£960.25	0.841	-£29.60	0.000096	Dominant

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Sleep-deprived EEG + Persyst (y1) cost + 500 per year	500	0	292	135	65	8	£946.83	0.841	-£43.02	0.000096	Dominant
Sleep-deprived EEG + Persyst (y2+) cost + 500 per year	500	0	292	135	65	8	£959.95	0.841	-£29.90	0.000096	Dominant
Sleep-deprived EEG + BioEP cost + 500 per year	143	48	297	67	87	0	£1,171.61	0.842	£181.76	0.001397	£130,126
Comparator (standard care)	2,000	-	1,169	540	260	31	£989.86	0.841	-	-	-
Sleep-deprived EEG + encevis cost + 2000 per year	2,000	0	1,170	540	260	30	£937.19	0.841	-£52.66	0.000096	Dominant
Sleep-deprived EEG + NeuroCenter cost + 2000 per year	2,000	0	1,170	540	260	30	£938.13	0.841	-£51.72	0.000096	Dominant
Sleep-deprived EEG + NeuroWorks cost + 2000 per year	2,000	0	1,170	540	260	30	£939.63	0.841	-£50.22	0.000096	Dominant
Sleep-deprived EEG + Persyst (y1) cost + 2000 per year	2,000	0	1,170	540	260	30	£936.27	0.841	-£53.58	0.000096	Dominant
Sleep-deprived EEG + Persyst (y2+) cost + 2000 per year	2,000	0	1,170	540	260	30	£939.55	0.841	-£50.30	0.000096	Dominant
Sleep-deprived EEG + BioEP cost + 2000 per year	571	193	1,189	269	350	1	£1,110.37	0.842	£120.52	0.001397	£86,280
Comparator (standard care)	4,000	-	2,337	1,080	520	63	£989.86	0.841	-	-	-
Sleep-deprived EEG + encevis cost + 4000 per year	4,000	0	2,339	1,080	520	61	£934.97	0.841	-£54.88	0.000096	Dominant
Sleep-deprived EEG + NeuroCenter cost + 4000 per year	4,000	0	2,339	1,080	520	61	£935.44	0.841	-£54.41	0.000096	Dominant
Sleep-deprived EEG + NeuroWorks cost + 4000 per year	4,000	0	2,339	1,080	520	61	£936.19	0.841	-£53.66	0.000096	Dominant
Sleep-deprived EEG + Persyst (y1) cost + 4000 per year	4,000	0	2,339	1,080	520	61	£934.51	0.841	-£55.34	0.000096	Dominant
Sleep-deprived EEG + Persyst (y2+) cost + 4000 per year	4,000	0	2,339	1,080	520	61	£936.15	0.841	-£53.70	0.000096	Dominant
Sleep-deprived EEG + BioEP cost + 4000 per year	1,143	385	2,378	537	699	1	£1,101.62	0.842	£111.77	0.001397	£80,016
Comparator (standard care)	1,000	-	584	270	130	16	£989.86	0.841	-	-	-
Sleep-deprived EEG + encevis cost + b6 rev	1,000	0	585	270	130	15	£936.63	0.841	-£53.22	0.000096	Dominant

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Sleep-deprived EEG + NeuroCenter cost + b6 rev	1,000	0	585	270	130	15	£938.50	0.841	-£51.35	0.000096	Dominant
Sleep-deprived EEG + NeuroWorks cost + b6 rev	1,000	0	585	270	130	15	£941.50	0.841	-£48.35	0.000096	Dominant
Sleep-deprived EEG + Persyst (y1) cost + b6 rev	1,000	0	585	270	130	15	£934.79	0.841	-£55.06	0.000096	Dominant
Sleep-deprived EEG + Persyst (y2+) cost + b6 rev	1,000	0	585	270	130	15	£941.35	0.841	-£48.50	0.000096	Dominant
Sleep-deprived EEG + BioEP cost + b6 rev	286	96	594	134	175	0	£1,136.62	0.842	£146.76	0.001397	£105,071
Comparator (standard care)	1,000	-	584	270	130	16	£989.86	0.841	-	-	-
Sleep-deprived EEG + encevis cost + b8c interp	1,000	0	585	270	130	15	£955.13	0.841	-£34.72	0.000096	Dominant
Sleep-deprived EEG + NeuroCenter cost + b8c interp	1,000	0	585	270	130	15	£957.00	0.841	-£32.85	0.000096	Dominant
Sleep-deprived EEG + NeuroWorks cost + b8c interp	1,000	0	585	270	130	15	£960.00	0.841	-£29.85	0.000096	Dominant
Sleep-deprived EEG + Persyst (y1) cost + b8c interp	1,000	0	585	270	130	15	£953.29	0.841	-£36.56	0.000096	Dominant
Sleep-deprived EEG + Persyst (y2+) cost + b8c interp	1,000	0	585	270	130	15	£959.85	0.841	-£30.00	0.000096	Dominant
Sleep-deprived EEG + BioEP cost + b8c interp	286	96	594	134	175	0	£1,136.62	0.842	£146.76	0.001397	£105,071
Comparator (standard care)	1,000	-	584	270	130	16	£989.86	0.841	-	-	-
Sleep-deprived EEG + encevis cost + b8a interp	1,000	0	585	270	130	15	£962.38	0.841	-£27.47	0.000096	Dominant
Sleep-deprived EEG + NeuroCenter cost + b8a interp	1,000	0	585	270	130	15	£964.25	0.841	-£25.60	0.000096	Dominant
Sleep-deprived EEG + NeuroWorks cost + b8a interp	1,000	0	585	270	130	15	£967.25	0.841	-£22.60	0.000096	Dominant
Sleep-deprived EEG + Persyst (y1) cost + b8a interp	1,000	0	585	270	130	15	£960.54	0.841	-£29.31	0.000096	Dominant
Sleep-deprived EEG + Persyst (y2+) cost + b8a interp	1,000	0	585	270	130	15	£967.10	0.841	-£22.75	0.000096	Dominant
Sleep-deprived EEG + BioEP cost + b8a interp	286	96	594	134	175	0	£1,136.62	0.842	£146.76	0.001397	£105,071
Comparator (standard care)	1,000	-	584	270	130	16	£983.77	0.841	-	-	-

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Sleep-deprived EEG + encevis cost + adult EEG cost	1,000	0	585	270	130	15	£935.54	0.841	-£48.22	0.000096	Dominant
Sleep-deprived EEG + NeuroCenter cost + adult EEG cost	1,000	0	585	270	130	15	£937.41	0.841	-£46.35	0.000096	Dominant
Sleep-deprived EEG + NeuroWorks cost + adult EEG cost	1,000	0	585	270	130	15	£940.41	0.841	-£43.35	0.000096	Dominant
Sleep-deprived EEG + Persyst (y1) cost + adult EEG cost	1,000	0	585	270	130	15	£933.70	0.841	-£50.06	0.000096	Dominant
Sleep-deprived EEG + Persyst (y2+) cost + adult EEG cost	1,000	0	585	270	130	15	£940.26	0.841	-£43.50	0.000096	Dominant
Sleep-deprived EEG + BioEP cost + adult EEG cost	286	96	594	134	175	0	£1,130.53	0.842	£146.76	0.001397	£105,071
Comparator (standard care)	1,000	-	584	270	130	16	£1,039.30	0.841	-	-	-
Sleep-deprived EEG + encevis cost + child EEG cost	1,000	0	585	270	130	15	£991.07	0.841	-£48.22	0.000096	Dominant
Sleep-deprived EEG + NeuroCenter cost + child EEG cost	1,000	0	585	270	130	15	£992.94	0.841	-£46.35	0.000096	Dominant
Sleep-deprived EEG + NeuroWorks cost + child EEG cost	1,000	0	585	270	130	15	£995.94	0.841	-£43.35	0.000096	Dominant
Sleep-deprived EEG + Persyst (y1) cost + child EEG cost	1,000	0	585	270	130	15	£989.23	0.841	-£50.06	0.000096	Dominant
Sleep-deprived EEG + Persyst (y2+) cost + child EEG cost	1,000	0	585	270	130	15	£995.79	0.841	-£43.50	0.000096	Dominant
Sleep-deprived EEG + BioEP cost + child EEG cost	286	96	594	134	175	0	£1,186.06	0.842	£146.76	0.001397	£105,071
Comparator (standard care)	1,000	-	584	270	130	16	£989.86	0.841	-	-	-
Sleep-deprived EEG + BioEP cost + BioEP extra rev 2m	286	96	594	134	175	0	£1,138.05	0.842	£148.20	0.001397	£106,097
Sleep-deprived EEG + BioEP cost + BioEP extra rev 10m	286	96	594	134	175	0	£1,143.78	0.842	£153.93	0.001397	£110,202
Comparator (standard care)	1,000	-	584	270	130	16	£989.86	0.878	-	-	-
Sleep-deprived EEG + encevis cost + higher u_tp	1,000	0	585	270	130	15	£941.63	0.878	-£48.22	0.000129	Dominant
Sleep-deprived EEG + NeuroCenter cost + higher u_tp	1,000	0	585	270	130	15	£943.50	0.878	-£46.35	0.000129	Dominant

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Sleep-deprived EEG + NeuroWorks cost + higher u_tp	1,000	0	585	270	130	15	£946.50	0.878	-£43.35	0.000129	Dominant
Sleep-deprived EEG + Persyst (y1) cost + higher u_tp	1,000	0	585	270	130	15	£939.79	0.878	-£50.06	0.000129	Dominant
Sleep-deprived EEG + Persyst (y2+) cost + higher u_tp	1,000	0	585	270	130	15	£946.35	0.878	-£43.50	0.000129	Dominant
Sleep-deprived EEG + BioEP cost + higher u_tp	286	96	594	134	175	0	£1,136.62	0.88	£146.76	0.002045	£71,754
Comparator (standard care)	1,000	-	584	270	130	16	£989.86	0.85	-	-	-
Sleep-deprived EEG + encevis cost + child u_fp, u_tn	1,000	0	585	270	130	15	£941.63	0.85	-£48.22	0.000096	Dominant
Sleep-deprived EEG + NeuroCenter cost + child u_fp, u_tn	1,000	0	585	270	130	15	£943.50	0.85	-£46.35	0.000096	Dominant
Sleep-deprived EEG + NeuroWorks cost + child u_fp, u_tn	1,000	0	585	270	130	15	£946.50	0.85	-£43.35	0.000096	Dominant
Sleep-deprived EEG + Persyst (y1) cost + child u_fp, u_tn	1,000	0	585	270	130	15	£939.79	0.85	-£50.06	0.000096	Dominant
Sleep-deprived EEG + Persyst (y2+) cost + child u_fp, u_tn	1,000	0	585	270	130	15	£946.35	0.85	-£43.50	0.000096	Dominant
Sleep-deprived EEG + BioEP cost + child u_fp, u_tn	286	96	594	134	175	0	£1,136.62	0.851	£146.76	0.001397	£105,071
Comparator (standard care)	1,000	-	584	270	130	16	£989.86	0.841	-	-	-
Sleep-deprived EEG + encevis cost + b7 interp	1,000	0	585	270	130	15	£964.38	0.841	-£25.47	0.000096	Dominant
Sleep-deprived EEG + NeuroCenter cost + b7 interp	1,000	0	585	270	130	15	£966.25	0.841	-£23.60	0.000096	Dominant
Sleep-deprived EEG + NeuroWorks cost + b7 interp	1,000	0	585	270	130	15	£969.25	0.841	-£20.60	0.000096	Dominant
Sleep-deprived EEG + Persyst (y1) cost + b7 interp	1,000	0	585	270	130	15	£962.54	0.841	-£27.31	0.000096	Dominant
Sleep-deprived EEG + Persyst (y2+) cost + b7 interp	1,000	0	585	270	130	15	£969.10	0.841	-£20.75	0.000096	Dominant
Sleep-deprived EEG + BioEP cost + b7 interp	286	96	594	134	175	0	£1,136.62	0.842	£146.76	0.001397	£105,071
Comparator (standard care)	1,000	-	584	252	148	16	£992.08	0.841	-	-	-
Sleep-deprived EEG + encevis cost + lower IED spec	1,000	0	585	252	148	15	£943.86	0.841	-£48.22	0.000096	Dominant

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Sleep-deprived EEG + NeuroCenter cost + lower IED spec	1,000	0	585	252	148	15	£945.73	0.841	-£46.35	0.000096	Dominant
Sleep-deprived EEG + NeuroWorks cost + lower IED spec	1,000	0	585	252	148	15	£948.73	0.841	-£43.35	0.000096	Dominant
Sleep-deprived EEG + Persyst (y1) cost + lower IED spec	1,000	0	585	252	148	15	£942.02	0.841	-£50.06	0.000096	Dominant
Sleep-deprived EEG + Persyst (y2+) cost + lower IED spec	1,000	0	585	252	148	15	£948.58	0.841	-£43.50	0.000096	Dominant
Sleep-deprived EEG + BioEP cost + lower IED spec	268	90	594	117	198	0	£1,148.91	0.842	£156.84	0.001343	£116,773
Comparator (standard care)	1,000	-	584	270	130	16	£989.86	0.841	-	-	-
Sleep-deprived EEG + BioEP cost + fewer inconclusive 5%	286	14	599	192	194	0	£1,139.55	0.843	£149.70	0.002001	£74,794
Sleep-deprived EEG + BioEP cost + fewer inconclusive 10%	286	29	598	182	191	0	£1,139.04	0.843	£149.18	0.001896	£78,680
Sleep-deprived EEG + BioEP cost + fewer inconclusive 20%	286	57	596	162	184	0	£1,138.02	0.843	£148.16	0.001685	£87,908
Comparator (standard care)	1,000	-	487	338	162	13	£981.85	0.851	-	-	-
Sleep-deprived EEG + encevis cost + different abnormality prev 50%	1,000	0	487	338	162	13	£933.61	0.851	-£48.23	0.00008	Dominant
Sleep-deprived EEG + NeuroCenter cost + different abnormality prev 50%	1,000	0	487	338	162	13	£935.48	0.851	-£46.36	0.00008	Dominant
Sleep-deprived EEG + NeuroWorks cost + different abnormality prev 50%	1,000	0	487	338	162	13	£938.48	0.851	-£43.36	0.00008	Dominant
Sleep-deprived EEG + Persyst (y1) cost + different abnormality prev 50%	1,000	0	487	338	162	13	£931.77	0.851	-£50.07	0.00008	Dominant
Sleep-deprived EEG + Persyst (y2+) cost + different abnormality prev 50%	1,000	0	487	338	162	13	£938.33	0.851	-£43.51	0.00008	Dominant
Sleep-deprived EEG + BioEP cost + different abnormality prev 50%	351	118	495	168	218	0	£1,175.18	0.852	£193.34	0.000978	£197,780
Comparator (standard care)	1,000	-	682	203	98	18	£997.86	0.831	-	-	-

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Sleep-deprived EEG + encevis cost + different abnormality prev 70%	1,000	0	682	203	98	18	£949.65	0.831	-£48.21	0.000112	Dominant
Sleep-deprived EEG + NeuroCenter cost + different abnormality prev 70%	1,000	0	682	203	98	18	£951.52	0.831	-£46.34	0.000112	Dominant
Sleep-deprived EEG + NeuroWorks cost + different abnormality prev 70%	1,000	0	682	203	98	18	£954.52	0.831	-£43.34	0.000112	Dominant
Sleep-deprived EEG + Persyst (y1) cost + different abnormality prev 70%	1,000	0	682	203	98	18	£947.81	0.831	-£50.05	0.000112	Dominant
Sleep-deprived EEG + Persyst (y2+) cost + different abnormality prev 70%	1,000	0	682	203	98	18	£954.37	0.831	-£43.49	0.000112	Dominant
Sleep-deprived EEG + BioEP cost + different abnormality prev 70%	221	74	693	101	131	0	£1,184.57	0.832	£186.71	0.001816	£102,810
Comparator (standard care)	1,000	-	584	270	130	16	£989.81	0.841	-	-	-
Sleep-deprived EEG + encevis cost + different seizure prev 0.6%	1,000	0	584	270	130	16	£941.59	0.841	-£48.22	0.000098	Dominant
Sleep-deprived EEG + NeuroCenter cost + different seizure prev 0.6%	1,000	0	584	270	130	16	£943.46	0.841	-£46.35	0.000098	Dominant
Sleep-deprived EEG + NeuroWorks cost + different seizure prev 0.6%	1,000	0	584	270	130	16	£946.46	0.841	-£43.35	0.000098	Dominant
Sleep-deprived EEG + Persyst (y1) cost + different seizure prev 0.6%	1,000	0	584	270	130	16	£939.75	0.841	-£50.06	0.000098	Dominant
Sleep-deprived EEG + Persyst (y2+) cost + different seizure prev 0.6%	1,000	0	584	270	130	16	£946.31	0.841	-£43.50	0.000098	Dominant
Sleep-deprived EEG + BioEP cost + different seizure prev 0.6%	286	96	594	134	175	0	£1,136.42	0.842	£146.61	0.00144	£101,827
Comparator (standard care)	1,000	-	584	270	130	16	£989.87	0.841	-	-	-
Sleep-deprived EEG + encevis cost + different seizure prev 4%	1,000	0	585	270	130	15	£941.65	0.841	-£48.22	0.000095	Dominant
Sleep-deprived EEG + NeuroCenter cost + different seizure prev 4%	1,000	0	585	270	130	15	£943.52	0.841	-£46.35	0.000095	Dominant

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Sleep-deprived EEG + NeuroWorks cost + different seizure prev 4%	1,000	0	585	270	130	15	£946.52	0.841	-£43.35	0.000095	Dominant
Sleep-deprived EEG + Persyst (y1) cost + different seizure prev 4%	1,000	0	585	270	130	15	£939.81	0.841	-£50.06	0.000095	Dominant
Sleep-deprived EEG + Persyst (y2+) cost + different seizure prev 4%	1,000	0	585	270	130	15	£946.37	0.841	-£43.50	0.000095	Dominant
Sleep-deprived EEG + BioEP cost + different seizure prev 4%	286	96	594	134	175	0	£1,136.70	0.842	£146.83	0.001379	£106,482
Comparator (standard care)	1,000	-	584	270	130	16	£929.91	0.841	-	-	-
Sleep-deprived EEG + encevis cost + lower treatment cost	1,000	0	585	270	130	15	£881.65	0.841	-£48.27	0.000096	Dominant
Sleep-deprived EEG + NeuroCenter cost + lower treatment cost	1,000	0	585	270	130	15	£883.52	0.841	-£46.40	0.000096	Dominant
Sleep-deprived EEG + NeuroWorks cost + lower treatment cost	1,000	0	585	270	130	15	£886.52	0.841	-£43.40	0.000096	Dominant
Sleep-deprived EEG + Persyst (y1) cost + lower treatment cost	1,000	0	585	270	130	15	£879.81	0.841	-£50.11	0.000096	Dominant
Sleep-deprived EEG + Persyst (y2+) cost + lower treatment cost	1,000	0	585	270	130	15	£886.37	0.841	-£43.55	0.000096	Dominant
Sleep-deprived EEG + BioEP cost + lower treatment cost	286	96	594	134	175	0	£1,072.07	0.842	£142.16	0.001397	£101,773
Comparator (standard care)	1,000	-	584	270	130	16	£2,452.21	0.841	-	-	-
Sleep-deprived EEG + encevis cost + higher treatment cost	1,000	0	585	270	130	15	£2,405.06	0.841	-£47.15	0.000096	Dominant
Sleep-deprived EEG + NeuroCenter cost + higher treatment cost	1,000	0	585	270	130	15	£2,406.93	0.841	-£45.28	0.000096	Dominant
Sleep-deprived EEG + NeuroWorks cost + higher treatment cost	1,000	0	585	270	130	15	£2,409.93	0.841	-£42.28	0.000096	Dominant
Sleep-deprived EEG + Persyst (y1) cost + higher treatment cost	1,000	0	585	270	130	15	£2,403.22	0.841	-£48.99	0.000096	Dominant
Sleep-deprived EEG + Persyst (y2+) cost + higher treatment cost	1,000	0	585	270	130	15	£2,409.78	0.841	-£42.43	0.000096	Dominant
Sleep-deprived EEG + BioEP cost + higher treatment cost	286	96	594	134	175	0	£2,711.34	0.842	£259.13	0.001397	£185,521
Comparator (standard care)	1,000	-	584	270	130	16	£989.86	0.841	-	-	-

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Sleep-deprived EEG + BioEP cost + Tait et al. (2024) sensitivity	286	96	591	134	175	4	£1,136.15	0.842	£146.30	0.000711	£205,731

Ambulatory EEG

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Comparator (standard care)	1,000	-	719	169	81	31	£1,298.02	0.824	-	-	-
Base case, Ambulatory EEG + encevis cost	1,000	0	720	169	81	30	£885.98	0.824	-£412.04	0.000112	Dominant
Base case, Ambulatory EEG + NeuroCenter cost	1,000	0	720	169	81	30	£887.85	0.824	-£410.17	0.000112	Dominant
Base case, Ambulatory EEG + NeuroWorks cost	1,000	0	720	169	81	30	£890.85	0.824	-£407.17	0.000112	Dominant
Base case, Ambulatory EEG + Persyst (y1) cost	1,000	0	720	169	81	30	£884.14	0.824	-£413.88	0.000112	Dominant
Base case, Ambulatory EEG + Persyst (y2+) cost	1,000	0	720	169	81	30	£890.70	0.824	-£407.32	0.000112	Dominant
Base case, Ambulatory EEG + BioEP cost	199	67	739	84	109	1	£1,429.29	0.827	£131.26	0.003227	£40,671
Comparator (standard care)	500	-	360	84	41	15	£1,298.02	0.824	-	-	-
Ambulatory EEG + encevis cost + 500 per year	500	0	360	84	41	15	£894.85	0.824	-£403.17	0.000112	Dominant
Ambulatory EEG + NeuroCenter cost + 500 per year	500	0	360	84	41	15	£898.60	0.824	-£399.42	0.000112	Dominant
Ambulatory EEG + NeuroWorks cost + 500 per year	500	0	360	84	41	15	£904.60	0.824	-£393.42	0.000112	Dominant
Ambulatory EEG + Persyst (y1) cost + 500 per year	500	0	360	84	41	15	£891.18	0.824	-£406.84	0.000112	Dominant
Ambulatory EEG + Persyst (y2+) cost + 500 per year	500	0	360	84	41	15	£904.30	0.824	-£393.72	0.000112	Dominant
Ambulatory EEG + BioEP cost + 500 per year	100	34	369	42	55	0	£1,554.72	0.827	£256.69	0.003227	£79,535
Comparator (standard care)	2,000	-	1,439	338	162	61	£1,298.02	0.824	-	-	-
Ambulatory EEG + encevis cost + 2000 per year	2,000	0	1,440	338	162	60	£881.54	0.824	-£416.48	0.000112	Dominant

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Ambulatory EEG + NeuroCenter cost + 2000 per year	2,000	0	1,440	338	162	60	£882.48	0.824	-£415.54	0.000112	Dominant
Ambulatory EEG + NeuroWorks cost + 2000 per year	2,000	0	1,440	338	162	60	£883.98	0.824	-£414.04	0.000112	Dominant
Ambulatory EEG + Persyst (y1) cost + 2000 per year	2,000	0	1,440	338	162	60	£880.62	0.824	-£417.40	0.000112	Dominant
Ambulatory EEG + Persyst (y2+) cost + 2000 per year	2,000	0	1,440	338	162	60	£883.90	0.824	-£414.12	0.000112	Dominant
Ambulatory EEG + BioEP cost + 2000 per year	399	134	1,477	168	218	2	£1,466.92	0.827	£168.89	0.003227	£52,330
Comparator (standard care)	4,000	-	2,878	675	325	122	£1,298.02	0.824	-	-	-
Ambulatory EEG + encevis cost + 4000 per year	4,000	0	2,880	675	325	120	£879.32	0.824	-£418.70	0.000112	Dominant
Ambulatory EEG + NeuroCenter cost + 4000 per year	4,000	0	2,880	675	325	120	£879.79	0.824	-£418.23	0.000112	Dominant
Ambulatory EEG + NeuroWorks cost + 4000 per year	4,000	0	2,880	675	325	120	£880.54	0.824	-£417.48	0.000112	Dominant
Ambulatory EEG + Persyst (y1) cost + 4000 per year	4,000	0	2,880	675	325	120	£878.86	0.824	-£419.16	0.000112	Dominant
Ambulatory EEG + Persyst (y2+) cost + 4000 per year	4,000	0	2,880	675	325	120	£880.50	0.824	-£417.52	0.000112	Dominant
Ambulatory EEG + BioEP cost + 4000 per year	797	269	2,955	336	437	4	£1,454.37	0.827	£156.35	0.003227	£48,444
Comparator (standard care)	1,000	-	719	169	81	31	£1,298.02	0.824	-	-	-
Ambulatory EEG + encevis cost + b8c interp	1,000	0	720	169	81	30	£939.98	0.824	-£358.04	0.000112	Dominant
Ambulatory EEG + NeuroCenter cost + b8c interp	1,000	0	720	169	81	30	£941.85	0.824	-£356.17	0.000112	Dominant
Ambulatory EEG + NeuroWorks cost + b8c interp	1,000	0	720	169	81	30	£944.85	0.824	-£353.17	0.000112	Dominant
Ambulatory EEG + Persyst (y1) cost + b8c interp	1,000	0	720	169	81	30	£938.14	0.824	-£359.88	0.000112	Dominant
Ambulatory EEG + Persyst (y2+) cost + b8c interp	1,000	0	720	169	81	30	£944.70	0.824	-£353.32	0.000112	Dominant

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Ambulatory EEG + BioEP cost + b8c interp	199	67	739	84	109	1	£1,429.29	0.827	£131.26	0.003227	£40,671
Comparator (standard care)	1,000	-	719	169	81	31	£1,298.02	0.824	-	-	-
Ambulatory EEG + encevis cost + b8a interp	1,000	0	720	169	81	30	£968.98	0.824	-£329.04	0.000112	Dominant
Ambulatory EEG + NeuroCenter cost + b8a interp	1,000	0	720	169	81	30	£970.85	0.824	-£327.17	0.000112	Dominant
Ambulatory EEG + NeuroWorks cost + b8a interp	1,000	0	720	169	81	30	£973.85	0.824	-£324.17	0.000112	Dominant
Ambulatory EEG + Persyst (y1) cost + b8a interp	1,000	0	720	169	81	30	£967.14	0.824	-£330.88	0.000112	Dominant
Ambulatory EEG + Persyst (y2+) cost + b8a interp	1,000	0	720	169	81	30	£973.70	0.824	-£324.32	0.000112	Dominant
Ambulatory EEG + BioEP cost + b8a interp	199	67	739	84	109	1	£1,429.29	0.827	£131.26	0.003227	£40,671
Comparator (standard care)	1,000	-	719	169	81	31	£1,298.02	0.824	-	-	-
Ambulatory EEG + BioEP cost + BioEP extra rev 2m	199	67	739	84	109	1	£1,431.49	0.827	£133.46	0.003227	£41,353
Ambulatory EEG + BioEP cost + BioEP extra rev 10m	199	67	739	84	109	1	£1,440.29	0.827	£142.26	0.003227	£44,079
Comparator (standard care)	1,000	-	719	169	81	31	£1,298.02	0.87	-	-	-
Ambulatory EEG + encevis cost + higher u_tp	1,000	0	720	169	81	30	£885.98	0.87	-£412.04	0.000151	Dominant
Ambulatory EEG + NeuroCenter cost + higher u_tp	1,000	0	720	169	81	30	£887.85	0.87	-£410.17	0.000151	Dominant
Ambulatory EEG + NeuroWorks cost + higher u_tp	1,000	0	720	169	81	30	£890.85	0.87	-£407.17	0.000151	Dominant
Ambulatory EEG + Persyst (y1) cost + higher u_tp	1,000	0	720	169	81	30	£884.14	0.87	-£413.88	0.000151	Dominant
Ambulatory EEG + Persyst (y2+) cost + higher u_tp	1,000	0	720	169	81	30	£890.70	0.87	-£407.32	0.000151	Dominant
Ambulatory EEG + BioEP cost + higher u_tp	199	67	739	84	109	1	£1,429.29	0.874	£131.26	0.004461	£29,426
Comparator (standard care)	1,000	-	719	169	81	31	£1,298.02	0.829	-	-	-

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Ambulatory EEG + encevis cost + child u fp, u tn	1,000	0	720	169	81	30	£885.98	0.829	-£412.04	0.000112	Dominant
Ambulatory EEG + NeuroCenter cost + child u fp, u tn	1,000	0	720	169	81	30	£887.85	0.829	-£410.17	0.000112	Dominant
Ambulatory EEG + NeuroWorks cost + child u fp, u tn	1,000	0	720	169	81	30	£890.85	0.829	-£407.17	0.000112	Dominant
Ambulatory EEG + Persyst (y1) cost + child u fp, u tn	1,000	0	720	169	81	30	£884.14	0.829	-£413.88	0.000112	Dominant
Ambulatory EEG + Persyst (y2+) cost + child u fp, u tn	1,000	0	720	169	81	30	£890.70	0.829	-£407.32	0.000112	Dominant
Ambulatory EEG + BioEP cost + child u fp, u tn	199	67	739	84	109	1	£1,429.29	0.832	£131.26	0.003227	£40,671
Comparator (standard care)	1,000	-	716	188	62	34	£1,295.32	0.823	-	-	-
Ambulatory EEG + encevis cost + Reus sens	1,000	0	716	188	62	34	£883.17	0.823	-£412.14	-0.000034	£12,077,455
Ambulatory EEG + Persyst (y1) cost + Reus sens	1,000	0	716	188	62	34	£881.35	0.823	-£413.97	-0.000014	£30,327,418
Ambulatory EEG + Persyst (y2+) cost + Reus sens	1,000	0	716	188	62	34	£887.91	0.823	-£407.41	-0.000014	£29,846,832
Comparator (standard care)	1,000	-	719	169	81	31	£1,298.02	0.824	-	-	-
Ambulatory EEG + encevis cost + Koren 2018 test failure	1,000	0	720	169	81	30	£885.98	0.824	-£412.05	0.000106	Dominant
Comparator (standard care)	1,000	-	719	158	93	31	£1,299.41	0.824	-	-	-
Ambulatory EEG + encevis cost + lower IED spec	1,000	0	720	158	93	30	£887.37	0.824	-£412.04	0.000112	Dominant
Ambulatory EEG + NeuroCenter cost + lower IED spec	1,000	0	720	158	93	30	£889.24	0.824	-£410.17	0.000112	Dominant
Ambulatory EEG + NeuroWorks cost + lower IED spec	1,000	0	720	158	93	30	£892.24	0.824	-£407.17	0.000112	Dominant
Ambulatory EEG + Persyst (y1) cost + lower IED spec	1,000	0	720	158	93	30	£885.53	0.824	-£413.88	0.000112	Dominant
Ambulatory EEG + Persyst (y2+) cost + lower IED spec	1,000	0	720	158	93	30	£892.09	0.824	-£407.32	0.000112	Dominant
Ambulatory EEG + BioEP cost + lower IED spec	188	63	739	73	124	1	£1,438.59	0.827	£139.18	0.003194	£43,577

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Comparator (standard care)	1,000	-	719	169	81	31	£1,298.02	0.824	-	-	-
Ambulatory EEG + encevis cost + lower interp time	1,000	0	720	169	81	30	£833.65	0.824	-£464.38	0.000112	Dominant
Ambulatory EEG + NeuroCenter cost + lower interp time	1,000	0	720	169	81	30	£835.52	0.824	-£462.51	0.000112	Dominant
Ambulatory EEG + NeuroWorks cost + lower interp time	1,000	0	720	169	81	30	£838.52	0.824	-£459.51	0.000112	Dominant
Ambulatory EEG + Persyst (y1) cost + lower interp time	1,000	0	720	169	81	30	£831.81	0.824	-£466.22	0.000112	Dominant
Ambulatory EEG + Persyst (y2+) cost + lower interp time	1,000	0	720	169	81	30	£838.37	0.824	-£459.66	0.000112	Dominant
Ambulatory EEG + BioEP cost + lower interp time	199	67	739	84	109	1	£1,429.29	0.827	£131.26	0.003227	£40,671
Comparator (standard care)	1,000	-	719	169	81	31	£1,298.02	0.824	-	-	-
Ambulatory EEG + BioEP cost + fewer inconclusive 5%	199	10	747	120	121	1	£1,431.81	0.828	£133.79	0.004625	£28,930
Ambulatory EEG + BioEP cost + fewer inconclusive 10%	199	20	746	114	119	1	£1,431.37	0.828	£133.35	0.004381	£30,437
Ambulatory EEG + BioEP cost + fewer inconclusive 20%	199	40	743	101	115	1	£1,430.49	0.828	£132.47	0.003894	£34,015
Comparator (standard care)	1,000	-	671	203	98	29	£1,294.11	0.829	-	-	-
Ambulatory EEG + encevis cost + different abnormality prev 70%	1,000	0	672	203	98	28	£882.06	0.829	-£412.05	0.000104	Dominant
Ambulatory EEG + NeuroCenter cost + different abnormality prev 70%	1,000	0	672	203	98	28	£883.93	0.829	-£410.18	0.000104	Dominant
Ambulatory EEG + NeuroWorks cost + different abnormality prev 70%	1,000	0	672	203	98	28	£886.93	0.829	-£407.18	0.000104	Dominant
Ambulatory EEG + Persyst (y1) cost + different abnormality prev 70%	1,000	0	672	203	98	28	£880.22	0.829	-£413.89	0.000104	Dominant
Ambulatory EEG + Persyst (y2+) cost + different abnormality prev 70%	1,000	0	672	203	98	28	£886.78	0.829	-£407.33	0.000104	Dominant

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Ambulatory EEG + BioEP cost + different abnormality prev 70%	231	78	689	101	131	1	£1,473.62	0.832	£179.51	0.002938	£61,104
Comparator (standard care)	1,000	-	767	135	65	33	£1,301.94	0.818	-	-	-
Ambulatory EEG + encephalogram cost + different abnormality prev 80%	1,000	0	768	135	65	32	£889.90	0.819	-£412.04	0.000119	Dominant
Ambulatory EEG + NeuroCenter cost + different abnormality prev 80%	1,000	0	768	135	65	32	£891.77	0.819	-£410.17	0.000119	Dominant
Ambulatory EEG + NeuroWorks cost + different abnormality prev 80%	1,000	0	768	135	65	32	£894.77	0.819	-£407.17	0.000119	Dominant
Ambulatory EEG + Persyst (y1) cost + different abnormality prev 80%	1,000	0	768	135	65	32	£888.06	0.819	-£413.88	0.000119	Dominant
Ambulatory EEG + Persyst (y2+) cost + different abnormality prev 80%	1,000	0	768	135	65	32	£894.62	0.819	-£407.32	0.000119	Dominant
Ambulatory EEG + BioEP cost + different abnormality prev 80%	168	56	788	67	87	1	£1,456.40	0.822	£154.46	0.003517	£43,917
Comparator (standard care)	1,000	-	719	169	81	31	£1,298.02	0.824	-	-	-
Ambulatory EEG + encephalogram cost + b7 interp	1,000	0	720	169	81	30	£976.98	0.824	-£321.04	0.000112	Dominant
Ambulatory EEG + NeuroCenter cost + b7 interp	1,000	0	720	169	81	30	£978.85	0.824	-£319.17	0.000112	Dominant
Ambulatory EEG + NeuroWorks cost + b7 interp	1,000	0	720	169	81	30	£981.85	0.824	-£316.17	0.000112	Dominant
Ambulatory EEG + Persyst (y1) cost + b7 interp	1,000	0	720	169	81	30	£975.14	0.824	-£322.88	0.000112	Dominant
Ambulatory EEG + Persyst (y2+) cost + b7 interp	1,000	0	720	169	81	30	£981.70	0.824	-£316.32	0.000112	Dominant
Ambulatory EEG + BioEP cost + b7 interp	199	67	739	84	109	1	£1,429.29	0.827	£131.26	0.003227	£40,671
Comparator (standard care)	1,000	-	726	169	81	24	£1,298.81	0.825	-	-	-
Ambulatory EEG + encephalogram cost + different seizure prev 30%	1,000	0	726	169	81	24	£886.75	0.825	-£412.06	0.00009	Dominant

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Ambulatory EEG + NeuroCenter cost + different seizure prev 30%	1,000	0	726	169	81	24	£888.62	0.825	-£410.19	0.00009	Dominant
Ambulatory EEG + NeuroWorks cost + different seizure prev 30%	1,000	0	726	169	81	24	£891.62	0.825	-£407.19	0.00009	Dominant
Ambulatory EEG + Persyst (y1) cost + different seizure prev 30%	1,000	0	726	169	81	24	£884.91	0.825	-£413.90	0.00009	Dominant
Ambulatory EEG + Persyst (y2+) cost + different seizure prev 30%	1,000	0	726	169	81	24	£891.47	0.825	-£407.34	0.00009	Dominant
Ambulatory EEG + BioEP cost + different seizure prev 30%	193	65	741	84	109	1	£1,433.72	0.827	£134.91	0.002496	£54,053
Comparator (standard care)	1,000	-	719	169	81	31	£1,230.83	0.824	-	-	-
Ambulatory EEG + encevis cost + lower treatment cost	1,000	0	720	169	81	30	£818.74	0.824	-£412.10	0.000112	Dominant
Ambulatory EEG + NeuroCenter cost + lower treatment cost	1,000	0	720	169	81	30	£820.61	0.824	-£410.23	0.000112	Dominant
Ambulatory EEG + NeuroWorks cost + lower treatment cost	1,000	0	720	169	81	30	£823.61	0.824	-£407.23	0.000112	Dominant
Ambulatory EEG + Persyst (y1) cost + lower treatment cost	1,000	0	720	169	81	30	£816.90	0.824	-£413.94	0.000112	Dominant
Ambulatory EEG + Persyst (y2+) cost + lower treatment cost	1,000	0	720	169	81	30	£823.46	0.824	-£407.38	0.000112	Dominant
Ambulatory EEG + BioEP cost + lower treatment cost	199	67	739	84	109	1	£1,358.13	0.827	£127.30	0.003227	£39,443
Comparator (standard care)	1,000	-	719	169	81	31	£2,937.33	0.824	-	-	-
Ambulatory EEG + encevis cost + higher treatment cost	1,000	0	720	169	81	30	£2,526.54	0.824	-£410.79	0.000112	Dominant
Ambulatory EEG + NeuroCenter cost + higher treatment cost	1,000	0	720	169	81	30	£2,528.41	0.824	-£408.92	0.000112	Dominant
Ambulatory EEG + NeuroWorks cost + higher treatment cost	1,000	0	720	169	81	30	£2,531.41	0.824	-£405.92	0.000112	Dominant
Ambulatory EEG + Persyst (y1) cost + higher treatment cost	1,000	0	720	169	81	30	£2,524.70	0.824	-£412.63	0.000112	Dominant

Scenario	n, patients	Inconclusive (BioEP only)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Ambulatory EEG + Persyst (y2+) cost + higher treatment cost	1,000	0	720	169	81	30	£2,531.26	0.824	-£406.07	0.000112	Dominant
Ambulatory EEG + BioEP cost + higher treatment cost	199	67	739	84	109	1	£3,165.31	0.827	£227.98	0.003227	£70,638
Ambulatory EEG + BioEP cost + Tait et al. (2024) sensitivity	199	67	732	84	109	8	£1,428.43	0.826	£130.41	0.00197	£66,202

Video telemetry EEG

Scenario	n, patients	Inconclusive (BioEP)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Comparator (standard care)	1,000	-	747	152	73	28	£1,651.12	0.822	-	-	-
Base case, Video telemetry EEG + encevis cost	1,000	0	747	152	73	28	£1,239.07	0.822	-£412.05	0.000104	Dominant
Base case, Video telemetry EEG + NeuroCenter cost	1,000	0	747	152	73	28	£1,240.94	0.822	-£410.18	0.000104	Dominant
Base case, Video telemetry EEG + NeuroWorks cost	1,000	0	747	152	73	28	£1,243.94	0.822	-£407.18	0.000104	Dominant
Base case, Video telemetry EEG + Persyst (y1) cost	1,000	0	747	152	73	28	£1,237.23	0.822	-£413.89	0.000104	Dominant
Base case, Video telemetry EEG + Persyst (y2+) cost	1,000	0	747	152	73	28	£1,243.79	0.822	-£407.33	0.000104	Dominant
Base case, Video telemetry EEG + BioEP cost	180	61	765	76	98	1	£1,795.19	0.825	£144.07	0.002994	£48,115
Comparator (standard care)	500	-	373	76	37	14	£1,651.12	0.822	-	-	-
Video telemetry EEG + encevis cost + 500 per year	500	0	374	76	37	14	£1,247.94	0.822	-£403.18	0.000104	Dominant
Video telemetry EEG + NeuroCenter cost + 500 per year	500	0	374	76	37	14	£1,251.69	0.822	-£399.43	0.000104	Dominant
Video telemetry EEG + NeuroWorks cost + 500 per year	500	0	374	76	37	14	£1,257.69	0.822	-£393.43	0.000104	Dominant
Video telemetry EEG + Persyst (y1) cost + 500 per year	500	0	374	76	37	14	£1,244.27	0.822	-£406.85	0.000104	Dominant
Video telemetry EEG + Persyst (y2+) cost + 500 per year	500	0	374	76	37	14	£1,257.39	0.822	-£393.73	0.000104	Dominant

Scenario	n, patients	Inconclusive (BioEP)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Video telemetry EEG + BioEP cost + 500 per year	90	30	382	38	49	0	£1,933.96	0.825	£282.84	0.002994	£94,457
Comparator (standard care)	2,000	-	1,493	304	146	57	£1,651.12	0.822	-	-	-
Video telemetry EEG + encephalogram cost + 2000 per year	2,000	0	1,495	304	146	55	£1,234.63	0.822	-£416.49	0.000104	Dominant
Video telemetry EEG + NeuroCenter cost + 2000 per year	2,000	0	1,495	304	146	55	£1,235.57	0.822	-£415.55	0.000104	Dominant
Video telemetry EEG + NeuroWorks cost + 2000 per year	2,000	0	1,495	304	146	55	£1,237.07	0.822	-£414.05	0.000104	Dominant
Video telemetry EEG + Persyst (y1) cost + 2000 per year	2,000	0	1,495	304	146	55	£1,233.71	0.822	-£417.41	0.000104	Dominant
Video telemetry EEG + Persyst (y2+) cost + 2000 per year	2,000	0	1,495	304	146	55	£1,236.99	0.822	-£414.13	0.000104	Dominant
Video telemetry EEG + BioEP cost + 2000 per year	360	121	1,529	151	197	2	£1,836.82	0.825	£185.70	0.002994	£62,017
Comparator (standard care)	4,000	-	2,987	607	292	113	£1,651.12	0.822	-	-	-
Video telemetry EEG + encephalogram cost + 4000 per year	4,000	0	2,989	607	292	111	£1,232.41	0.822	-£418.71	0.000104	Dominant
Video telemetry EEG + NeuroCenter cost + 4000 per year	4,000	0	2,989	607	292	111	£1,232.88	0.822	-£418.24	0.000104	Dominant
Video telemetry EEG + NeuroWorks cost + 4000 per year	4,000	0	2,989	607	292	111	£1,233.63	0.822	-£417.49	0.000104	Dominant
Video telemetry EEG + Persyst (y1) cost + 4000 per year	4,000	0	2,989	607	292	111	£1,231.95	0.822	-£419.17	0.000104	Dominant
Video telemetry EEG + Persyst (y2+) cost + 4000 per year	4,000	0	2,989	607	292	111	£1,233.59	0.822	-£417.53	0.000104	Dominant
Video telemetry EEG + BioEP cost + 4000 per year	721	243	3,058	302	393	4	£1,822.94	0.825	£171.83	0.002994	£57,383
Comparator (standard care)	1,000	-	747	152	73	28	£1,651.12	0.822	-	-	-
Video telemetry EEG + encephalogram cost + b8c interp	1,000	0	747	152	73	28	£1,293.07	0.822	-£358.05	0.000104	Dominant
Video telemetry EEG + NeuroCenter cost + b8c interp	1,000	0	747	152	73	28	£1,294.94	0.822	-£356.18	0.000104	Dominant
Video telemetry EEG + NeuroWorks cost + b8c interp	1,000	0	747	152	73	28	£1,297.94	0.822	-£353.18	0.000104	Dominant

Scenario	n, patients	Inconclusive (BioEP)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Video telemetry EEG + Persyst (y1) cost + b8c interp	1,000	0	747	152	73	28	£1,291.23	0.822	-£359.89	0.000104	Dominant
Video telemetry EEG + Persyst (y2+) cost + b8c interp	1,000	0	747	152	73	28	£1,297.79	0.822	-£353.33	0.000104	Dominant
Video telemetry EEG + BioEP cost + b8c interp	180	61	765	76	98	1	£1,795.19	0.825	£144.07	0.002994	£48,115
Comparator (standard care)	1,000	-	747	152	73	28	£1,651.12	0.822	-	-	-
Video telemetry EEG + encevis cost + b8a interp	1,000	0	747	152	73	28	£1,322.07	0.822	-£329.05	0.000104	Dominant
Video telemetry EEG + NeuroCenter cost + b8a interp	1,000	0	747	152	73	28	£1,323.94	0.822	-£327.18	0.000104	Dominant
Video telemetry EEG + NeuroWorks cost + b8a interp	1,000	0	747	152	73	28	£1,326.94	0.822	-£324.18	0.000104	Dominant
Video telemetry EEG + Persyst (y1) cost + b8a interp	1,000	0	747	152	73	28	£1,320.23	0.822	-£330.89	0.000104	Dominant
Video telemetry EEG + Persyst (y2+) cost + b8a interp	1,000	0	747	152	73	28	£1,326.79	0.822	-£324.33	0.000104	Dominant
Video telemetry EEG + BioEP cost + b8a interp	180	61	765	76	98	1	£1,795.19	0.825	£144.07	0.002994	£48,115
Comparator (standard care)	1,000	-	747	152	73	28	£1,651.12	0.822	-	-	-
Video telemetry EEG + BioEP cost + BioEP extra rev 2m	180	61	765	76	98	1	£1,797.39	0.825	£146.27	0.002994	£48,850
Video telemetry EEG + BioEP cost + BioEP extra rev 10m	180	61	765	76	98	1	£1,806.19	0.825	£155.07	0.002994	£51,789
Comparator (standard care)	1,000	-	747	152	73	28	£1,651.12	0.869	-	-	-
Video telemetry EEG + encevis cost + higher u_tp	1,000	0	747	152	73	28	£1,239.07	0.87	-£412.05	0.000141	Dominant
Video telemetry EEG + NeuroCenter cost + higher u_tp	1,000	0	747	152	73	28	£1,240.94	0.87	-£410.18	0.000141	Dominant
Video telemetry EEG + NeuroWorks cost + higher u_tp	1,000	0	747	152	73	28	£1,243.94	0.87	-£407.18	0.000141	Dominant
Video telemetry EEG + Persyst (y1) cost + higher u_tp	1,000	0	747	152	73	28	£1,237.23	0.87	-£413.89	0.000141	Dominant
Video telemetry EEG + Persyst (y2+) cost + higher u_tp	1,000	0	747	152	73	28	£1,243.79	0.87	-£407.33	0.000141	Dominant
Video telemetry EEG + BioEP cost + higher u_tp	180	61	765	76	98	1	£1,795.19	0.874	£144.07	0.004136	£34,835

Scenario	n, patients	Inconclusive (BioEP)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Comparator (standard care)	1,000	-	747	152	73	28	£1,651.12	0.827	-	-	-
Video telemetry EEG + encevis cost + child u_fp, u_tn	1,000	0	747	152	73	28	£1,239.07	0.827	-£412.05	0.000104	Dominant
Video telemetry EEG + NeuroCenter cost + child u_fp, u_tn	1,000	0	747	152	73	28	£1,240.94	0.827	-£410.18	0.000104	Dominant
Video telemetry EEG + NeuroWorks cost + child u_fp, u_tn	1,000	0	747	152	73	28	£1,243.94	0.827	-£407.18	0.000104	Dominant
Video telemetry EEG + Persyst (y1) cost + child u_fp, u_tn	1,000	0	747	152	73	28	£1,237.23	0.827	-£413.89	0.000104	Dominant
Video telemetry EEG + Persyst (y2+) cost + child u_fp, u_tn	1,000	0	747	152	73	28	£1,243.79	0.827	-£407.33	0.000104	Dominant
Video telemetry EEG + BioEP cost + child u_fp, u_tn	180	61	765	76	98	1	£1,795.19	0.83	£144.07	0.002994	£48,115
Comparator (standard care)	1,000	-	747	152	73	28	£1,651.12	0.822	-	-	-
Video telemetry EEG + encevis cost + Koren 2025 test failure	1,000	0	747	152	73	28	£1,239.07	0.822	-£412.05	0.000103	Dominant
Video telemetry EEG + Persyst (y1) cost + Koren 2025 test failure	1,000	0	747	152	73	28	£1,237.23	0.822	-£413.89	0.000103	Dominant
Video telemetry EEG + Persyst (y2+) cost + Koren 2025 test failure	1,000	0	747	152	73	28	£1,243.79	0.822	-£407.33	0.000103	Dominant
Comparator (standard care)	1,000	-	747	152	73	28	£1,651.12	0.822	-	-	-
Video telemetry EEG + encevis cost + b7 interp	1,000	0	747	152	73	28	£1,330.07	0.822	-£321.05	0.000104	Dominant
Video telemetry EEG + NeuroCenter cost + b7 interp	1,000	0	747	152	73	28	£1,331.94	0.822	-£319.18	0.000104	Dominant
Video telemetry EEG + NeuroWorks cost + b7 interp	1,000	0	747	152	73	28	£1,334.94	0.822	-£316.18	0.000104	Dominant
Video telemetry EEG + Persyst (y1) cost + b7 interp	1,000	0	747	152	73	28	£1,328.23	0.822	-£322.89	0.000104	Dominant
Video telemetry EEG + Persyst (y2+) cost + b7 interp	1,000	0	747	152	73	28	£1,334.79	0.822	-£316.33	0.000104	Dominant
Video telemetry EEG + BioEP cost + b7 interp	180	61	765	76	98	1	£1,795.19	0.825	£144.07	0.002994	£48,115
Comparator (standard care)	1,000	-	747	142	83	28	£1,652.37	0.822	-	-	-
Video telemetry EEG + encevis cost + lower IED spec	1,000	0	747	142	83	28	£1,240.32	0.822	-£412.05	0.000104	Dominant

Scenario	n, patients	Inconclusive (BioEP)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Video telemetry EEG + NeuroCenter cost + lower IED spec	1,000	0	747	142	83	28	£1,242.19	0.822	-£410.18	0.000104	Dominant
Video telemetry EEG + NeuroWorks cost + lower IED spec	1,000	0	747	142	83	28	£1,245.19	0.822	-£407.18	0.000104	Dominant
Video telemetry EEG + Persyst (y1) cost + lower IED spec	1,000	0	747	142	83	28	£1,238.48	0.822	-£413.89	0.000104	Dominant
Video telemetry EEG + Persyst (y2+) cost + lower IED spec	1,000	0	747	142	83	28	£1,245.04	0.822	-£407.33	0.000104	Dominant
Video telemetry EEG + BioEP cost + lower IED spec	170	57	765	66	111	1	£1,805.08	0.824	£152.71	0.002964	£51,519
Comparator (standard care)	1,000	-	747	152	73	28	£1,651.12	0.822	-	-	-
Video telemetry EEG + encevis cost + lower interp time	1,000	0	747	152	73	28	£1,186.74	0.822	-£464.38	0.000104	Dominant
Video telemetry EEG + NeuroCenter cost + lower interp time	1,000	0	747	152	73	28	£1,188.61	0.822	-£462.51	0.000104	Dominant
Video telemetry EEG + NeuroWorks cost + lower interp time	1,000	0	747	152	73	28	£1,191.61	0.822	-£459.51	0.000104	Dominant
Video telemetry EEG + Persyst (y1) cost + lower interp time	1,000	0	747	152	73	28	£1,184.90	0.822	-£466.22	0.000104	Dominant
Video telemetry EEG + Persyst (y2+) cost + lower interp time	1,000	0	747	152	73	28	£1,191.46	0.822	-£459.66	0.000104	Dominant
Video telemetry EEG + BioEP cost + lower interp time	180	61	765	76	98	1	£1,795.19	0.825	£144.07	0.002994	£48,115
Comparator (standard care)	1,000	-	747	152	73	28	£1,651.12	0.822	-	-	-
Video telemetry EEG + BioEP cost + fewer inconclusive 5%	180	9	772	108	109	1	£1,797.49	0.826	£146.37	0.004291	£34,115
Video telemetry EEG + BioEP cost + fewer inconclusive 10%	180	18	771	103	107	1	£1,797.09	0.826	£145.97	0.004065	£35,912
Video telemetry EEG + BioEP cost + fewer inconclusive 20%	180	36	768	91	103	1	£1,796.29	0.825	£145.17	0.003613	£40,179
Comparator (standard care)	1,000	-	674	203	98	26	£1,645.21	0.829	-	-	-
Video telemetry EEG + encevis cost + different abnormality prev 70%	1,000	0	675	203	98	25	£1,233.15	0.829	-£412.06	0.000094	Dominant
Video telemetry EEG + NeuroCenter cost +	1,000	0	675	203	98	25	£1,235.02	0.829	-£410.19	0.000094	Dominant

Scenario	n, patients	Inconclusive (BioEP)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
different abnormality prev 70%											
Video telemetry EEG + NeuroWorks cost + different abnormality prev 70%	1,000	0	675	203	98	25	£1,238.02	0.829	-£407.19	0.000094	Dominant
Video telemetry EEG + Persyst (y1) cost + different abnormality prev 70%	1,000	0	675	203	98	25	£1,231.31	0.829	-£413.90	0.000094	Dominant
Video telemetry EEG + Persyst (y2+) cost + different abnormality prev 70%	1,000	0	675	203	98	25	£1,237.87	0.829	-£407.34	0.000094	Dominant
Video telemetry EEG + BioEP cost + different abnormality prev 70%	228	77	691	101	131	1	£1,826.74	0.832	£181.53	0.002596	£69,920
Comparator (standard care)	1,000	-	819	101	49	31	£1,657.03	0.814	-	-	-
Video telemetry EEG + encevis cost + different abnormality prev 85%	1,000	0	820	101	49	30	£1,244.99	0.814	-£412.04	0.000114	Dominant
Video telemetry EEG + NeuroCenter cost + different abnormality prev 85%	1,000	0	820	101	49	30	£1,246.86	0.814	-£410.17	0.000114	Dominant
Video telemetry EEG + NeuroWorks cost + different abnormality prev 85%	1,000	0	820	101	49	30	£1,249.86	0.814	-£407.17	0.000114	Dominant
Video telemetry EEG + Persyst (y1) cost + different abnormality prev 85%	1,000	0	820	101	49	30	£1,243.15	0.814	-£413.88	0.000114	Dominant
Video telemetry EEG + Persyst (y2+) cost + different abnormality prev 85%	1,000	0	820	101	49	30	£1,249.71	0.814	-£407.32	0.000114	Dominant
Video telemetry EEG + BioEP cost + different abnormality prev 85%	132	45	839	50	66	1	£1,850.52	0.817	£193.49	0.003392	£57,035
Comparator (standard care)	1,000	-	753	152	73	22	£1,651.93	0.823	-	-	-
Video telemetry EEG + encevis cost + different seizure prev 40%	1,000	0	754	152	73	21	£1,239.87	0.823	-£412.06	0.000082	Dominant
Video telemetry EEG + NeuroCenter cost + different seizure prev 40%	1,000	0	754	152	73	21	£1,241.74	0.823	-£410.19	0.000082	Dominant
Video telemetry EEG + NeuroWorks cost + different seizure prev 40%	1,000	0	754	152	73	21	£1,244.74	0.823	-£407.19	0.000082	Dominant

Scenario	n, patients	Inconclusive (BioEP)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Video telemetry EEG + Persyst (y1) cost + different seizure prev 40%	1,000	0	754	152	73	21	£1,238.03	0.823	-£413.90	0.000082	Dominant
Video telemetry EEG + Persyst (y2+) cost + different seizure prev 40%	1,000	0	754	152	73	21	£1,244.59	0.823	-£407.34	0.000082	Dominant
Video telemetry EEG + BioEP cost + different seizure prev 40%	174	58	767	76	98	1	£1,800.76	0.825	£148.83	0.002238	£66,488
Comparator (standard care)	1,000	-	747	152	73	28	£4,522.36	0.822	-	-	-
Video telemetry EEG + encevis cost + inpatient cost	1,000	0	747	152	73	28	£4,110.31	0.822	-£412.05	0.000104	Dominant
Video telemetry EEG + NeuroCenter cost + inpatient cost	1,000	0	747	152	73	28	£4,112.18	0.822	-£410.18	0.000104	Dominant
Video telemetry EEG + NeuroWorks cost + inpatient cost	1,000	0	747	152	73	28	£4,115.18	0.822	-£407.18	0.000104	Dominant
Video telemetry EEG + Persyst (y1) cost + inpatient cost	1,000	0	747	152	73	28	£4,108.47	0.822	-£413.89	0.000104	Dominant
Video telemetry EEG + Persyst (y2+) cost + inpatient cost	1,000	0	747	152	73	28	£4,115.03	0.822	-£407.33	0.000104	Dominant
Video telemetry EEG + BioEP cost + inpatient cost	180	61	765	76	98	1	£4,666.43	0.825	£144.07	0.002994	£48,115
Comparator (standard care)	1,000	-	747	152	73	28	£1,582.32	0.822	-	-	-
Video telemetry EEG + encevis cost + lower treatment cost	1,000	0	747	152	73	28	£1,170.22	0.822	-£412.10	0.000104	Dominant
Video telemetry EEG + NeuroCenter cost + lower treatment cost	1,000	0	747	152	73	28	£1,172.09	0.822	-£410.23	0.000104	Dominant
Video telemetry EEG + NeuroWorks cost + lower treatment cost	1,000	0	747	152	73	28	£1,175.09	0.822	-£407.23	0.000104	Dominant
Video telemetry EEG + Persyst (y1) cost + lower treatment cost	1,000	0	747	152	73	28	£1,168.38	0.822	-£413.94	0.000104	Dominant
Video telemetry EEG + Persyst (y2+) cost + lower treatment cost	1,000	0	747	152	73	28	£1,174.94	0.822	-£407.38	0.000104	Dominant
Video telemetry EEG + BioEP cost + lower treatment cost	180	61	765	76	98	1	£1,722.78	0.825	£140.46	0.002994	£46,910
Comparator (standard care)	1,000	-	747	152	73	28	£3,329.63	0.822	-	-	-

Scenario	n, patients	Inconclusive (BioEP)	True positive	True negative	False positive	False negative	Cost per patient	Utilities per patient	Incremental costs	Incremental utilities	ICER (£/QALY)
Video telemetry EEG + encephalogram cost + higher treatment cost	1,000	0	747	152	73	28	£2,918.75	0.822	-£410.88	0.000104	Dominant
Video telemetry EEG + NeuroCenter cost + higher treatment cost	1,000	0	747	152	73	28	£2,920.62	0.822	-£409.01	0.000104	Dominant
Video telemetry EEG + NeuroWorks cost + higher treatment cost	1,000	0	747	152	73	28	£2,923.62	0.822	-£406.01	0.000104	Dominant
Video telemetry EEG + Persyst (y1) cost + higher treatment cost	1,000	0	747	152	73	28	£2,916.91	0.822	-£412.72	0.000104	Dominant
Video telemetry EEG + Persyst (y2+) cost + higher treatment cost	1,000	0	747	152	73	28	£2,923.47	0.822	-£406.16	0.000104	Dominant
Video telemetry EEG + BioEP cost + higher treatment cost	180	61	765	76	98	1	£3,561.76	0.825	£232.13	0.002994	£77,522
Video telemetry EEG + BioEP cost + Tait et al. (2024) sensitivity	180	61	758	76	98	7	£1,794.40	0.823	£143.28	0.00183	£78,280

Appendix B5: Summary of the economic model provided by Neuronostics (BioEP)

Structure

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Changes of the model applied by the EAG included:

[REDACTED]

Limitations

Key limitations identified by the EAG:

[REDACTED]

[REDACTED]

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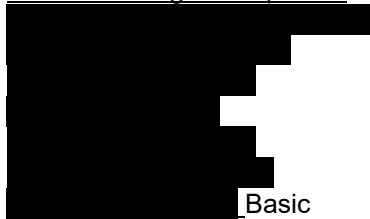
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Appendix C – Supplementary technology details

Appendix C1: Technical information

Device (Company)	Versions	Contraindications	Installation methods and other requirements	Training	Validation	Comments	Additional features (as claimed by company)
BioEP (Neuronostics)	Current version; V2025.11.1 (launched: 05/11/2025). The company shared a draft report with the EAG which links to the instructions for use, publications, training video and contact for support. Technology available from 2023 <u>Planned changes or updates:</u> Additional clinical data is being generated to include the paediatric population (ages 2-18 years) expected to be completed by mid-2026. Developing prognostic capabilities through ECLIPSE study (Innovate UK) to track patient response to anti-seizure medication. Currently working with EEG service providers to embed BioEP pull-through directly into their software to further minimise workload.	Patients under 18 years of age, EEGs showing clear epileptiform activity (as these are not inconclusive and should be diagnosed as per current guidelines), and individuals with structural brain abnormalities, skull breaches, or intracranial metal/plastic implants, as these impact the signal characteristics of the EEG in a manner that makes the BioEP analysis unsuitable. BioEP does not analyse sleep, hyperventilation, or photic stimulation sections, which should be excluded. If the neurophysiology EEG contains ictal or interictal epileptiform discharges, the BioEP report is not valid. BioEP should only be used when the patient is in their baseline state (NOT in a suspected ictal state) when their EEG was taken. BioEP is not intended to be used as a standalone diagnostic. It is intended to be used as an additional piece of information in the wider portfolio of evidence used in the clinical diagnosis of epilepsy, alongside the neurophysiology EEG report and a patient's clinical history.	BioEP is a cloud-based platform that does not require infrastructure changes and integrates with existing EEG workflows. It requires a suitable intervention connection and web browser requirements. Hardware agnostic as long as data exported in EDF. Requires a minimum of 19 channels recorded according to the international 10/20 system. Minimum of 15 minutes of EEG recording. At least 256 Hz sampling rate. Any referential montage.	<u>Staff training:</u> Mandatory training video (5 minutes long) that guides users in process of upload and interpreting the report; automatically presented at first log in. <u>Algorithm training:</u> BioEP has been trained on over 1000 EEGs collected since 2015. No further information was provided on patient demographics, proportion with epilepsy, types of epilepsy reported.	Validated in adult (18+) patients with a range of epilepsy types, including generalised and focal epilepsies. Retrospective multi-site validation study (Tait et al. 2024); included in the evidence summarised by the EAG. This found no evidence that performance was altered by epilepsy type. BioEP achieved an AUROC of 0.72 (with sensitivity >0.6) for distinguishing epilepsy from non-epilepsy in 281 clinically inconclusive EEGs across 8 NHS sites. The company note that the pooled sensitivity of all EEGs for adults is as low as 17.3% (Bouma et al., 2016).	BioEP analyses the background brain activity: 1) Signal Analysis: Quantifies alterations in the frequency, spectral power and amplitude of the EEG signal. 2. Brain Network Connectivity: Maps the brain's communication between regions (graph theory) to identify disrupted connections characteristic of epilepsy, simulates brain activity inferred from the EEG to assess the brain's underlying propensity for seizure generation. These outputs then integrated into a supervised statistical model (a random forest classifier) trained on hundreds of inconclusive EEGs from patients with confirmed epilepsy and those with alternative conditions (e.g. Non-Epileptic Attack Disorder).	BioEP may be used to support prioritisation of EEGs for review. Process from upload to report generation takes approx.10 minutes (for a routine 30 minute recording). Identifiers (name, DOB, hospital or NHS number) are entered at point of upload to enable BioEP report to relevant patient record within an NHS health Board or Trust; however the company has confirmed that these are not used in any aspect of the algorithmic decision making. Eight features used to derive biomarker, see Supplementary Material (Charles et al., 2026).

Device (Company)	Versions	Contraindications	Installation methods and other requirements	Training	Validation	Comments	Additional features (as claimed by company)
encevis (AIT)	Available from 2014 <u>Planned changes or updates:</u>  Basic reporting capability expected to be available within the next year. The company confirmed that: • DeepSpike is the previously used name for the AI model of the spike detection. • EpiScan is the previously used name for encevis seizure detection • PureEEG is the name for the current artefact reduction • Neurotrend: is contained in the encevis epilepsy and ICU packages, that it provides continuous EEG analysis including trend overviews.	There are no contraindications or unwanted side effects.	Integrates with existing EEG acquisition systems; no major hardware or workflow modifications required; typically requires individual configuration to match local system interfaces and governance requirements. The encevis viewer can read the EEG files of all major manufactures. When EEG data is stored in DICOM forma, an interface with PACS is required. The software also works directly with manufacturer native file format. Requires 10/20 (minimum) scalp EEG-data. Maximum length for on continuous EEG that can be reviewed and analysed is 10 days. The IFU states that “The life span of this version of encevis ends on Windows 10 64 bit operating systems on October 14th 2025 and for Windows 11 64 bit on October 12th 2027. As of these dates, no more error corrections will be performed for encevis on the named operating systems and this version of encevis may no longer be used.” The company confirmed that this was due to regaultroy requirements, that they support current versions of Windows and keep this updated.	<u>Staff training:</u> Training requirements for NHS adoption of encevis are minimal. Healthcare professionals such as neurophysiologists, neurologists, and EEG technicians would benefit from brief initial training focused on system operation, interpretation of automated results, and the use of artefact-reduction tools. Training can be delivered through short on-site sessions or remote tutorials and typically fits within existing EEG workflow familiarisation. <u>Algorithm training:</u> For seizure detection algorithms, the training data were obtained from 859 intensive care and epilepsy monitoring patients, comprising a total EEG recording duration of approximately 21,400 hours (about 2.4 years). For spike detection 447,000 labelled EEG epochs were used. Training datasets included men and women from diverse ethnic and geographic backgrounds. The data was recorded in various clinics with different EEG hardware. No further information was provided on patient demographics, proportion with epilepsy, types of epilepsy reported.	Validation was performed by comparing the algorithmic results against annotations from at least three independent expert raters, covering approximately 12 hours of spike data and 1,600 hours of seizure data. Validation datasets included men and women from diverse ethnic and geographic backgrounds. The data was recorded in various clinics with different EEG hardware. No further information was provided on patient demographics, proportion with epilepsy, types of epilepsy reported.	Delays of up to several minutes can occur between the beginning of a seizure, the occurrence of a spike or detection of quantitative EEG features and when the encevis notifications will be shown to a user. The life span of this version of encevis ends on Windows 10 64 bit operating systems on October 14th 2025 and for Windows 11 64 bit on October 12th 2027. As of these dates, no more error corrections will be performed for encevis on the named operating systems and this version of encevis may no longer be used. The company confirmed that while the ECG signal can be displayed in NeuroTrend overview if it is included in the EEG recording, that it is not required for seizure detection (not included in the algorithm)	encevis artefact reduction is intended to reduce EMG, eye movement, and electrode artefacts in a standard 10-20 EEG recording. It does not remove the entire artefact signal and is not effective for other types of artefacts. The source localization represents the origin of EEG activity in the brain. Individual spikes as well as rhythmic activity can be localised. Detects and visualises patterns with frequencies up to 12Hz.
NeuroCenter EEG (CSS)	Available from 2010; other names DeepIED, <u>Planned changes or updates:</u> Automated diagnostic suggestions are not part of the current version but may be explored in future	Potential limitations include: recordings with very heavy artefacts, children below 6 years (limited training data), severely encephalopathic patterns where IED morphology may deviate	Implementation requires minimal disruption to existing clinical systems. Offline use is hardware-agnostic and supports EDF+ natively; online real-time detection of IEDs and specific seizure	<u>Staff training:</u> Training needs are low. Most users become proficient within one hour. On-site sessions, online modules and integrated instructional materials are available, and the interface is intentionally	The model has been validated in children aged 6 years and above and in adults, covering both focal and generalised epileptiform discharges. No further information was provided on patient demographics,	The company noted that DeepCRI is a cerebral recovery index model intended to predict neurological outcome following cardiac arrest. This intended purpose is distinct from EEG analysis	Analysis of routine EEG takes approx. 2-3 minutes, 24-hour recording approx. 20-25 minutes. Real-time symmetry metric (Brain Symmetry

Device (Company)	Versions	Contraindications	Installation methods and other requirements	Training	Validation	Comments	Additional features (as claimed by company)
	developments. The company confirmed they estimate reporting functionality to be available within the next year. Expect transition to class IIa in 2026	substantially from typical forms.	types is available within NeuroCenter EEG platform. Potential barriers to adoption include: integration into local IT infrastructures, interoperability with proprietary EEG formats, variation in EEG review workflows across clinical sites.	built to align with common EEG review workflows <u>Algorithm training:</u> The model has been trained in children aged 6 years and above and in adults, including routine, sleep-deprived and ambulatory EEG covering both focal and generalised epileptiform discharges. No further information was provided on patient demographics, proportion with epilepsy, types of epilepsy reported.	proportion with epilepsy, types of epilepsy reported. Performance is supported by external validation studies demonstrating expert-level detection accuracy (Tjepkema-Cloostermans et al., 2025, Epilepsia); which was deprioritised by the EAG (summary in Appendix A5). The company claim that there are no major performance differences have been observed between focal and generalised epileptiform discharges. Training and validation in 4 datasets (applying temporal shifting and different montages) reported in da Silva Lourenço (Clin Neurophysiol, 2021; 1234-1240); which was deprioritised by the EAG (summary in Appendix A5).	for suspected epilepsy. Therefore, studies evaluating DeepCRI for post-cardiac arrest prognostication are outside the scope of this assessment and are not considered generalisable to the current NeuroCenter EEG epilepsy indication.	Index, BSI) which can be used for focal seizure detection and for detecting asymmetries associated with cerebral ischaemic. Algorithms focusing on background EEG properties (Colourful Brain) including automated extraction of key EEG features (posterior dominant rhythm, symmetry, reactivity, antero-posterior differentiation) to support rapid reporting.
NeuroWorks (Natus Medical)	Current version 10 GMA5 with autoSCORE (launched 09/10/2025) is the commercial product for the AI-enabled EEG analysis (developed by Holberg EEG) [Note that autoSCORE is the commercial product name for the SCORE-AI algorithm described in the literature. SCORE-AI is currently v2.0 which was launched 15 April 2025] <u>Planned changes or updates:</u> None reported.	SCORE-AI is not intended to be used for comatose intensive care unit (ICU) patients, or in neonatal patients less than 3 months of age. SCORE-AI has not been assessed for intracranial recordings. SCORE-AI cannot detect or classify seizures.	Intended to be installed by a professional who is qualified to install the Natus NeuroWorks EEG software. SCORE-AI is embedded directly into the Natus NeuroWorks EEG software. Can be used with routine EEG, Long Term Monitoring, and Ambulatory EEG (with a duration between 14 minutes and 4 hours) with surface electrodes according to the 10-20 EEG scheme. Inputs include: 19 EEG channels, 1 ECG channel, patient age and sex, EEG frequency content between 0.5-128 Hz, standardised sample rate 256 Hz or higher.	SCORE-AI was trained on 30,493 routine EEG recordings (between 2014-2020) sourced from multiple European epilepsy centres. All EEGs were fully annotated by 17 expert clinical neurophysiologists. Annotation used the internationally standardised SCORE EEG terminology. Included adult and paediatric patients (>3 months). Excluded: neonatal EEGs and EEGs from critically ill ICU patients	The company state that the model was “fixed and frozen” prior to validation, meaning no tuning or optimisation occurred during clinical testing, reducing bias and overfitting. Model performance was assessed using three independent test datasets not used in training: 1. A multicentre expert-consensus dataset (100 EEGs, 11 independent experts) 2. A large external single-centre dataset (9,785 EEGs) 3. A benchmark dataset used for comparison with other AI approaches Performance was compared against human expert interpretation.	NeuroWorks 10.0 GMA4 launched March 2025; EEG system without AI assisted assessment of abnormalities. NeuroWorks 10.0 GMA5 launched October 2025; EEG system with autoscore, an AI assisted assessment of abnormalities SCORE-AI is the commercial product for the AI-enabled EEG analysis (developed by Holberg EEG). SCORE-AI does not have a user interface, but sends information to the Natus Neuroworks EEG reviewing software. Software integration with Persyst analysers.	SCORE-AI provides an overview of the probabilities that EEG recordings between 14 minutes and 4 hours include any abnormalities (focal or generalised epileptiform, focal or diffuse non-epileptiform). For EEGs of longer than 4 hour duration, SCORE-AI indicates the number of segments with a duration of 2-4 hours that include abnormalities and the total number of analysed segments. SCORE-AI cannot detect or classify seizures. The user can sort the SCORE-AI finding by descending probability to support diagnosis.

Device (Company)	Versions	Contraindications	Installation methods and other requirements	Training	Validation	Comments	Additional features (as claimed by company)
			Requires Windows 10 or newer, Microsoft Visual C++ 2015 or newer. Requires RAM to a total of 1 GB or more.		The algorithm demonstrated human-expert-level diagnostic accuracy across multiple EEG abnormality categories.	Company confirmed that SCORE-AI does not use or interact with Persyst, but both can be used together during recording or in off-line analysis mode. They confirmed that SCORE-AI does not distinguish between ictal and interictal epileptiform activity, using Persyst in parallel with SCORE-AI is complementary as Persyst will mark seizures.	
Persyst 15 (Persyst)	Persyst 15 launched November 2024. Previous version Persyst 14 (P14) was considered as most comparable by company which was available from 2018; Company confirmed that Persyst 13 also included machine-learning/neural network approaches. <u>Planned changes or updates:</u> The company confirmed they estimate reporting functionality to be available within the next year. The company shared a draft report with the EAG. Several warnings highlighting use of technology is to be used alongside clinical information and support (not replace) clinical expert.	Automated event marking not applicable to aEEG, notifications not a substitute for real time monitoring of the underlying EEG by a trained expert; sleep state output is subject to user confirmation via EEG waveform review and not intended for diagnosis of sleep disorders Persyst 15 Spike Detection performance has not been assessed for intracranial recordings. Heart rate measurement of Persyst 15 is not applicable to patients with pacemaker and/or active implantable devices.	Persyst is compatible and integrates with major EEG systems (e.g. Natus, Micromed, Nihon Kohden, Deymed, Compumedics, Cadwell, and others) and supports wide range EEG formats. Optimal results are obtained with full 10–20 or 10-10 electrode montages. min i5 processor, min 4 GB RAM or better, min 2 GB free space, Windows 10 or 11, LAN 1 GbE connection speed to file storage. Antivirus exclusions for Persyst analysis files: *.af1, *.af2, *.ar, *.indx, *.lay, *.mg2, *.mmx, *.raw, *.sd4, *.xml	<u>Staff training:</u> Training how to use Persyst is provided by the company. <u>Algorithm training:</u> The seizure and spike detection components were developed using large, curated scalp EEG datasets (standard electrode placements/clinical montages) with events annotated by trained EEG experts. Development has been iterative across versions, with updated training sets and methodology over time (including modern machine-learning methods). No further information was provided on patient demographics, proportion with epilepsy, types of epilepsy reported. Electrode artefact testing: Two board-certified experts in EEG interpretation identified and marked artefacts and no-artefact signals; based on 159 patients records and 109,854 marked events); Spike detection: based on recordings of 50 clinical and 277 EMU patients, consensus-marked by 2 experts, training and test data	<u>Seizure marking:</u> In typical prolonged EMU recordings, an evaluation comparing expert readers and commercial detectors reported that Persyst 14 performed statistically non-inferior to human (benchmarking algorithm performance against inter-reader variability). In continuous inpatient EEG, a large retrospective evaluation assessed performance at the record level (presence/absence of seizures in a record), reporting high negative predictive value for “no detections” as a potential basis for triage of records for manual review (not as a standalone alarm). <u>Adult seizure detection:</u> Scheuer et al., 2021 compared Persyst 13 versus Persyst 14; which was deprioritised by the EAG (see summary in Appendix A5). Persyst 14 was trained on EEG records from 764 seizure affected patients, collected from approximately a dozen institutions and marked by about six readers, plus hundreds of additional	Can assist triage process (seizure probability trends, detected event markers). Company confirmed that ECG is not required for Persyst's core EEG analysis output (spike/seizure detection). If an ECG channel is present in the EEG recoding Persyst can calculate and display heart rate based on that channel.	Artefact reduction (reduce EMG, eye movement and electrode artefacts). Software includes the Persyst mobile application implemented to function using a web browser (read only mode).

Device (Company)	Versions	Contraindications	Installation methods and other requirements	Training	Validation	Comments	Additional features (as claimed by company)
				were split by odd and even patient records; Seizure detection: 85 records in test data compare to human reader marks. Neonatal seizure detections: 3 expert reviewers read 55 neonatal EEGs, detecting 475 seizures.	records used to train related functions (for example spike detection and artefact related routines). For validation, they evaluated 120 prolonged EMU EEGs (2,805 hours total) with 411 expert marked seizure events and reported the Persyst 14 algorithm's performance as comparable with expert humans and statistically noninferior to the experts' pairwise performance, including analyses of sensitivity/false positives and detection latency, and explicitly notes test data were not used for algorithm training. Reus et al. 2022 external validation in an EMU dataset retrospectively processed 286 prolonged EEG records from people aged 16–86 years (249 seizures across 64 records); this was an included study in the EAG report (see summary in section 4.2). At record level, sensitivity was reported as 98% when “positive” meant detecting at least one seizure in the record, and median false positives were 1.7 per 24 hours; the authors concluded Persyst performed best among the three commercial packages assessed. Kamitaki et al., 2019 evaluated EMU detection methods (including Persyst 11 automated seizure alarm) and report detection yield by seizure type plus a false alarm rate, in the context of nursing response/workflow. This study was deprioritised by the EAG (see summary in Appendix A5).		

Device (Company)	Versions	Contraindications	Installation methods and other requirements	Training	Validation	Comments	Additional features (as claimed by company)
					Ganguly et al., 2022 compared Persyst automated detections (v12/v13) of inpatient continuous EEG to human review, reporting performance at individual seizure level and record level, and conclude the strongest value is record-level triage (high NPV) rather than using it as a seizure alarm. This study was deprioritised by the EAG (see summary in Appendix A5). Koren et al., 2025 head-to-head compared Persyst 14 versus encephalogram 2.0 in a large VEM dataset (80 patients, 6826 h EEG, 912 seizures) across different sensitivity settings, reporting detection rates and false positive rates. This was an included study in the EAG report (see summary in section 4.2). <u>Pattern-specific performance / limitations (adult critical care):</u> Zorlu et al., 2018 [Abstract]–evaluated Persyst seizure detection sensitivity across different electrographic patterns of status epilepticus, reporting higher detection for repetitive focal seizures than for patterns on the ictal–interictal continuum (small sample, version not reported). This abstract was deprioritised by the EAG (see summary in Appendix A5). <u>Neonatal seizure detection</u> Duckworth et al., 2024 (single-centre ICU service evaluation; clinical validation was done in neonates undergoing ICU cEEG at Great Ormond Street Hospital (May 2019 to Dec 2022), using 49 seizure cases and 49 seizure free controls; AUC		

Device (Company)	Versions	Contraindications	Installation methods and other requirements	Training	Validation	Comments	Additional features (as claimed by company)
					was 0.94, and at a seizure probability threshold of 0.6 they report 80% sensitivity and 98% specificity. This was an included study in the EAG report (see summary in section 4.2). <u>Spike / IED detection</u> Tjepkema-Cloostermans et al. 2025 conducted internal validation (n=50 patients; 22 of which had focal or generalised epilepsy) and external validation (n=174 EEGs; 89 with IEDs of Persyst 14 performance at different probability thresholds, highlighting variability between expert readers and algorithm trade-offs. This study was deprioritised by the EAG (see summary in Appendix A5).		

Appendix C2: Cost information

Parameter	BioEP (Neuronostics)	encevis (AIT)	Persyst (Persyst)	NeuroCenter (CSS)	NeuroWorks (Natus Medical)
Components included in cost	Annual licence fee includes access to BioEP service, standard onboarding and configuration, training for users (including remote or on-site delivery), ongoing software updates, maintenance and standard support.		Persyst prime includes annual support programme, major and minor updates.	Annual “machine licence” includes: training (provided remotely, including initial onboarding session, user documentation), technical support, bug fixes, security updates, minor and major software updates. There are no additional mandatory maintenance contracts.	The company confirmed that there is no limit to the number of EEGs that each licence can be used for, and that the annual licence includes training, installation, ongoing support, maintenance, upgrades.
Variations in cost	Fixed annual pricing is based on annual EEG volume: - Less than 200: £25,000 201-349: £40,000 350-650: £65,000 651-1,100: £120,000 - More than 1,100: price agreed at time of order. For multi-year contracts the pricing may be adjusted annually capped at lower of CPI or 3% per annum.	Licence can be bought as a one-time payment or licence (which would include updates and support). Epilepsy package is limited to one computer. £150 for 1 hour of additional support. Other packages (with different pricing) included: - Epilepsy review: £2,050 (one-off) or £515 (annually). Cannot start calculations on a review licence. - Spike and seizure package: £2,340 (one-time) or £600 (annually) - Spike and seizure review: £1,170 (one-off) or £300 (annually). Cannot start calculations on a review licence. - ICU package: £6,450 (one-off) or £1650 (annually) - ICU review: £3,225 (one-off) or £825 (annually). Cannot start calculations on a review licence. The company recommend local licenses for recording machines for calculation and network licenses for review.	Not priced per patient; licencing is per clinical workstation/user, per server or per site/centre. Additional costs were provided for acquisition licences (company confirmed that acquisition licenses are used for online processing, live trending). Upgrades are included in Persyst Prime costs, however if Prime has lapsed a “reinstatement” fee would apply. Additional software modules and options (at additional cost) include: - Advanced review (includes monitoring, review and processing of EEG files; archiving of EEG and supported video formats, advanced frequency and voltage analysis, artefact reduction, trends, seizure and spike detection). Can only process already acquired records. - Routine and ambulatory review (includes EEG review and offline processing for routine/ambulatory recordings, including artefact reduction, spike detection and review, seizure detection for supported EEG formats). Can only process already acquired records.	If optional on-site support is requested, this may incur additional cost subject to agreement. Discounts may be agreed under multi-year contracts or volume agreements, but these are not reflected in the list pricing provided by the company.	The company clarified that the hospital requires Neuroworks 10 software for use of SCORE-AI and that if the hospital has an earlier version of NeuroWorks that they would need to upgrade to Version 10 for compatibility and validation. This upgrade would incur additional costs depending on the number of licences the hospital has.

Parameter	BioEP (Neuronostics)	encevis (AIT)	Persyst (Persyst)	NeuroCenter (CSS)	NeuroWorks (Natus Medical)
			• Persyst research • Multi-patient monitor • Persyst Mobile (subscription) standalone (noting that this is included at no additional cost for server-based deployments) • Conversion of CR to AR • Conversion to AR to AR for res • Advanced review for server • Conversion of CR to AR for server • Routine and ambulatory for server Prices are adjusted yearly between 2 and 3%.		

Appendix D – Correspondence log

Expert #1	
Expert #2	
Expert #3	
Expert #4	
Expert #5	

Appendix D1: Questions to clinical experts (12/02/2026); questions via email

Question	1. The technologies in scope use EEG recordings of different EDF, EDF+ or DICOM/native manufacturer file formats. Are all these file types standard in the NHS?
Expert: 1	NR
Expert: 2	All Clinical EEG systems used in the NHS acquire data in the native manufacturer file format (XLTEK, Micromed, Deymed etc.) and by default clinical review of data is in these native formats. Most Clinical EEG systems allow for the export of EEG data into EDF/EDF+ format and some allow import/review of data in the EDF/EDF+ format. However, the EDF/ EDF+ format is not used for clinical review of data nor generally for sharing clinical data between different trusts (usually its used as a fall back when native formats/EEG viewers don't work/are not accessible). The EDF/ EDF+ is generally used in the research context or for running bespoke analyses pipelines / processing large datasets acquired on different system in the same harmonised way. The new DICOM standard for EEG data is not supported at the moment by the majority of clinical systems used in the NHS. Only a select few clinical systems are capable of this such as Encevis
Expert: 3	Basically all software can export to EDF/EDF+. DICOM is not yet standardised to the best of my understanding. It is worth noting that there will be a substantial workflow (and therefore time/cost difference) between technologies that integrate with manufacturers' software directly

	versus those that require data to be exported and then imported/uploaded to a third-party tool. (I think it's even possible that the latter workflow would obviate any anticipated savings in staff cost from automated analysis, at least for short recordings.)
Expert: 4	Yes
Question	2. The EAG have identified some published evidence of the technologies when used with people in a coma (post cardiac arrest). Could any outcomes of this evidence be considered generalisable to the decision problem of the NICE assessment (to support diagnosis of epilepsy)?
Expert: 1	NR
Expert: 2	No. Don't think this is generalisable to epilepsy
Expert: 3	Probably not. Diagnosis of causes of reduced levels of awareness has some but far from total overlap with diagnosis of epilepsy. (Seizures are one cause of reduced level of awareness, but they are rare in conventional EEG recordings, and these technologies may not be intended/optimised for interictal EEG analysis in suspected epilepsy.)
Expert: 4	No, different features being evaluated
Question	3. Are "nonconvulsive seizures and nonconvulsive status epilepticus" as seen in critical care similar in terms of brain waveforms? (Herta, 2015) Are these in scope to this assessment, 'Software for electroencephalogram (EEG) interpretation to support diagnosing epilepsy'?
Expert: 1	NR
Expert: 2	Mostly depends on the duration of the event. There are various subtypes within them. Not within our scope.
Expert: 3	Both non-convulsive seizures and non-convulsive status epilepticus can be associated with a very wide range of EEG patterns that will overlap. In principle, software tools that are sensitive to these patterns might be useful in the context of outpatient EEG for the diagnosis of epilepsy. But since most outpatient EEG does not capture seizures and instead captures interictal findings only, a tool that was optimised for seizure detection in the ICU would have very low sensitivity in the conventional diagnostic setting. I think that these technologies are really in scope only if they (have been demonstrated to) reliably detect seizures in conventional diagnostic (i.e. outpatient EEG or telemetry) settings.
Expert: 4	Yes
Question	4. Would you ever give medication to treat epilepsy without confirmatory EEG, or while waiting for an EEG?
Expert: 1	It is standard clinical practice to make a decision about offering medication based on clinical history before EEG is available.
Expert: 2	Yes , treatment would depend on the clinical priority. If we are convinced based on history +/- videos would not wait for EEG always.

Expert: 3	Yes, this would be common. EEG is useful to support a diagnosis of epilepsy after a single seizure, and to classify the epilepsy type (focal versus generalised with treatment implications). For many patients the diagnosis of epilepsy (and sometimes the likely classification) can be made with sufficient confidence on the basis of the clinical history alone. If a patient has had two unprovoked seizures that are clearly epileptic based upon the history, that is sufficient to make a diagnosis and treat epilepsy.
Expert: 4	If convinced that the clinical events are likely epileptic, and there is a wait for the EEG. The EEG is supportive of the diagnosis, not diagnostic unless absence epilepsy
Question	5. Does EEG testing for epilepsy always follow the three tests in order (routine EEG, sleep-deprived EEG, then ambulatory EEG), or are you aware of instances where tests might be offered in a different order or missed out?
Expert: 1	Sleep-deprived EEG only if there was a particular reason (e.g. suspected genetic generalised epilepsy). Ambulatory EEG/ video EEG telemetry would be undertaken if it is necessary to record a seizure, e.g. in pre-surgical assessment or if there is concern about non-epileptic attacks. Ambulatory EEG or Sleep-deprived EEG can follow a routine EEG.
Expert: 2	No . Can be done in any order , depending on the clinical question and urgency
Expert: 3	No, this is centre-, patient- and clinician preference dependent. Some centres go straight to a sleep EEG as the first test, some centres don't offer ambulatory EEG (or home VT), so would repeat sleep EEG instead to enhance the diagnostic yield. If a patient was having very frequent events (e.g. daily), a prolonged recording might be the optimal first test.
Expert: 4	Likely to be this order
Question	6. In relation to the previous question, what's the longest you would expect someone to wait for each of the three tests?
Expert: 1	6 weeks
Expert: 2	Routine EEGs <2- 3 months , Video telemetry anything from 3- 6months or longer
Expert: 3	In theory, 6 weeks for a routine or sleep EEG, and perhaps it's reasonable to expect a longer delay to ambulatory EEG/home VT (as an initial treatment decision is probably more secure by this stage). In practice, in our centre, awake EEG has a wait time of 4-8 weeks, sleep EEG around 8 months (this is coming down quite fast at the moment but has been even longer at times), and home VT around 6 months. A high proportion of patients will attend A&E with a first seizure, and ideally a first EEG would be offered within 24 hours as this is associated with enhanced yield. However, this is very rarely feasible in the UK.
Expert: 4	3-4 weeks
Question	7. If someone has not been diagnosed with epilepsy, would they ever be re-tested at a later date if there is still clinical suspicion?
Expert: 1	Yes. If a standard EEG is normal, occasionally an EEG is repeated at a later date, sometimes with sleep-deprivation. If there are frequent attacks (i.e. more than 2 per week) ambulatory EEG or video EEG telemetry are often requested.

Expert: 2	Definitely, if history is suggestive.
Expert: 3	Yes
Expert: 4	Yes – but note the clinical presentation/description is the most useful
Question	8. Is it clinically plausible that diagnosing epilepsy earlier can lead to: a) Not only fewer seizures, but less severe seizures? b) Change in proportion receiving or responding to monotherapy? c) Change in proportion receiving or responding to adjuvant therapy? d) Change in proportion receiving or responding to surgery/vagus nerve stimulation?
Expert: 1	a) Not likely, unless head injury or hypoxia follows a severe seizure (rare event) b) No c) No d) No
Expert: 2	a) Yes to former, can't guarantee the latter b) Not necessarily c) Earlier referral can occur if drug resistant, But can't predict response d) Earlier diagnosis of drug resistance may lead to earlier referrals. But may not change outcome
Expert: 3	a) In the short term, earlier diagnosis could lead to patients experiencing less severe seizures. Although as many as 30% of patients with epilepsy have refractory seizures (ie treatment does not stop the seizures) even within this population, treatments often reduce the burden of the most severe events with morbidity and potential mortality benefits. b) I am not aware of any evidence in humans for this. It feels conceivable but potentially a small effect particularly at the sort of timescales under consideration. c) similar to my answer to b) but potentially an even smaller effect. d) again, theoretically, I can see how this is conceivable, but likely to be a minuscule effect in routine practice.
Expert: 4	a) Yes b) Yes, if accurate diagnosis not only of epilepsy bt epilepsy type c) No. d) No
Question	9. What is the clinical risk to the patient if incorrectly diagnosed with epilepsy and given medication? Related question, how often would this happen in practice, and how long would it take for them to then be correctly diagnosed as not having epilepsy?
Expert: 1	This happens infrequently but depends significantly on the clinical acumen of the treating clinician.

Expert: 2	High risk of side effects of using wrong drugs, serious drug reactions, may miss cardiac and other treatable causes – sudden death, stigma, social restrictions. ~1/3 are misdiagnosed as epilepsy . May have a combination of epileptic and non -epileptic events too. Nobody knows the answer to that Only if suspected by their clinicians and investigated appropriately.
Expert: 3	Risks of inappropriate treatment - Antiseizure medications have significant side effects so an inappropriately treated patient must suffer these until the diagnosis is undone. These side effects include risks of teratogenicity during pregnancy, so there may be harm beyond the treated patient. - it can be incredibly difficult and slow to “undo” a diagnosis of epilepsy, and starting treatment probably makes this harder. Because the vast majority of patients with epilepsy are diagnosed on the basis of the clinical history (+/- support from investigations) and without the episodes themselves having been witnessed by the treating physician, it takes a huge amount of confidence on the part of a second physician to change the diagnosis later - they are essentially claiming that their version of the patient’s history is closer to the truth than the original history. Given that this is all in the realm of the subjective, it takes a brave clinician to do that without confirmatory evidence. - The nature of seizure recurrence probability is such that if a problem was transient (syncope related to transient physiological challenge or a non-epileptic attack that was highly situational) once diagnosed with epilepsy and treated as such, common practice would be to stay on treatment for at least two years and depending upon circumstances and patient preference, could easily be 5-10 years. - There are some epilepsy mimics which might be worsened by anti-seizure medications. Anti-seizure medications are frequently associated with cognitive side effects that can include dissociative feelings; this can probably exacerbate some non-epileptic attacks. - Non-epileptic attacks are more successfully treated soon after onset, so mis-diagnosis of non-epileptic attacks as epilepsy will potentially make them harder to treat in the long run. It’s hard to get a good feeling for the overall rate of mis-diagnosis, but it’s probably at least 20%. As mentioned above, it is frequently many years until this is considered and dealt with.
Expert: 4	Misdiagnosis rates are high – as high as 30% in some studies. There is the risk of unwanted side effects, some of which can be serious
Question	10. Thinking of where these technologies can support diagnosis of epilepsy, within the current NHS is the main value: a) to reduce the positive rate with current NHS standard of care?, b) to reduce the false negative rate with current NHS standard of care?, or c) or to reduce the false positive and false negative rate within current NHS standard of care?
Expert: 1	Probably none of these – rather to make the diagnostic test more cost effective.
Expert: 2	c)
Expert: 3	As I understand it, there are different technologies under evaluation. Those that detect/label epileptiform and other interictal abnormalities will help reduce false positive rates by improving EEG reporting. Those that use apparently normal EEG to detect risk of transformation to epilepsy (e.g. BioEP) may increase false negative rates. So overall, the hope would be c).
Expert: 4	C- to reduce the false positive and false negative rate within current NHS standard of care

Question	11. The cost of some of the technologies being evaluated is based on the annual EEG volume for which you would use the technology (i.e. suspected epilepsy). Can you advise what your annual volume of use would be within your NHS Health Board or NHS trust?																										
Expert: 1	In a catchment population of 2.5 million locally we undertake around 1000 EEGs for adults and 1200 for children.																										
Expert: 2	For 2024-25 <table border="1"> <tr> <td>Outpatient EEG</td><td>964</td><td>962</td><td>967</td><td>915</td><td>964</td><td>937</td></tr> <tr> <td>Inpatient EEG</td><td>571</td><td>672</td><td>665</td><td>601</td><td>571</td><td>471</td></tr> <tr> <td>Telemetry</td><td>312</td><td>329</td><td>287</td><td>272</td><td>312</td><td>273</td></tr> </table>						Outpatient EEG	964	962	967	915	964	937	Inpatient EEG	571	672	665	601	571	471	Telemetry	312	329	287	272	312	273
Outpatient EEG	964	962	967	915	964	937																					
Inpatient EEG	571	672	665	601	571	471																					
Telemetry	312	329	287	272	312	273																					
Expert: 3	We perform around 4000 EEGs annually, very approximately the ratio of sleep:wake is around 3:1 (i.e. likely unusually, many more sleep EEGs in our centre).																										
Expert: 4	2000/year																										

Appendix D2: Questions to clinical experts (19/02/2026); meeting on Teams

Attendees:

EAG: Kim Keltie [KK], Rachel O’Leary [RO], Sarah Gascoigne [SG],
Sheila Wallace [SW], Alex Inskip [AI], Elliot Blacklock [EWB],

NICE: Suvi Harmala [SH],

Experts: [REDACTED]

1. Welcome and brief introductions

2. Background

EAG is looking at the clinical and cost-effectiveness of the technologies included in the Scope for this Early Use Assessment. Main aim of today is to discuss the proposed value propositions (reduced waiting time for EEG, reduced need for subsequent EEGs, reduced time to diagnosis and reduced time to treatment) and go through questions to inform the development of an economic model.

3. Key points of discussion

- EEG alone is not used for diagnosis. Based on clinical history, presentation. NICE guidance (NG217) says to “consider EEG” which is consistent with this. Technologies in scope should be considered “decision support” and not “decision making”. Normal EEG cannot rule out epilepsy.
- The main bottle neck is the waiting time to receive EEG, which is between 3 weeks and 12 months (depending on the type of EEG). This varies by centre and between patient groups (adult and children). Value propositions proposed in introduction are not aligned with clinical experience, main value is reduced technician/physiologist time interpreting EEG and writing the report. An example of review time was 3 hours per 24-hour recording for ambulatory EEG.
- Technical failure of the technologies (unable to process EEG) is of less concern as patients would default to standard care.
- The order and potential sequence of the different types of EEG (routine, sleep-deprived, ambulatory/home video telemetry) varies greatly between hospitals and clinicians and patients (depends on presentation and history). One example was provided where a

routine EEG may only be considered in 33%, and of those only 10-20% require subsequent sleep-deprived or ambulatory EEG.

Discussed that treatment may be initiated before EEG.

- One expert stated that by extending the EEG recording time you increase the sensitivity. Other factors (anti-seizure medication) may also impact the EEG (ECLIPSE study ongoing). IED detection and seizure detection both need considering (but separately).
- BioEP was considered different to the other 4 technologies. It works on initial non-contributory EEGs; it does not highlight suspicious regions on EEGs like the others but instead may help guide next steps by indicating whether the EEG supports a diagnosis of epilepsy.

4. Next steps

The EAG are extremely grateful for your support on this topic. We might have further questions to circulate during the process of the Early Use Assessment.

Appendix D3: Questions to clinical experts (02/03/2026); questions via email

Question	1. Can you please check the summary table below of average review/report times and interpretation times for each of the 3 types of EEG, do a) the times (minutes) and b) role (NHS banding) seem appropriate for including in an economic model? <table><tr><th>Arm</th><th>Type of EEG</th><th>Physiologist-review / report time (Band)</th><th>Clinical Neurophysiologist interpretation time (Band)</th></tr><tr><td rowspan="3">Standard care</td><td>Routine</td><td>30 minutes (Band 5)</td><td>20 minutes (Band 8)</td></tr><tr><td>Sleep-deprived</td><td>40 minutes (Band 5)</td><td>30 minutes (Band 8)</td></tr><tr><td>Ambulatory/telemetry</td><td>360 minutes (Band 7)</td><td>120 minutes (Band 8)</td></tr><tr><td rowspan="3">Standard care with technologies (except BioEP)</td><td>Routine</td><td>10 minutes (Band 5)</td><td>10 minutes (Band 8)</td></tr><tr><td>Sleep-deprived</td><td>15 minutes (Band 5)</td><td>15 minutes (Band 8)</td></tr><tr><td>Ambulatory/telemetry</td><td>120 minutes (Band 7)</td><td>60 minutes (Band 8)</td></tr><tr><td rowspan="3">Standard care with BioEP</td><td>Routine</td><td>10 minutes (Band 5)</td><td>10 minutes (Band 8)</td></tr><tr><td>Sleep-deprived</td><td>15 minutes (Band 5)</td><td>15 minutes (Band 8)</td></tr><tr><td>Ambulatory/telemetry</td><td>120 minutes (Band 7)</td><td>60 minutes (Band 8)</td></tr></table>				Arm	Type of EEG	Physiologist-review / report time (Band)	Clinical Neurophysiologist interpretation time (Band)	Standard care	Routine	30 minutes (Band 5)	20 minutes (Band 8)	Sleep-deprived	40 minutes (Band 5)	30 minutes (Band 8)	Ambulatory/telemetry	360 minutes (Band 7)	120 minutes (Band 8)	Standard care with technologies (except BioEP)	Routine	10 minutes (Band 5)	10 minutes (Band 8)	Sleep-deprived	15 minutes (Band 5)	15 minutes (Band 8)	Ambulatory/telemetry	120 minutes (Band 7)	60 minutes (Band 8)	Standard care with BioEP	Routine	10 minutes (Band 5)	10 minutes (Band 8)	Sleep-deprived	15 minutes (Band 5)	15 minutes (Band 8)	Ambulatory/telemetry	120 minutes (Band 7)	60 minutes (Band 8)
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Expert: 1	-																																					
Expert: 2	- Timing in Arms including technologies: This is purely arbitrary as we have no experience of the technologies in action, and whether they will save time? - Clinical Neurophysiologist interpretation – Banding not applicable for Consultants																																					
Expert: 3	Physiologist – review/report time (Band 5) – would assume 5.5 (i.e. average of 5 and 6) or Band 6 here Clinical Neurophysiologist interpretation time - This whole column should be “NHS consultant” (I think that band 8 overlaps with but is below the consultant payscale on average?) Standard care with technologies (except BioEP) - I’m not sure that we have enough experience with the technologies outlined to reliably answer this. It could even be that review time increases because the AI finds false positive that need more careful manual review and rejection. Standard care with technologies (except BioEP)- Ambulatory/telemetry-interpretation time (40 minutes) - Optimistically, I will suggest that there is a greater time saving with a more prolonged recording. Standard care with BioEP - I’m not sure this is the correct way to think about BioEP at all. I don’t think it will save staff time on a per recording basis if it worked as theorised. Instead, the claim is that it will lead to fewer EEGs being repeated or needed in the first place. But it will not change reviewing time at all. I have no direct experience with it but I have a nasty feeling that if it is not very cleverly integrated into existing software, it will significantly increase time per EEG for whoever’s duty it is to select and upload the segments of EEG to the software/online tool. But maybe they have something that is effectively																																					

	built-in to standard viewing software now? For research studies, teams have been exporting and anonymising EDF files - this is a multi-minute procedure per recording, so it will be critical to understand the workflow to do the modelling correctly and ensure that any reduction in number of tests required is not offset by an increased time per test due to the involvement of third-party software.
Expert: 4	-
Expert: 5	Our service is a bit different to this. We would have physiologists/clinical neurophysiologists at either band 6 or 7 for all of the EEGs (first column). Reports considered normal are then checked by clinical neurophysiologist at band seven or eight. EEGs considered abnormal are checked by a consultant neurophysiologist (i.e. consultant level doctor). In terms of timing, is the physiologist: allowing for fitting and removal of the EEG or, as it says, reporting time? This is a little difficult to quantify as the physiologist would be looking at the recording live, so would only need an extra few minutes to review the record after the patient has left, and maybe 15 minutes to produce the report. Therefore, depending what you are recording, a routine EEG would be around an hour (time to apply the electrodes, perform 30 minute recording, remove the electrodes and write the report). The more involved tests would clearly be more in terms of time. I don't understand why we are not allowing time for a consultant neurophysiologist (consultant level doctor). Very few (hopefully no) NHS neurophysiology departments will operate without consultant oversight and they would be expected to review every abnormal EEG. I suspect some departments will have consultant neurophysiologists reviewing every EEG. I don't understand what you are asking from the final row-standard care with BioEP. The only thing that physiologist would do is upload a 10 minute segment of non-contributory EEG to the BioEP platform. Colleagues tell me this takes two minutes. There would be no involvement for anyone else. Given that the upload to BioEP takes the same amount of time no matter what the test, then that two minutes would be the same whether the EEG was routine, sleep deprived or telemetry. There would be no extra analysis time as the results go directly to the clinician requesting the test. Given that BioEP will only work on non-contributory EEG, that additional two minutes would be on top of the normal analysis that you've given in the first row.
Expert: 6	-
Expert: 7	-
Expert: 8	-
Expert: 9	-
Question	2. For a population undergoing an EEG for diagnosis of suspected epilepsy, in approximately what proportion of EEGs would there be an <u>abnormality</u> that would support a diagnosis of epilepsy: a) Routine EEG b) Sleep-deprived EEG c) Ambulatory EEG d) Telemetry EEG
Expert: 1	
Expert: 2	a) Routine EEG ~ 50% b) Sleep-deprived EEG ~60-70% c) Ambulatory EEG ~70-80% max d) Telemetry EEG ~70-80% max

Expert: 3	a) Routine EEG 20% b) Sleep-deprived EEG 50% c) Ambulatory EEG 75% d) Telemetry EEG 85% Here I have assumed that the population tested does have epilepsy; my figures may be slightly conservative. Importantly, the question is a little ambiguous as the population with “suspected epilepsy” will include patients who do and don’t have epilepsy. So the correct answers if you really meant “suspected epilepsy” will be lower than these. There is a heavy age-dependence and figures for an exclusively paediatric population would be significantly better; I’m assuming ~¾ adults which is our practice at KCH
Expert: 4	-
Expert: 5	a) Routine EEG - it depends what cohort you look at. It’s exceptionally low in our first seizure clinic (around 4% epileptiform abnormalities with a further 22% showing non-specific but possibly suspicious changes), other estimates vary up to maybe 30% most optimistically. b) Sleep-deprived EEG - yield is much greater perhaps up to 80% in people who have epilepsy. However, that’s not really the question here. Sleep deprived EEGs tend to be requested in specific circumstances rather than across the board at diagnosis. I am aware of one study that suggests there is little difference in the identification of epileptiform activity in routine versus sleep deprived EEGs (12% and 13% respectively), though the authors comment that performing both may be of use in the right clinical context. Green D, Cordato D, Jones A, Beran R. 2958 Comparison of the yield of routine and sleep-deprived EEG studies: a five-year retrospective observational study. BMJ Neurology Open. 2024;6:. https://doi.org/10.1136/bmjno-2024-ANZAN.12 c) Ambulatory EEG - for ambulatory and telemetry the yield will be higher, but the aim of these tests tends to be to try to record an actual episode when a routine and sleep deprived EEG have been non-contributory. Therefore it’s an extremely biased population with many people turning out to have a seizure mimic-typically functional dissociative seizures. I think it would be extremely difficult to make a meaningful estimate. d) Telemetry EEG – no response provided
Expert: 6	-
Expert: 7	-
Expert: 8	-
Expert: 9	-
Question	3. For a population undergoing an EEG for suspected epilepsy, we have assumed that in the following proportion of EEGs a <u>seizure indicative of epilepsy</u> would happen. Do these values seem appropriate? a) Routine EEG: 1% b) Sleep-deprived EEG: 3% c) Ambulatory EEG: 10% d) Telemetry EEG: 20%
Expert: 1	-
Expert: 2	Numbers seem random. Depends on the age, type of seizure, epilepsy syndrome, and the individual patient’s seizure frequency. Feel cannot really extrapolate to all patients .

	For Telemetry, depends on the setting. For presurgical evaluation with medication reduction, aim is to capture seizures in the majority.		
Expert: 3	In general pretty good Telemetry EEG 20% - I would think of this as 15-20% chance <i>per day of telemetry</i> . The other tests are fixed duration (20 mins, 60 mins, 17-24 hours respectively). Telemetry duration varies between 24 hours and two weeks.		
Expert: 4	-		
Expert: 5	In my experience, that's high for routine and sleep deprived EEGs, though possibly in the upper end of the ballpark (in the 500+ patients who have come through my first seizure clinic having an EEG at the clinic, we have had two myoclonic seizures and an absence recorded). I would expect the incidence of seizures being recorded on a routine or sleep deprived EEG in someone who is treated to be less than that. 10% and 20% respectively is lower than I would have estimated for ambulatory EEG and telemetry, where the point is to try to record seizures. That said, we have criteria whereby people have to be having frequent seizures (in other words a good chance of recording one) before we undertake the test.		
Expert: 6	-		
Expert: 7	-		
Expert: 8	-		
Expert: 9	-		
Question	4. Regarding diagnostic accuracy of clinical physiologists reviewing an EEG (without technologies) compared to a reference standard in <u>detection of IED</u> , do the following sensitivity and specificity seem appropriate?		
	Type of EEG	Sensitivity	Specificity
	Routine	50%	75%
	Sleep-deprived	60%	75%
	Ambulatory	70%	75%
	Telemetry	70%	75%
Expert: 1	-		
Expert: 2	What is the reference standard? It will depend on individual expertise and training mostly Don't feel that the newer technologies will improve the accuracy, may sometimes cause false + results. Probably may reduce the reporting times.		
Expert: 3	Here you mean that there is a gold standard detected IED (or gold standard exclusion of an IED in the recording) and you want to know whether the clinical physiologist found it or if what they found was not an IED? Assuming that interpretation, the default figures given here are way off. There will be variability with banding - band 5 physiologists will generally show poorer signal detection characteristics than band 7-8. But overall, the clinical physiologists should very rarely miss IEDs, so the sensitivity would be way higher. In my practice, I emphasise sensitivity over specificity in the clinical physiologists' initial screen of the EEG as when I review, I will be comfortable screening out any oddities that worried them but really don't want to miss a true IED. It's also quite hard to estimate their specificity because the use of terminology in the clinical physiologists' factual report may be different from the diagnostic terminology I would use in the conclusion. That having been said, I think that 75% is not a bad estimate for specificity if you forced our clinical physiologists to declare if something was an IED or not.		

	It might be a bit higher with experience (band 7-8) and a bit lower with inexperience (band 5). Perhaps I'd err slightly lower (70%) overall, but I don't have high confidence about this. <table><tr><th>Type of EEG</th><th>Sensitivity</th><th>Specificity</th></tr><tr><td>Routine</td><td>97%</td><td>75%</td></tr><tr><td>Sleep-deprived</td><td>97%</td><td>75%</td></tr><tr><td>Ambulatory</td><td>95%</td><td>75%</td></tr><tr><td>Telemetry</td><td>95%</td><td>75%</td></tr></table> Ambulatory/Telemetry are a bit lower to reflect that reviewing prolonged recordings is a bit harder	Type of EEG	Sensitivity	Specificity	Routine	97%	75%	Sleep-deprived	97%	75%	Ambulatory	95%	75%	Telemetry	95%	75%
Type of EEG	Sensitivity	Specificity														
Routine	97%	75%														
Sleep-deprived	97%	75%														
Ambulatory	95%	75%														
Telemetry	95%	75%														
Expert: 4	-															
Expert: 5	I would bow to neurophysiology colleagues for a definitive answer, but they seem in the ballpark to me.															
Expert: 6	-															
Expert: 7	-															
Expert: 8	-															
Expert: 9	-															
Question	5. Regarding diagnostic accuracy of clinical physiologists reviewing an EEG (without technologies) compared to a reference standard in <u>detection of a seizure</u>, do the following sensitivity and specificity seem appropriate? <table><tr><th>Type of EEG</th><th>Sensitivity</th><th>Specificity</th></tr><tr><td>Routine</td><td>70%</td><td>75%</td></tr><tr><td>Sleep-deprived</td><td>80%</td><td>75%</td></tr><tr><td>Ambulatory</td><td>90%</td><td>75%</td></tr><tr><td>Telemetry</td><td>90%</td><td>75%</td></tr></table>	Type of EEG	Sensitivity	Specificity	Routine	70%	75%	Sleep-deprived	80%	75%	Ambulatory	90%	75%	Telemetry	90%	75%
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Sleep-deprived	80%	75%														
Ambulatory	90%	75%														
Telemetry	90%	75%														
Expert: 1																
Expert: 2	What is the reference standard? It will depend on individual expertise and training mostly Feel that the role of seizure detection algorithms would be to speed up the EEG review process, especially of prolonged recordings rather than improving diagnostic accuracy?															
Expert: 3	Similar to above [Question 4], the clinical physiologists should be <i>much</i> better than these figures. Here, their specificity will be higher too; false alarm rates for seizures are much lower than the draft figures would imply. <table><tr><th>Type of EEG</th><th>Sensitivity</th><th>Specificity</th></tr><tr><td>Routine</td><td>95%</td><td>90%</td></tr><tr><td>Sleep-deprived</td><td>95%</td><td>90%</td></tr><tr><td>Ambulatory</td><td>95%</td><td>90%</td></tr><tr><td>Telemetry</td><td>95%</td><td>90%</td></tr></table>	Type of EEG	Sensitivity	Specificity	Routine	95%	90%	Sleep-deprived	95%	90%	Ambulatory	95%	90%	Telemetry	95%	90%
Type of EEG	Sensitivity	Specificity														
Routine	95%	90%														
Sleep-deprived	95%	90%														
Ambulatory	95%	90%														
Telemetry	95%	90%														

Expert: 4	-
Expert: 5	I would be surprised if a clinical physiologist could not identify seizure, if that's what you're asking. On that basis these seem low.
Expert: 6	-
Expert: 7	-
Expert: 8	-
Expert: 9	-

NICE Health Tech Programme

HTE10086 Software for electroencephalogram (EEG) interpretation to support diagnosing epilepsy

Any confidential sections of the information provided should be underlined and highlighted. Please underline all confidential information, and separately highlight information that is **commercial in confidence** in blue and all that is **academic in confidence** in yellow

Redacted External Assessment Report (EAR) – Collated comments table:

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
1	Persyst Development Corporation LLC, [REDACTED]	11 to 13, 73	Executive summary / 5.4	Please ensure the report gives greatest weight to evidence on Persyst used alongside clinical experts, because this is the intended use in the scope. The EAR already notes that the technologies are intended to support clinician review rather than operate without human oversight, and that fully automated evidence is not the intended use case. For Persyst, this point matters because conclusions relevant to NHS implementation should be anchored in supervised clinical use, especially where fully automated performance varies by EEG type, seizure type, duration, and setting. The EAR states that the technologies are intended to support clinician review and not be used without human oversight, and notes that nine studies described fully automated use, which was not their intended purpose. It also highlights uncertainty in generalisability to current versions and NHS practice.	Thank you for your comment. We have added some wording to the executive summary to highlight that only 7/17 studies included in the clinical evidence used the technologies alongside clinical expert review (as per their IFU). This sentence was already present in section 5.4.
2	Persyst Development Corporation LLC, [REDACTED]	58 to 59, 269 to 270	5.2 / Appendix C1	I believe the narrative around the practical NHS relevance of the Persyst seizure-detection evidence should be strengthened. The EAR includes external validation evidence for Persyst 14 in prolonged EEG, reporting record-level sensitivity of 98% and median false positives of 1.7 per 24 hours in the Reus study. Appendix C1 also notes that, in typical prolonged EMU recordings, Persyst 14 performed comparably with expert humans and was statistically non-inferior to expert inter-reader	Thank you for your comment. The study by Reus et al. 2022a used Persyst 14 (predecessor version), was conducted in the Netherlands in an epilepsy monitoring unit. Sensitivity and false detection rate results are shown in Table 7 of the report,

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
				performance. These findings are directly relevant to the likely NHS use case of supervised review and triage, and should be drawn out more clearly in the interpretation. The EAR summary of Reus reports Persyst 14 record-level sensitivity of 98% with median false positives of 1.7 per 24 hours. Appendix C1 states Persyst 14 was comparable with expert humans and statistically non-inferior to expert pairwise performance in prolonged EMU recordings.	and the narrative that precedes it. Therefore, no changes have been made to the report.
3	Persyst Development Corporation LLC, [REDACTED]	65 to 66	5.2 / Table 12	We believe the comparative routine EEG study identified a material reduction in review time when Persyst was used alongside clinical review should be made more explicit. The reported mean time saving was 101 seconds per recording versus clinical interpretation alone. While the EAR is right to note uncertainty about how far this translates into NHS throughput, this is still directly relevant because the EAR's own economic case is built around faster review, reporting and interpretation. This point should be more prominent in the Persyst narrative. The EAR reports that Persyst 13 plus clinical expert reduced mean routine EEG assessment time from 160 seconds to 59 seconds, a mean saving of 101 seconds per recording. The EAR also states that the economic model was developed to explore faster review, reporting and interpretation of EEGs.	Thank you for your comment. The study by Kural et al. 2022 reported a time saving with Persyst 13 (mean time saving of 101 seconds per recording). This is shown in Table 12 and reported in the narrative that precedes it. When providing technical information, the company confirmed that Persyst 13 was a historical version and that data from Persyst 14 was considered more generalisable. The EAG included comparative data from a single study that considered 2 technologies (Persyst 13, encevis DeepSpike) as they were used in the same population and may give some indication of relative performance (as stated in section 5.1). Therefore, no changes have been made to the report.
4	Persyst Development Corporation LLC, [REDACTED]	123, 268 to 270	7.3 / Appendix C1	We would argue that Persyst's deployment strengths are a major advantage which would become apparent if all the systems were run head to head in a clinical setting. As far as we know, such an integration unique to Persyst. The EAR records that Persyst integrates with major EEG systems, supports a wide range of EEG formats, can be configured to process EEG during acquisition, includes training as part of implementation, and has browser-based read-only mobile access. These features are relevant to NHS adoption because they reduce practical implementation friction and support use within existing workflows.	Thank you for your comment. Implementation considerations for Persyst (including compatibility and integration with major EEG systems) is stated in section 7.2. Additional features of all technologies (including the mobile application for Persyst) are stated in Appendix C1. Therefore, no changes have been made to the report.

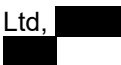
Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
				The EAR states that Persyst is compatible with major EEG systems, supports a range of EEG formats, can process EEG during acquisition, and provides training as part of implementation. Appendix C1 also states that the Persyst mobile application functions in a web browser in read-only mode.	
5	Persyst Development Corporation LLC, [REDACTED]	124 to 133	8.1 to 8.3	Please align the Persyst evidence-generation section more explicitly to the uncertainties that are most decision-relevant for supervised NHS use: total staff time for review and reporting, contribution of Persyst-supported review to final diagnosis, subgroup performance by EEG type, and performance using the current version in UK practice. This would make the research recommendations more actionable and better matched to the stated value proposition of the technology. The EAR states that no ongoing studies were identified for Persyst 15, that UK evidence is limited to Persyst 14, and that future evidence should consider total staff time, clearly report the population and EEG type, and investigate the claimed value propositions including reduced waiting times, increased diagnostic accuracy, and reduced EEG review and reporting time.	Thank you for your comment. Due to the lack of evidence from a UK setting, the evidence generation recommendations outlined in Table 28 are applicable to all technologies. Therefore, no changes have been made to the report.
6	AIT Austrian Institute of Technology, [REDACTED]			The report does not clearly reflect the full range of sensitivity estimates for encevis as presented in the submitted evidence. In particular, variation across studies is not described, which may lead to an incomplete representation of performance.	Thank you for your comment. The EAG extracted values for diagnostic sensitivity from all included papers as summarised in section 5.2.1 and Tables 5 to 8; it is unclear which values are missing. Therefore, no changes have been made to the report.
7	AIT Austrian Institute of Technology, [REDACTED]			Encevis generates also more impact for cost effective work and workflows through other measures like a long term overview which is not represented in the report.	Thank you for your comment. NeuroTrend overview has been included in the technical information in Appendix C1. However, as there was no direct evidence demonstrating the value of this feature, it was not directly considered in the economic modelling. The impact of this feature could

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
					be considered indirectly through reduction in EEG review times. Therefore, no changes have been made to the report.
8	Neuronostics Ltd, [REDACTED]	75-77	6.2	The EAR notes that clinical experts identified reduced EEG waiting time (between 3 weeks and 12 months) as the primary bottleneck in the diagnostic pathway yet dismisses this value proposition for all technologies collectively on the basis that interpretation support tools are 'unlikely to directly reduce the waiting time for EEG.' BioEP's mechanism is fundamentally different from the other four technologies in scope: it is applied specifically to EEGs that have been reviewed and determined not to contain epileptiform abnormalities (so-called interictal epileptiform discharges (IEDs)) that would support a diagnosis. This fundamental difference is acknowledged in the different classification applied to BioEP. However, it is not followed through in the developed model. Specifically, the model is largely pre-conditioned on a use case where EEG is in and of itself a diagnostic test (which it is not) and the EEG contains detectable IEDs (which most do not). BioEP is specifically designed to be used on these inconclusive EEGs (the majority case) to support diagnostic decision making, as well as to determine whether further testing is required. By prioritising subsequent EEG demand (Charles et al., 2026), BioEP has a direct mechanism for reducing waiting list pressure that was not adequately distinguished or modelled in the EAR. This distinction should be reflected in the report.	Thank you for your comment. The EAG extracted all outcomes for BioEP from the identified evidence, and none of the studies reported a reduction in waiting time. Therefore, this was not incorporated in the economic model. The EAG has outlined a future Markov model in section 6.5 which was explicitly stated could be used when evidence regarding reduction in waiting times, time to diagnosis, time to treatment and potentially better disease control longer-term become available. However, the EAG has also acknowledged in the EAR that if BioEP could reduce the need for subsequent EEGs, this could have a positive impact on waiting times. However, evidence on this potential effect is currently unavailable.
9	Neuronostics Ltd, [REDACTED]	113	6.3.2	The EAR states: 'Overall, it is unlikely that BioEP will be found to be cost-effective for the use case and using the data available.' This conclusion is inconsistent with the EAG's own caveat in Section 6.4, which explicitly states: 'Results from this modelling work should not be interpreted as evidence or lack of evidence of cost-effectiveness.' An exploratory early model built on acknowledged limitations (expert opinion for key parameters, 1-year time horizon, unvalidated inconclusive rate, no lifetime modelling) cannot support a conclusion about the long-term cost-effectiveness of a technology. Further, given the narrow use case defined by the EAG, which captures only a minority of individuals entering the epilepsy diagnosis pathway and	Thank you for your comment. There are a large number of assumptions within the early economic model; largely a consequence of the lack of available evidence to populate the economic model, particularly over a longer time horizon. The EAG have removed the sentence "Overall, it is unlikely that BioEP will be found to be cost-effective for the use case and using the data available" from section 6.3.2 and instead have stated the incremental cost at

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
				truncates evaluation at 1 year, BioEP cannot, by construction, demonstrate cost-effectiveness. Decision support technology cannot demonstrate value when the evaluation framework excludes the very clinical scenarios in which that value accrues. In this regard, the 1-year time horizon is a particularly critical limitation that warrants emphasis. Published evidence demonstrates that diagnostic delay in epilepsy routinely exceeds 1 year, rendering the model's time horizon structurally incapable of capturing the clinical and economic consequences of delayed diagnosis. Alessi and Quintas (2021), in a systematic review of 17 studies, found that diagnostic delay affected 16–77% of epilepsy patients, with 75% of studies reporting delays in 38% or more of patients. Median diagnostic delays ranged from 7 to 25 months, and 13-16% of patients experienced delays exceeding 1 year, with some delays extending to decades. Pellinen et al. (2021) reported a median diagnostic delay of 12 months for new-onset focal epilepsy in adults aged 15-75, with annual healthcare costs for patients with new-onset epilepsy being approximately five times higher than for those with established epilepsy, reflecting the substantial economic burden incurred during the pre-diagnostic period. Kerr et al. (2016) demonstrated that diagnostic delay is particularly severe in patients ultimately diagnosed with psychogenic non-epileptic seizures (PNES) [now typically called functional seizures or functional neurological disorder], with a mean delay of 8.4 years (95% CI: 7.0-9.8) and a robust average of 2.8 years (95% CI: 2.2-3.5), driven by serial anti-seizure medication trials that exponentially increase time to correct diagnosis. This data demonstrates that the majority of diagnostic delay in epilepsy, and consequently the majority of the health and economic consequences of delayed or incorrect diagnosis, occurs beyond the 1-year time horizon adopted by the EAG. A model that truncates at 1 year systematically excludes the period in which BioEP's diagnostic contribution generates its most significant clinical and economic impact. The language on page 113 significantly overstates what can reasonably be concluded from a model with this structural limitation and should be moderated to be consistent with Section 6.4.	which the technology could be considered cost-effective (at a willingness to pay threshold of £20,000/QALY). This language is consistent with the executive summary and summary in section 6.4. The EAG have also clarified, in section 6.2.1, the differences between BioEP and other technologies, and added sensitivity analysis exploring additional scenarios for BioEP (see Appendix B4) for which a scenario was identified at which BioEP would be considered cost-effective. The conclusions and executive summary have been updated to reflect this additional analysis. Please see response to comment 8 above, regarding modelling of waiting times.

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
10	Neuronostics Ltd, [REDACTED]	116	6.4	Section 6.4 states: 'Results from this modelling work should not be interpreted as evidence or lack of evidence of cost-effectiveness.' This important and appropriate caveat is inconsistently applied throughout the report. In particular, it is contradicted by the language in Section 6.3.2 (page 113) which draws a negative conclusion about BioEP's cost-effectiveness. Neuronostics requests that this caveat be applied consistently across all sections of the report where conclusions are drawn from the early model results, and that the report is amended to reflect that the absence of a demonstrated cost-effectiveness result from an early model is not equivalent to a finding of non-cost-effectiveness.	See response to comment 9 above. Additionally, this caveat and reminder of the limitations have been added to section 6.2.7.
11	Neuronostics Ltd, [REDACTED]	77	6.2	The EAR discusses the value propositions of all five technologies in scope together (Section 6.2), without consistently distinguishing BioEP's fundamentally different clinical mechanism. BioEP is not a tool to support the initial EEG review (unlike encevis, NeuroCenter, NeuroWorks, Persyst); it is applied after standard care review, to EEGs that have not supported a diagnosis. This means that value propositions such as staff time saving in initial EEG review are not the primary mechanism for BioEP. Conflating BioEP with the other technologies in the narrative discussion creates an inaccurate impression that BioEP's value depends on time savings, when its primary value proposition is supporting accurate diagnosis and reducing the need for repeat EEGs. The other four technologies (encevis, NeuroCenter, NeuroWorks, Persyst) are EEG waveform feature-detection tools that identify and annotate electrophysiological features; BioEP is a probabilistic decision-support tool that provides a five-level probability score to inform clinical decision-making specifically on inconclusive EEGs. This fundamental difference in function means the EAG's diagnostic test accuracy framework is partially appropriate for the feature-detection tools (noting that it does not currently appropriately consider the majority of EEGs that will not contain such features) and is structurally ill-suited for assessing BioEP's value. The EAR should distinguish BioEP's value proposition more clearly and consistently.	Thank you for your comment. The overall structure of the economic model was designed such that it could be applied to all technologies, including BioEP. The EAG has explicitly noted that the starting patient population would be different for BioEP and has highlighted how the different value propositions apply to this technology at the start of section 6.2. The EAG found no comparative evidence for BioEP (used alongside clinical experts, when compared with clinical experts without the support of the technology); therefore, it is unclear how this technology would perform in the NHS. Therefore, additional evidence is required to demonstrate the benefit of this technology. Future evidence could be incorporated into the early economic model or support the development of an alternative model structure. The EAG have also made the distinction between the other technologies and BioEP more clear throughout the results sections.

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
12	Neuronostics Ltd, [REDACTED]	102-107	6.3.1	The EAR notes that BioEP could reduce the number of patients requiring subsequent EEGs (e.g. by 230 in the routine EEG scenario) and calculates that this could offset BioEP's cost if it avoided a relatively small number of follow-up EEGs. This is presented as a plausibility observation but is not included in the base case model or as a named alternative scenario. For BioEP, the reduction in subsequent EEG demand is a core part of the clinical use case that should be included in the primary analysis. Neuronostics requests that avoided subsequent EEG costs be incorporated as a named and modelled scenario with explicit results, rather than as a narrative footnote. [REDACTED] Furthermore, our understanding is that cost-effectiveness (CE) estimates should be bounded between £20,000 and £30,000 per QALY per patient, rather than simply relying on the lower bound of £20,000 utilised by the EAG. Working with the example used by the EAG of a 1,000-patient cohort and their model as currently proposed, we estimate the cost-effectiveness point for BioEP would be £39.56 per patient (weighted across all EEGs) at the upper limit of £30,000 per QALY per patient. As we previously submitted, the baseline BioEP license fee for the EAG example would be £65,000, since 650 of the 1,000 patients are estimated to have inconclusive EEGs. We anticipate the potential for further discounting to NHS Trusts; a 40% discount would bring the license fee to £39 per patient, falling below the CE threshold. Given that the EAG model as currently proposed significantly reduces the potential for BioEP's added value, we anticipate BioEP to demonstrate dominant cost savings in an updated version of the model as described above.	Thank you for your comment. The intent of the EAR and economic modelling described is to demonstrate the plausibility of cost-effectiveness and value of the technologies in scope. The EAG had considered this with their narrative exploration of the impact of reducing the need for subsequent EEGs. However, a further sensitivity analysis has now been run (Appendix B4), which adds a cost of further EEG to all terminal nodes at which a positive diagnosis of epilepsy would not be made, and further explores the incremental QALYs that would need to be achieved to demonstrate cost-effectiveness. Thank you for providing additional information considered academic-in-confidence. This text (with appropriate redaction applied) has been added to section 6.1 of the EAG report. The EAG note that these results match the output of the executable preliminary economic model provided to the EAG, and further details of the model have been added to the report. Regarding the company submitted economic model the EAG would note three key points: [REDACTED]

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
					 The threshold applied by the EAG of £20,000 per QALY is in line with the NICE HealthTech programme manual, so this has not been updated. The EAG has identified one sensitivity analysis which is under the £20,000/QALY (and also lower than £30,000/QALY) for which BioEP could be considered cost effective. Because of the uncertainties involved, this has little impact overall. Regarding the license fee, the EAG acknowledges that this varies according to the number of EEGs that would be eligible for BioEP analysis. It is currently unknown how many EEGs are carried out each year at a typical NHS centre, and how these are distributed across the types of EEG. Any further analysis on this basis would be hypothetical and subject to significant uncertainty. The EAG ran the model using the costs provided by the company in the request for evidence, and therefore no updates have been made to the model or report.
13	Neuronostics Ltd, 	93	6.2.4 Table 21	Neuronostics license costs are commercially sensitive. While we accept the pricing is required to be available to the committee, we did not and do not approve of the license cost being made available to the public and comparator technology companies.	Thank you for your comment. The EAG have checked the RFE received by the EAG on 17/02/2026 which included the

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
				Please consider all pricing related to BioEP as commercial in confidence on all subsequent drafts of the EAR.	costing information from Neuronostics and no information provided was highlighted as commercial in confidence. Therefore, the level of redaction has remained unchanged in the report. The company has discussed confidentiality with NICE, and understands and acknowledges that pricing cannot be considered confidential within the early use assessment and that costs will be shown as part of the assessment outputs.
14	Neuronostics Ltd, [REDACTED]	89	6.2.3 Table 18	Table 18 sets the standard care comparator sensitivity at 95.0% across all four EEG types (routine, sleep-deprived, ambulatory, home video telemetry), sourced from 'Clinical expert (Appendix D3)' and 'EAG assumption.' The EAG's own commentary in every row acknowledges: 'Ideal source for this parameter would be published evidence. The EAG acknowledges this is a limitation.' Published systematic review evidence is available that directly contradicts the 95% assumption. Bouma et al. (2016), a systematic review and meta-analysis published in the European Journal of Neurology (15 studies, 1,799 participants), found the pooled sensitivity of routine EEG in adults after a first unprovoked seizure to be 17.3% (95% CI: 7.9–33.8%), with specificity of 94.7% (95% CI: 73.7–99.1%). Further evidence suggests that the sensitivity of ambulatory and video telemetry is at most 50% (Naim-Fell et al., 2024). The true sensitivity will almost certainly be lower since in this study all those receiving EEGs did have epilepsy. The EAG's 95% comparator sensitivity is therefore significantly higher than the best available published estimates. This is the single most influential parameter assumption in the model for BioEP, because it sets the baseline from which any incremental technology benefit is measured. Erroneously setting it at 95% fundamentally predetermines the result. Neuronostics requests that all eight sensitivity rows in Table 18 be updated to reflect the Bouma et al. (2016) and Naim-Fell et al. (2024).	Thank you for your comment. The evidence stated in this stakeholder comment, refers to the contribution of EEG in the diagnosis of epilepsy. The EAG have stated repeatedly in the report that diagnosis of epilepsy includes other factors (not solely reliant on EEG as a diagnostic). The EAG would also note that the study by Bouma et al. 2016 included papers published between 1978 and 2008 and therefore may not represent current practice. The EAG have instead focused on where the EEG did contain abnormalities that were identified by an expert, and whether these abnormalities were also flagged by the technology. The EAG did not identify any comparative evidence for BioEP (comparing clinicians with and without the support of BioEP) and therefore could not populate the base case of the early economic model using that information. The EAG has added further sensitivity analysis to the report, including different diagnostic accuracy of standard of care, and BioEP (see section 6.3.2, and Appendix B4) and identified a

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
					scenario where BioEP could be considered cost-effective at a willingness to pay threshold of £20,000/QALY; however further data collection would be required to reduce uncertainty associated with this scenario.
15	Neuronostics Ltd, [REDACTED]	86	6.2.3	Section 6.2.3 states that ‘diagnostic accuracy was advised by clinical experts’ and that ‘the evidence base was limited to a few studies using the technologies alongside a clinical expert, which did not cover all types of EEG, all technologies, or current versions of the technologies.’ The EAG chose to rely on expert opinion rather than published diagnostic accuracy literature for the standard care baseline. However, as per A7, published systematic review evidence on routine EEG diagnostic accuracy does exist. Bouma et al. (2016) conducted a systematic review and meta-analysis of 15 studies examining the diagnostic accuracy of routine EEG after a first unprovoked seizure in adults, finding pooled sensitivity of 17.3%. Likewise, there are also estimates of the sensitivity of ambulatory / video telemetry (Naim-Fell et al., 2024). This evidence was available to the EAG and should have been used to inform the standard care sensitivity parameter rather than relying solely on expert opinion. The discrepancy between the EAG’s 95% assumption and the published 17.3% figure is explained by a fundamental conflation of conditional and unconditional sensitivity made by the EAG. With regards the 95% value, expert 3 explicitly notes: “<i>Here you mean that there is a gold standard detected IED (or gold standard exclusion of an IED in the recording) and you want to know whether the clinical physiologist found it or if what they found was not an IED?</i>”. In other words, the expert is saying conditional on their being an epileptiform abnormality present in the data, how often would an expert correctly identify it? This is a fundamental proposition to the scenario where someone is suspected of having epilepsy, undergoes an EEG and an epileptiform abnormality is identified. As identified by the same expert in response to the broader question regarding sensitivity of EEG for all individuals with suspected epilepsy, the reality is that IEDs are present in only	See response to comment 14.

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
				approximately 17% of routine EEGs (Bouma et al., 2016). The unconditional sensitivity of routine EEG, that is, the probability that a routine EEG will yield a finding supportive of epilepsy diagnosis across all patients referred for EEG, is therefore approximately 17%, not 95%. The EAG's use of the conditional figure as if it were the unconditional sensitivity represents a methodological error that significantly distorts the model's baseline. This distinction has profound implications for the assessment of all considered technologies, and BioEP in particular. In the 83% of routine EEGs where no IEDs are present, standard visual EEG interpretation provides no epileptiform features to support or refute an epilepsy diagnosis. In this use case, feature-detection software may add value if experts are confident enough to trust that the EEG is free of IEDs based on the software output. However, an EEG free of IEDs cannot confirm or refute a diagnosis of epilepsy (NICE NG217, 2025 update). These patients typically proceed to further investigations (sleep-deprived EEG, ambulatory EEG, or video telemetry, as well as functional imaging), incurring additional cost and diagnostic delay (often resulting in A&E admissions and additional primary care costs). BioEP is specifically designed to provide diagnostic information in this IED-negative population by analysing resting-state EEG characteristics that are not dependent on IED capture. By using a 95% baseline sensitivity, the EAG's model assumes standard care already achieves near-perfect diagnostic performance across all EEGs, leaving negligible room for the included interventions to demonstrate incremental benefit. Neuronostics requests that the standard care sensitivity parameter be updated to reflect the published evidence, and that the model structure be amended to include an IED present versus IED not present decision tree branch to accurately represent the clinical pathway.	
16	Neuronostics Ltd, [REDACTED]	116, 118	6.4	The summary on page 116 states that 'the EAG applied a baseline sensitivity and specificity to the standard care arm, advised by clinical experts (Appendix D3)' and on page 118 acknowledges that 'a second notable limitation was that most model parameters were based on the views and opinions of	See response to comment 14 (Redacted EAR comments).

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
				clinical experts.' Neuronostics notes that for the comparator sensitivity parameter specifically. The Bouma et al. (2016) systematic review (European Journal of Neurology; 15 studies, 1,799 participants) provides pooled adult routine EEG sensitivity of 17.3% (95% CI: 7.9–33.8%). Likewise, the Naim-Fell et al. (2024) study indicates the sensitivity of ambulatory / video telemetry at 50%. This discrepancy is not addressed in the sensitivity analysis, which only varies sensitivity ± 5 percentage points around the 95% base case (Section 6.3.2), a range that does not encompass any plausible published value.	
17	Neuronostics Ltd, [REDACTED]	82	6.2.1	The EAG's decision tree model reveals a structural limitation that fundamentally undermines its capacity to evaluate BioEP's cost-effectiveness. This can be demonstrated by tracing through the model's own parameters for routine EEG. The model begins with a cohort of 1,000 patients undergoing EEG with suspected epilepsy. The first node splits the cohort by whether an EEG abnormality (IEDs or seizures) is present, using a prevalence of 35% (Table 17, clinical expert opinion): 350 patients have an abnormality present and 650 do not. Within the abnormality-present branch (350 patients), seizure prevalence is 1% (Table 17), giving 3.5 patients with seizures and 346.5 without seizures but with IEDs present. For the 3.5 patients with seizures, standard care seizure detection sensitivity of 95.0% (Table 18) means 3.325 are correctly identified ('Supportive'), leaving 0.175 undetected. Of these 0.175, IED detection sensitivity of 97.0% (Table 18) identifies a further 0.170, leaving 0.005 with negative results on both detection steps. For the 346.5 patients without seizures but with IEDs, seizure detection specificity of 90.0% (Table 18) produces a false positive rate of 10.0%, meaning 34.65 are incorrectly classified as 'Supportive' via seizure detection, and 311.85 proceed to IED detection. Of these 311.85, IED detection sensitivity of 97.0% identifies 302.49, leaving 9.36 with negative results on both detection steps. In total, approximately 9.4 patients from the abnormality-present branch receive negative results for both seizure and IED detection.	Thank you for your comment. In response to this comment, the EAG had considered applying the same utilities to the false positive terminal nodes as to the true positive terminal nodes, therefore allowing BioEP to demonstrate benefit in all patients it was used in. However, applying the utility values used in the base case (described in section 6.2.5 in EAG report) would disadvantage the technology because utilities are already higher for false positive nodes than for true positive nodes. That is, a person with epilepsy will have worse quality of life, even if controlled, than a person without epilepsy who receives medication as if they have it. Please see the EAG's response to comment 14 (Redacted EAR comments) regarding diagnostic accuracy parameters. Regarding prevalence, it is important to note that the prevalence used by the EAG is for abnormalities being present on the EEG (that is, the proportion of EEGs with seizures or IEDs that are there to be identified by the person reviewing them), not the prevalence of epilepsy in those attending the clinic. The

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
				Within the no-abnormality branch (650 patients), seizure detection specificity of 90.0% means 10.0% (65 patients) are false positives classified as 'Supportive', and 585 proceed to IED detection. IED detection specificity of 75.0% (Table 18) means 25.0% of the remaining 585 (146.25 patients) are false positives, and 438.75 receive negative results on both detection steps. In total, 448 patients (9.4 + 438.75) receive negative results for both seizure and IED detection, at which point the BioEP chance node is applied. Of these 448 patients, approximately 439 (98%) originate from the no-abnormality branch and only approximately 9 (2%) are from the abnormality-present branch where standard care failed to detect features that were present. The consequence for BioEP's evaluation is a fundamental mismatch between where the model applies costs and where it permits benefits to accrue. BioEP's technology cost is incurred across all 448 patients reaching the BioEP chance node. However, because the model defines diagnostic ground truth exclusively by the presence or absence of IEDs and seizures on the EEG recording, only the approximately 9 patients (2%) whose abnormalities were missed by standard care can generate a true positive BioEP result. For the remaining 439 patients (98%), whose EEGs did not capture IEDs or seizures, any BioEP 'Supportive' result is classified as a false positive. The model therefore distributes BioEP's costs across 448 patients while limiting its capacity to demonstrate benefit to 9. The above is caveated by the previously discussed issues with the sensitivity assumptions, which should be updated to reflect the data sources we provide. We further highlight there are issues with the prevalence assumptions. Data provided from the NAPIER audit (Lee et al. (2023)) demonstrates that of the people newly attending first seizure clinics with suspected epilepsy, only 0.3 will ultimately receive a diagnosis of epilepsy. Collectively these suggest that the "abnormality" arm as currently defined should only contain between 90 and 175, rather than 350.	EAG have also not restricted the population to those specifically attending a first seizure clinic. Rather the population is restricted to those having an EEG recorded for diagnosis of epilepsy. The prevalence was set at a different value for the different types of EEG, based on what clinical experts see in their clinics (see section 6.2.3 in EAG report), and varied across the ranges provided in sensitivity analysis. The EAG notes that confusion may have been caused by the decision tree diagram shared in the EAR. Therefore, this diagram (Figure 3 in EAG report) has been updated to more accurately reflect the use of BioEP.

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
18	Neuronostics Ltd, [REDACTED]	22	2	We note the statement in the draft EAR that all companies “do not have DTAC” for their technologies. We suggest this would benefit from clarification, as DTAC is an assurance framework used to assess digital health technologies rather than a single centrally awarded certification held uniformly across suppliers. As set out in our company evidence submission, we have not sought formal external DTAC accreditation from a national or regional NHS body, ORCHA, or an external consultancy. However, we have completed full DTAC self-assessments and prepared comprehensive DTAC evidence packs, which have been submitted to several NHS Trusts as part of procurement, information governance, and compliance review processes. Those materials have been considered by NHS organisations during local review processes, and BioEP has subsequently progressed to deployment or active implementation in relevant NHS settings. On that basis, we consider BioEP to be aligned with DTAC requirements, while recognising that this is distinct from holding a formal external accreditation. We would therefore suggest that the draft EAR wording is amended to reflect this distinction more precisely. For example, rather than stating that companies “do not have DTAC”, it may be more accurate to state that BioEP does not currently hold formal external DTAC accreditation, but has undergone DTAC self-assessment and has provided DTAC evidence to NHS Trusts as part of local review and implementation processes.	Thank you for your comment. A sentence has been added to section 2 of the EAG report to summarise the DTAC status for BioEP.
19	Neuronostics Ltd, [REDACTED]			References 1. Alessi N, Perucca P, McIntosh AM (2021). Missed, mistaken, stalled: Identifying components of delay to diagnosis in epilepsy. <i>Epilepsia</i> 62(7), 1494-1504. https://onlinelibrary.wiley.com/doi/10.1111/epi.16929 2. Baykan B, Dunne J, Weibe S, Maillard L, Beniczky S, Koutroumanidis M, Seeck M (2025). Presence of interictal epileptiform EEG discharges implies increased risk of recurrence after the first unprovoked seizure: Report of the International League Against Epilepsy and	Thank you for your comment. It is unclear what this list of references refers to, nor the relevance of each study to the decision problem. The EAG note that: 1. Alessi et al. 2021 does not report the use of BioEP. This is narrative literature review which found that the proportion of patients with diagnostic delays in epilepsy ranged between 16 and 77%. Key delays were

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
				International Federation of Clinical Neurophysiology. Epilepsia. 66(10) 3920-3936. https://doi.org/10.1111/epi.18591 3. Bonnon A, et al. (2026). Is resective surgery cost-effective for adults with epilepsy? A cost-utility analysis in a publicly funded healthcare system. Journal of Neurology, Neurosurgery and Psychiatry. 97(1), https://jnnp.bmj.com/content/97/1/25 4. Bouma HK, Labos C, Gore GC, Wolfson C, Keezer, MR (2016). The diagnostic accuracy of routine electroencephalography after a first unprovoked seizure in adults: A systematic review and meta-analysis. European Journal of Neurology, 23(4), 455-463. https://onlinelibrary.wiley.com/doi/10.1111/ene.12739 5. Charles R, et al. (2026). Prioritising follow-up for people with suspected epilepsy using a digital EEG biomarker. Epilepsy & Behavior, 177, 110925. 6. Hernandez-Ranquillo L, Thorpe L, Dash D, Huusein T, Hunter G, Waterhouse K, Roy PL, Tellez-Zenteno JF (2020). Diagnostic Accuracy of the Ambulatory EEG vs. Routine EEG for First Single Unprovoked Seizures and Seizure Recurrence: The DX-Seizure Study. Frontiers in neurology, doi: 10.3389/fneur.2020.00223 7. Kerr WT, Janio EA, Le JM, et al. (2016). Diagnostic delay in psychogenic seizures and the association with anti-seizure medication trials. Seizure, 40, 123–126. https://doi.org/10.1016/j.seizure.2016.06.015 8. Koren J, Colabrese K, Hartmann M, Feigl M, Lang C, Hafner S, Nierenberg N, Kluge T & Baumgartner C (2025). Systematic comparison of Commercial seizure detection Software: Update equals Upgrade? Clinical Neurophysiology, 174, 178–188. https://dx.doi.org/10.1016/j.clinph.2025.04.003 9. Koren JP, Herta J, Furbass F, Pirker S, Reiner-Deitemyer V, Riederer F, Flechsenhar J, Hartmann M, Kluge T & Baumgartner C (2018). Automated long-term EEG review: Fast and precise analysis in critical care	related to decision delay (patient decision to seek medical review), referral delay (delay by primary care/emergency care physician to refer to specialist) and attendance delay (delay in the patient attending the specialist review). Therefore, this evidence has limited applicability to the decision problem. 2. Baykan et al. 2025 does not report the use of BioEP. From the abstract, the study appears to be a systematic review of 22 studies determining the association between IEDs detected on EEG from first unprovoked seizure, and seizure recurrence. This appears related to the diagnostic performance of EEG in diagnosis of epilepsy and not related to the decision problem. Therefore, this evidence has limited applicability to the decision problem. 3. Bonnon et al. 2026 is referred to in the EAG report (section 6.1.1) in the development of the future economic model structure. This paper did not report the use of BioEP. 4. Bouma et al. 2016 is referred to in the EAG report (Appendix C1, Appendix A4). This study discusses the sensitivity of EEG in the diagnosis of epilepsy and did not report the use of BioEP. This included 15 studies published between 1978 and 2008; and therefore, results of this study may not represent current practice.

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
				patients. <i>Frontiers in Neurology</i>, 9(JUN), 454. https://dx.doi.org/10.3389/fneur.2018.00454 10. Kural MA, et al. (2022). Accurate identification of EEG recordings with interictal epileptiform discharges using a hybrid approach: Artificial intelligence supervised by human experts, <i>Epilepsia</i>, 63(5): 1064-1073, doi: 10.1111/epi.17206 11. Lee SH, Gillespie C, Bandyopadhyay S, Nazari A, Ooi SZY, Park JJ, Champ C, Taylor C, Kinney M, Mackay G, Myint PK, Marson A, on behalf of the NANSIG Collaborative (2023). National audit of pathways in epileptic seizure referrals (NAPIER): A national, multicentre audit of first seizure clinics throughout the UK and Ireland. <i>Seizure: European Journal of Epilepsy</i>, 111, 165–171. https://doi.org/10.1016/j.seizure.2023.08.010 12. Naim-Fell J, et al. (2024). Pro-Ictal EEG Scheduling Improves the Yield of Epilepsy Monitoring: Validating the Use of Multiday Seizure Cycles to Optimize Video-EEG Timing. <i>Ann Neurol</i>, 96, 1148-1159. https://onlinelibrary.wiley.com/doi/pdf/10.1002/ana.27078 13. NICE (2022). NG217: Epilepsies in children, young people and adults. National Institute for Health and Care Excellence. https://www.nice.org.uk/guidance/ng217 14. NICE (2025). NG217 Update: Epilepsies guideline. National Institute for Health and Care Excellence. https://www.nice.org.uk/guidance/ng217 15. Oto M. (2017). The misdiagnosis of epilepsy: Appraising risks and managing uncertainty. <i>Seizure</i>, 44, 143–146. https://doi.org/10.1016/j.seizure.2016.11.029 16. Pellinen J, French J, Bhala K., et al. (2021). Diagnostic delay in epilepsy: The scope of the problem. <i>Current Neurology and Neuroscience Reports</i>, 21(71), https://link.springer.com/article/10.1007/s11910-021-01161-8 17. Reus EEM, et al. (2022). Automated seizure detection in an EMU setting: Are software packages ready for	5. Charles et al. 2026 is explicitly included in the EAG report as evidence for BioEP (Table 4, Table 9, Appendix A4). 6. Hernandez-Ranquillo et al. 2020 does not report the use of BioEP. As detailed in the abstract, this study compares ambulatory EEG with first, second routine EEG in 113 adults who experienced first single unprovoked seizure in terms of their ability to predict recurrent seizure up to 1 year later. Therefore, this evidence has limited applicability to the decision problem. 7. Kerr et al. 2016 does not report the use of BioEP. From the reported methods this study focuses on review of 297 patients (in a US setting) attending an adult epilepsy video EEG monitoring unit between 2006 and 2014, who were diagnosed not having epileptic seizures. The study aimed to determine whether trials of anti-seizure medication contributed to longer delays in definitive diagnoses. It is not related to the decision problem. Therefore, the EAG would consider this study out of scope. 8. Koren et al. 2025 was explicitly included in the EAG report as evidence for encephalitis 2.0 and Persyst 14 (Table 4, Table 8, Table 11, Table 13, Appendix A4). 9. Koren et al. 2018 was explicitly included in the EAG report as evidence for encephalitis NeuroTrend

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
				implementation? Seizure, 96, 13-17, https://www.seizure-journal.com/article/S1059-1311(22)00009-7/fulltext 18. Tait L, et al. (2024). Estimating the likelihood of epilepsy from clinically non-contributory electroencephalograms using computational analysis: A retrospective, multisite case-control study. <i>Epilepsia</i>, 65(8), 2459-2469, https://doi.org/10.1111/epi.18024 19. Tittensor P, et al. (2024). Updating beliefs using new evidence from a diagnostic decision support aid in a nurse led first seizure clinic. <i>medRxiv</i>, https://doi.org/10.1101/2024.12.13.24318654 20. Xu Y, Nguyen D, Mohamed A, Carcel C, Li Q, Kutlubayev MA, Anderson CS and Hackett ML (2016). 'Frequency of a false positive diagnosis of epilepsy: a systematic review of observational studies', <i>Seizure</i> 41, 167-174. https://www.seizure-journal.com/article/S1059-1311(16)30133-9/fulltext	(Table 4, Table 7, Table 11, Table 12, Appendix A4). 10. Kural et al. 2022 was explicitly included in the EAG report as evidence for encephalitis (DeepSpike) and Persyst 13. 11. Lee et al. 2023 does not report the use of BioEP. The study reports a national retrospective audit of first seizure clinics in the UK and Ireland (30 consecutive patients attending per centre, from 25 centres, who attended December 2019 and earlier; that is working backwards through patient lists). It reports that 18.7% of first appointment attendees were diagnosed with a new epilepsy, and 4.5% had a seizure associated with a previously diagnosed epilepsy. The EAG note that prevalence of abnormalities on EEG (that is, not prevalence of epilepsy, noting that some patients will be diagnosed with epilepsy without a contributory EEG) differed by type of EEG in the base case analysis of the economic model (routine: 35%, sleep-deprived: 60% etc, see Table 17 of the EAG report). Prevalence of EEG abnormalities suggestive of epilepsy was also varied in sensitivity analysis (see Appendix B4). 12. Naim-Fell et al. 2024 does not report the use of BioEP. From the abstract this study introduces the concept of "pro-ictal EEG" a method of scheduling video EEG to coincide

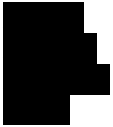
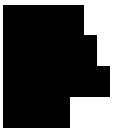
Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
					with periods of increased seizure likelihood to enhance the diagnostic yield. The EAG would consider this evidence is out of scope of this assessment. 13. NICE (NG217, 2022) is referred to in the EAG report, but does not report the use of BioEP. 14. NICE (NG217, 2025) is referred to in the EAG report, but does not report the use of BioEP. 15. Oto et al. 2017 does not report the use of BioEP. This study is a narrative review discussing the number of misdiagnoses of epilepsy within standard care (assumed without use of the technologies included in this early use assessment) and the consequences of these. This narrative review also acknowledges the overreliance and misinterpretation of EEG in the diagnosis of epilepsy; highlighting that other patient/clinical factors contribute to the diagnosis. 16. Pellinen et al. 2021 does not report the use of BioEP. This is a narrative literature review describing diagnostic delay within standard care (assumed without use of the technologies included in this early use assessment). Therefore, this evidence has limited applicability to the decision problem. 17. Reus et al. 2022 was explicitly included in the EAG report (Reus et al. 2022a).

Comment no.	Stakeholder	Page no.	Section no.	Comment	EAG Response
					18. Tait et al. 2024 was explicitly included in the EAG report as evidence for BioEP being used fully automated. Diagnostic sensitivity from this source has now been added to the EAG's sensitivity analysis. 19. Tittensor et al. 2024 was explicitly included in the EAG report as evidence for BioEP when used alongside an expert. 20. Xu et al. 2016 does not report the use of BioEP. This systematic review (N=27 studies; 10 conducted in UK setting) reports the frequency of false positive diagnoses of epilepsy from observational studies. This study is not direct evidence that BioEP could reduce these false positives.

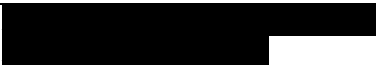
Economic Model – Collated comments table:

Stakeholder	Comment	Description of problem	Description of proposed amendment	Result of amended model or expected impact on the result (if applicable)	EAG response
Persyst Development Corporation LLC, [REDACTED]	1	The model uses broad staff-time assumptions that do not fully reflect the Persyst-specific evidence base. This matters because the EAR identifies reduction in staff time as the most plausible route by which these	Please add a Persyst-specific scenario analysis informed by the published routine EEG review-time evidence and Persyst's use as a triage support tool in prolonged EEG. This could include one scenario for routine EEG using the	This would better align the model with the available Persyst evidence and is likely to strengthen the plausibility of Persyst's economic case in supervised NHS use. The EAR says the model was developed to explore faster time to review, report and interpret	Thank you for your comment. The EAG did include a scenario analysis using the sensitivity and specificity reported in Kural et al. 2022 (see Appendix B4), but used the same review time reduction as used in the base case, of 20 minutes, which is

		technologies could create value in practice.	observed time saving from the comparative study, and a second scenario for prolonged EEG that tests the impact of triage-oriented workflow benefits.	EEGs, and that reduction in staff time was the most plausible driver of practical impact. It also reports a 101-second mean saving per routine EEG recording with Persyst plus clinical expert, and notes that in continuous inpatient EEG Persyst's strongest value may be record-level triage with high negative predictive value for "no detections."	more favourable for the intervention. A quick calculation shows that a review that is 101 seconds quicker saves £1.21 versus the comparator, instead of £14.34 reported in Appendix B4. There is no evidence available for the claimed 'triage-oriented workflow benefits' or 'record-level triage' specific to Persyst, and these benefits would likely apply to other technologies, therefore the EAG have made no changes to the analysis or report.
Persyst Development Corporation LLC, [REDACTED]	2	The economic summary does not draw out clearly enough how favourable the modelled Persyst results are across EEG settings.	Please revise the summary text so it explicitly states the Persyst base-case results by EEG type and highlights that Persyst year 1 is modelled as cost saving and dominant in routine, sleep-deprived, ambulatory and home video telemetry EEG.	This would not change the model outputs, but it would give the committee a clearer account of the economic plausibility already shown for Persyst within the EAG's own modelling framework. In Table 23, Persyst year 1 is dominant in routine EEG, sleep-deprived EEG, ambulatory EEG and home video telemetry EEG, with modelled incremental cost savings in each setting. The EAR also states that early economic modelling found Persyst 15 cost saving and dominant across the range of scenarios explored.	Thank you for your comment. The base case results for Persyst (and all other technologies) are summarised in Table 23 of the EAG report. All modelling in the base case assumed the same clinical parameters across Persyst, encephalogram, NeuroCenter, NeuroWorks (the EAG note that there was no published data for Persyst 15). Results of all scenario analyses are summarised in Appendix B4 and described narratively in the context of the extent to which they drive the results of the economic model. Therefore, no changes have been made to the report.
Persyst Development Corporation LLC, [REDACTED]	3	The threshold analysis is particularly useful for judging implementation plausibility, but the Persyst-specific findings are not prominent	Please strengthen the narrative around the Persyst threshold analysis by explicitly stating the percentage reduction in	This would help the committee judge whether Persyst's economic case is credible in practice, especially in prolonged EEG pathways where only a	See response to comment 2 (Economic Model comments).

		enough in the summary narrative.	review and interpretation time needed to offset Persyst cost in each EEG setting.	small time reduction is needed to offset cost. The EAR states that, to offset the cost per patient of Persyst 15, review and interpretation time would need to reduce by 9.6% in routine EEG, 6.6% in sleep-deprived EEG, and 1.1% in both ambulatory and telemetry EEG.	
AIT Austrian Institute of Technology, 	5	The sensitivity parameter for encevis (e.g. seizure detection and/or IED detection) does not appear to reflect the full range of values reported in the submitted evidence. The model appears to rely on a limited subset of estimates without clear justification.	Update the sensitivity parameter(s) to reflect the full range of values reported in the submitted evidence for encevis. Where multiple studies are available, a weighted average or sensitivity analysis using minimum and maximum values should be implemented.	Increasing sensitivity would reduce false negatives, which is expected to improve patient outcomes (QALYs) and may reduce downstream healthcare costs. This would improve the cost-effectiveness of encevis.	Thank you for your comment. The EAG has applied the sensitivity of Kural et al. 2022 in the economic model in sensitivity analysis (see Appendix B4), noting that this is the only source from which comparative data were available, in which encevis was used alongside clinical judgement and compared with clinical judgement alone. Therefore, no changes have been made to the report.
AIT Austrian Institute of Technology, 	6	The model appears to assume broadly similar diagnostic performance across technologies, which may not reflect differences reported in the submitted evidence and ignores additional measures beside Spike and Seizuredetection which also improves the diagnoses.	Ensure that technology-specific parameter values (sensitivity, specificity, additional measures) are applied consistently for each technology based on submitted evidence.	Differentiation between technologies may result in improved relative cost-effectiveness of encevis if higher performance is reflected.	Thank you for your comment. There was limited evidence for all technologies that could be applied to the economic model. Therefore, the base case assumed clinical parameters were the same (only costs varied). The EAG has applied the sensitivity of Kural et al. 2022 in the economic model in sensitivity analysis (see Appendix B4). Therefore, no changes have been made to the report.

AIT Austrian Institute of Technology, [REDACTED]	7	It is not clear how parameter values for encevis were derived from the submitted evidence, including which studies were selected and how values were calculated.	Provide full transparency on parameter derivation, including mapping between submitted studies and model inputs.	Improved transparency may lead to revised parameter values and potentially improved cost-effectiveness estimates for encevis.	Thank you for your comment. A full description of the literature search, studies included and excluded (with reasons for exclusion) are provided in section 4 of the EAG report. In the base case, the EAG assumed the same clinical parameters for NeuroWorks, NeuroCenter, Persyst and encevis; only the cost of the technology was varied between technologies. Diagnostic accuracy parameters were varied for encevis (using data from Kural et al. 2022) as summarised in sensitivity analysis in Appendix B4. Therefore, no changes were made to the report.
Neuronostics Ltd, [REDACTED]	8	Time horizon: 1 year (Section 6.2.1, page 82). The model applies utilities over a 1-year time horizon and diagnostic costs over 'a few days at most.' For a technology whose primary clinical value is supporting accurate diagnosis of a chronic, lifelong condition, a 1-year time horizon fails to capture the full health and economic consequences of correct or incorrect diagnosis. An accurate epilepsy diagnosis has consequences for medication, seizure control, driving, employment, SUDEP	The model should be run with a materially longer time horizon using the Markov model structure already designed by the EAG (Section 6.5). The EAG's own Markov model covers long-term treatment states, drug resistance, surgical referral, and mortality, and should be populated and used as the primary analysis. Parameters of this Markov model should be chosen wherever possible from published studies. Where expert opinion is used, appropriate interpretation of the	The Neuronostics economic model addresses this limitation directly. The model extends the time horizon to ten years with three health states (Poorly Controlled, Well Controlled, Well Controlled Seizure-Free) and quarterly transition cycles. Results: [REDACTED]	See response to comment 12 (Redacted EAR comments). The EAG also highlight that the intent of the modelling undertaken is to explore plausibility of technologies being cost-effective. Given the uncertainties in the evidence base described previously and the use of estimated parameters in the decision tree, the EAG did not consider it appropriate to further propagate uncertainties by extending the time horizon or structure of the model. Key areas for evidence generation are outlined in section 8.3 of the EAG report.

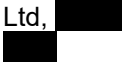
		risk, and quality of life over decades. Published evidence on diagnostic delay in epilepsy demonstrates that a 1-year time horizon is insufficient even to capture the diagnostic process itself for a substantial proportion of patients. Alessi and Quintas (2021) conducted a systematic review of 17 studies examining diagnostic delay in epilepsy and found that diagnostic delay affected 16-77% of patients across studies, with 75% of studies reporting delays affecting 38% or more of patients. Median diagnostic delays ranged from 7 to 25 months, with 13-16% of patients experiencing delays exceeding 1 year and some patients experiencing delays of decades. The review identified three components of diagnostic delay: decision delay (time from seizure onset to first medical contact), referral delay (time from primary care to specialist referral), and attendance delay (time from referral to specialist assessment), all of which accumulate to produce diagnostic timelines that substantially exceed 1 year. Pellinen et al. (2021) reported a median diagnostic delay of	conditioning of the statements must be incorporated.	 Neuronostics is prepared to provide an economic model for the committee's consideration if requested to provide an alternative perspective of the economic analysis	

		12 months for new-onset focal epilepsy in adults aged 15-75, noting that diagnostic delay can extend to years or decades. The consequences of diagnostic delay are severe: 5% of patients experience motor vehicle accidents prior to diagnosis; 50% experience seizure-related injuries; and annual healthcare costs for patients with new-onset epilepsy are approximately five times those of patients with established epilepsy, reflecting uncontrolled seizures, emergency admissions, and repeated investigations during the pre-diagnostic period. There is also evidence of accelerated cognitive decline and increased SUDEP risk associated with prolonged diagnostic delay. Kerr et al. (2016) studied 297 patients with psychogenic non-epileptic seizures (PNES) and found a mean diagnostic delay of 8.4 years , with a robust average of 2.8 years) and a maximum delay of 52 years. Each anti-seizure medication trial increased the diagnostic delay exponentially by approximately one-third of a year. PNES patients represent a critical misdiagnosis population in			

		the epilepsy diagnostic pathway, and their diagnostic trajectories are entirely invisible to a 1-year model. A 1-year time horizon therefore structurally excludes the period in which the majority of diagnostic delay, and its associated health, economic, and quality-of-life consequences, occurs. The model cannot capture BioEP's contribution to reducing diagnostic delay, accelerating appropriate treatment initiation, or avoiding the substantial costs of prolonged misdiagnosis.			
Neuronostics Ltd, [REDACTED]	9	0.1% sensitivity improvement assumption (Section 6.2.3, pages 86–89; Table 18). The base case assumes only a 0.1% improvement in sensitivity for BioEP, described as a 'hypothetical' value applied due to 'lack of evidence.' This assumption predetermines negligible clinical benefit from the technology. The EAG's own Table 18 acknowledges this parameter ideally 'would be published evidence' and flags it as a limitation. Crucially, the sensitivity/specificity framework used by the EAG is designed for EEG waveform feature-detection tools (encevis, NeuroCenter, NeuroWorks, Persyst).	Neuronostics requests that the EAG reconsider the use of a sensitivity/specificity framework for BioEP, as this framework does not reflect BioEP's mechanism of action. The appropriate outcome measure is the degree to which BioEP updates clinical belief about diagnosis, as demonstrated by Tittensor et al. (2024), rather than a marginal increment to feature-detection sensitivity. If the EAG retains the sensitivity framework, the 0.1% assumption should be confined to a clearly labelled conservative scenario rather than the base case, and the standard care baseline should be informed by	The Neuronostics model does not use the EAG's sensitivity/specificity framework for BioEP. Instead, BioEP's value is captured through two evidence-based mechanisms: (1) its five-level probability score informs clinical pathway decisions via decision matrices, consistent with the belief-updating mechanism demonstrated by Tittensor et al. (2024), reducing the need for subsequent costly EEGs; and (2) BioEP reduces the misdiagnosis rate from 25% (Oto 2017; Xu Y et al., 2016) to 15.3%, calculated from BioEP's published specificity of 75% (Tait et al., 2024) applied to the inconclusive EEG population. The model uses published diagnostic yield data by EEG	Thank you for your comment. Please see response to comment 14 (in the redacted EAG report comments). As stated in section 5.2.1 of the report, the pre-print by Tittensor et al. 2024 reported the results from 2 reviewers and prospective belief updated when using BioEP. However, as stated in the EAG report: <i>"The authors acknowledged that there was no follow-up for these patients and no reference standard therefore it is unclear how the reviewer estimates related to the final clinical diagnosis."</i> Evidence generation recommendations outlined in section 8.3 for the technologies (including BioEP), will support future economic evaluations of

		Effectively the model has been pre-conditioned to focus only on scenarios where an EEG contains such features. As discussed extensively above, this is only a minority of EEGs. BioEP is not a feature-detection tool; it is a probabilistic decision-support tool whose value lies in updating clinical belief about epilepsy diagnosis. Tittensor et al. (2024) studied 86 patients and found that BioEP changed clinician diagnostic belief in 41–67% of cases, demonstrating that the appropriate outcome measure for BioEP is belief updating, not a marginal sensitivity increment. Additionally, the 95% baseline sensitivity assumed for standard care is contradicted by published evidence: Bouma et al. (2016), a systematic review and meta-analysis of 15 studies, found the pooled sensitivity of routine EEG in adults to be just 17.3%. Critically, the EAG's 95% figure represents the sensitivity of EEG interpretation conditional on interictal epileptiform discharges (IEDs) being present in the recording. However, IEDs are present in only approximately 17% of routine EEGs in the target	published evidence rather than expert opinion. Bouma et al. (2016) provides a systematic review showing adult routine EEG sensitivity of 17.3% (95% CI: 7.9–33.8%), which should replace the current 95% expert-opinion estimate. Alternatively, the decision tree should be restructured to include an IED present versus IED not present arm, with the 95% sensitivity applied only to the IED-present subpopulation (approximately 17% of routine EEGs) and a near-zero sensitivity applied to the IED-absent subpopulation (approximately 83%). This would accurately model the clinical reality and reveal BioEP's incremental value in the IED-negative population. If the EAG retains the sensitivity framework, then Neuronostics request that the EAG re-run the analysis using the routine EEG sensitivity of 17.3% and the Tait et al. (2024) BioEP sensitivity of 61%.	type (routine EEG 17% conclusive, consistent with the Bouma et al. (2016) systematic review finding of 17.3% adult sensitivity) rather than the EAG's unsupported 95% baseline. This effectively models the IED present versus IED not present distinction: the 17% diagnostic yield represents the proportion of EEGs where IEDs are captured and standard care achieves high sensitivity, whilst the remaining 83% represents the IED-absent population where BioEP's incremental value is greatest. This approach models the clinically meaningful outcome (correct diagnosis and pathway efficiency) rather than an intermediate process measure (feature detection sensitivity).  Neuronostics is prepared to provide an economic model for the committee's consideration if requested to provide an alternative perspective of the economic analysis.	the technology. The EAG also outlined a future economic model which would be populated when more evidence is available (see section 6.5 of the EAG report).

		population (Bouma et al., 2016). In the remaining 83% of EEGs where no IEDs are captured, the sensitivity of standard visual interpretation for detecting epileptiform features is effectively zero. The EAG's decision tree does not include an IED present versus IED not present arm and therefore fails to model this critical distinction. BioEP provides its greatest diagnostic value precisely in this IED-negative majority population, as it does not depend on IED presence to generate a clinically informative probability score. The 0.1% increment applied to a 95% baseline is flawed: it uses the wrong metric for BioEP, applies it to a baseline that conflates conditional sensitivity (given IED presence) with unconditional sensitivity (across all EEGs), and the decision tree structure omits the IED prevalence-dependent branching that would reveal where BioEP's true incremental value is concentrated.			
Neuronostics Ltd, [REDACTED]	10	Inconclusive/neutral result assigned zero clinical benefit (Section 6.2.2, page 83; Section 6.3.1, pages 102-107). The model assigns zero utility gain to BioEP neutral outputs, treating them as a	A utility value above zero (though less than a supportive result) should be assigned to neutral BioEP results to reflect their clinical informational contribution. When individuals present	The Neuronostics model captures the clinical value of all BioEP outputs (including neutral) through the decision matrix framework. BioEP's five-level probability score (Very Supportive to Very	Thank you for your comment. The EAG apologise for the misleading wording in section 6.2.2 – the 'no clinical benefit' referred to a clinical scenario in which the results are inconclusive and therefore no

		pure cost. The EAR states these results are 'associated with cost of technology but for no clinical benefit.' This is not clinically accurate. A neutral BioEP result provides probabilistic information - it indicates the resting-state EEG does not exhibit typical epileptiform patterns - which, combined with clinical history and presentation, informs the diagnostic pathway. The assumption that neutral outputs have zero informational or clinical value misrepresents how clinicians use the result.	with suspected epilepsy, the treating clinician will form an impression of how likely epilepsy is. Therefore, evidence on how clinicians use neutral BioEP outputs in practice should be sought and incorporated. Neuronostics is willing to provide data to support parameterisation of this outcome.	Unsupportive) is applied through a 5×5 mapping matrix weighted by the observed BioEP score distribution (Very Unsupportive 10%, Unsupportive 20%, Neutral 30%, Supportive 30%, Very Supportive 10%). A neutral result shifts the probability-weighted clinical suspicion score, influencing pathway decisions and reducing unnecessary further investigations. This means every BioEP result contributes informational value that is reflected in the model's diagnostic pathway costs and downstream outcomes. 	diagnosis can be made. In the model, inconclusive results were treated the same as the corresponding negative results, with appropriate utilities applied to those terminal nodes. This has now been clarified in the report. The EAG have also reviewed the preliminary economic model submitted by the company and added details of this to the EAG report (see section 6.1 and Appendix B5).
Neuronostics Ltd, 	11	Standard care sensitivity set at 95% based on expert opinion only (Section 6.2.3, Table 18). The comparator sensitivity for seizure detection is set at 95% for all	The standard care sensitivity parameter should be updated to reflect the published systematic review evidence. Bouma et al. (2016) provides a pooled	The Neuronostics model avoids the need to estimate standard care “sensitivity” as a single aggregate figure. Instead, it models diagnostic yield by EEG type using published evidence:	Thank you for your comment. Please see response to comment 9 (Economic model comments).

		EEG types. The EAG's Table 18 explicitly acknowledges: 'Ideal source for this parameter would be published evidence. The EAG acknowledges this is a limitation.' Published evidence directly contradicts this assumption. Bouma et al. (2016), a systematic review and meta-analysis published in the European Journal of Neurology (15 studies, 1,799 participants), found the pooled sensitivity of routine EEG in adults after a first unprovoked seizure to be 17.3%, with specificity of 94.7%. The discrepancy arises because the EAG's 95% figure represents the conditional sensitivity of EEG interpretation given that IEDs are present in the recording. However, Bouma et al. (2016) demonstrate that IEDs are captured in only approximately 17% of routine EEGs in the target population. In the remaining 83% of recordings where no IEDs are present, the sensitivity of standard visual EEG interpretation for supporting an epilepsy diagnosis is effectively zero, as there are no epileptiform waveforms for the reviewer to identify.	estimate of 17.3% adult routine EEG sensitivity from 15 studies; conditional on the individual having epilepsy Naim-Fell et al. (2024) places the sensitivity of ambulatory / video telemetry EEG at 50%. These published estimates should replace the current 95% estimate, based on conflation of expert opinion. The decision tree should be restructured to include an IED present versus IED not present branching arm. The conditional sensitivity of 95% should be applied only to the IED-present subpopulation (approximately 17% of routine EEGs, per Bouma et al., 2016), whilst a near-zero sensitivity should be applied to the IED-absent subpopulation (approximately 83%). This structural change would accurately represent the clinical pathway and enable the model to capture the differential diagnostic contribution of BioEP across both IED-positive and IED-negative EEG populations.	routine EEG 17% conclusive, consistent with both the Bouma et al. (2016) systematic review (17.3% pooled adult sensitivity, 15 studies, 1,799 participants), sleep-deprived 50%, ambulatory 60%, video telemetry 80%. This approach implicitly captures the IED present versus IED absent distinction: the 17% conclusive rate for routine EEG reflects the proportion of recordings where IEDs are present and standard care achieves high interpretive sensitivity, whilst the 83% non-conclusive rate represents the IED-absent population where BioEP's probability score provides its greatest incremental diagnostic value. Whilst the NICE guideline NG217 (2025 update) recommends the presence of epileptiform abnormalities in an EEG to support a diagnosis of epilepsy, it explicitly states that an EEG free of IEDs should not exclude an epilepsy diagnosis. The reason for this is because the sensitivity of routine EEG is far below the 95% assumed by the EAG. The published yield data applies equally to both the BioEP and control arms; BioEP's incremental value flows from its probability score improving clinical decision-making and reducing misdiagnosis from 25% to 15.3%.	Please see response to comment 14 (Redacted EAR comments) above regarding the Bouma et al. 2016 study.

		The EAG's decision tree does not model this distinction. It applies the 95% sensitivity uniformly across all EEGs, regardless of whether IEDs are present. This structural omission systematically overestimates the diagnostic capability of standard care across the full EEG population and correspondingly underestimates the incremental value of technologies that provide diagnostic information independently of IED presence. BioEP analyses resting-state EEG characteristics (spectral power, connectivity, and background activity patterns) to generate a probability score that is informative irrespective of whether IEDs are captured during the recording. Its clinical impact is therefore concentrated in the 83% of EEGs where standard care has near-zero sensitivity, a population that the current model structure entirely fails to represent. Using expert opinion for this critical parameter when published systematic review evidence is available and failing to distinguish between IED-present and IED-absent EEG populations in the model structure, fundamentally		 Neuronostics is prepared to provide an economic model for the committee's consideration if requested to provide an alternative perspective of the economic analysis	

		predetermines BioEP's modelled value and structurally suppresses its demonstrated clinical utility.			
Neuronostics Ltd, [REDACTED]	12	Downstream EEG savings excluded from base case (Section 6.3.1, pages 102-107). The model acknowledges that BioEP could substantially reduce the number of patients requiring subsequent EEGs (e.g. 230 fewer patients needing further testing in the routine EEG scenario). The EAG notes the cost of BioEP could be fully offset by avoiding 72 routine, 54 ambulatory, or 42 home video telemetry subsequent EEGs (plus associated outpatient appointments). However, this is presented only as a post-hoc plausibility observation rather than being modelled in the base case or as a named scenario. For BioEP, avoiding subsequent EEGs is a core clinical value proposition confirmed by the clinical experts consulted.	The cost of avoided subsequent EEGs should be incorporated into the base case model, or at a minimum presented as a clearly labelled and fully modelled scenario. The EAG should not dismiss this value proposition without modelling it explicitly.	The Neuronostics model explicitly captures downstream EEG savings as a core component. The diagnostic pathway model tracks patients through four phases, with BioEP's probability score influencing which patients proceed to further investigatory EEGs (sleep-deprived, ambulatory, or video telemetry). [REDACTED] [REDACTED] Neuronostics is prepared to provide an economic model for the committee's consideration if requested to provide an alternative perspective of the economic analysis	Thank you for your comment. Please see response to comment number 12 (Redacted EAG comments) and the narrative in section 6.3.1.1. of the EAG report, which comprehensively outlines the number of EEG avoided due to use of BioEP (true negatives). The EAG has also now included costs of a subsequent EEG for all "Unsupportive" and "Inconclusive" terminal nodes within a sensitivity analysis (Appendix B4), to allow further modelling of this.

Neuronostics Ltd, [REDACTED]	13	Treatment pathway costs limited to first-line monotherapy only (Section 6.2.4, Table 19). The model uses only carbamazepine monotherapy (£123.45/year) as the treatment cost. This significantly underestimates the full economic cost of epilepsy management in practice, which includes drug titration, therapeutic drug monitoring, treatment of medication side effects, transition to adjunctive or second-line therapies when first-line fails, and potential surgical evaluation for drug-refractory cases. Using only first-line monotherapy costs means the downstream economic value of reaching the correct diagnosis earlier is substantially compressed.	Treatment pathway costs should be expanded to reflect the full range of epilepsy management costs over the model time horizon, drawing on established NHS epilepsy treatment cost data. The NG217 economic model (Tinelli et al. 2024) and the Bonnon et al. (2026) model for drug-refractory epilepsy (cited in Section 6.1.1) both cover multi-line treatment pathways and should be used to inform more realistic treatment cost inputs.	The Neuronostics model incorporates comprehensive treatment pathway costs sourced from Bonnon et al. (2026). ASM monotherapy cost (£428.47/year, BNF-weighted average) is assigned to Well Controlled and Well Controlled Seizure-Free patients. The cost of 2.5 ASMs (£1,071.18/year) is assigned to Poorly Controlled patients, reflecting multiple treatment lines.	Thank you for your comment. The EAG note that this value of first year treatment costs was sourced from NG217 (see Table 19 of the EAG report). The EAG also note that lower and higher treatment costs were explored in the sensitivity analysis in Appendix B4. Please see also the EAG's response to comment 9 (Redacted EAR comments). Therefore, no changes have been made to the report.
Neuronostics Ltd, [REDACTED]	14	EEG waiting list burden and diagnostic delay not modelled (Section 6.2, pages 75-77). Clinical experts explicitly identified EEG waiting times of 3 weeks to 12 months as the primary bottleneck in the diagnostic pathway. The economic burden of diagnostic delay is not captured in the model at all. This represents a significant omission of value that disproportionately affects BioEP, whose primary mechanism is avoiding the need for further EEGs in	The economic impact of diagnostic delay and waiting list reduction should be modelled using the Markov model structure (Section 6.5) which includes a diagnosis phase. Published evidence on the cost of delayed epilepsy diagnosis in the UK and NHS cost data on epilepsy-related emergency and unplanned care should be used to parameterise this.	The Neuronostics model partially captures the cost of diagnostic delay through its diagnostic pathway structure, which tracks patients through four investigatory phases over a one-year horizon. Patients remaining in the pathway ("not under management") incur higher resource use than managed patients (outpatient attendance 0.38 vs 0.10 per patient per year; inpatient admissions 0.145 vs 0.003). BioEP accelerates pathway resolution by improving clinical confidence through its	See response to comment 8 (Redacted EAR comments).

		patients who have already waited for their initial EEG. Published evidence quantifies both the prevalence and consequences of diagnostic delay in epilepsy. Alessi and Quintas (2021), in a systematic review of 17 studies, found diagnostic delay affected 16–77% of patients, with median delays of 7–25 months and delays exceeding 1 year in 13–16% of patients. The review identified three distinct delay components (decision delay, referral delay, and attendance delay), each of which represents a period of unmanaged disease with associated health and economic costs. Pellinen et al. (2021) documented the consequences of diagnostic delay: 5% of patients experience motor vehicle accidents before diagnosis; 50% experience seizure-related injuries including fractures, lacerations, and burns; there is evidence of accelerated cognitive decline associated with uncontrolled seizure activity; and SUDEP risk remains elevated throughout the pre-diagnostic period. Crucially, the annual healthcare cost for patients with new-onset epilepsy is approximately five times the cost for patients with		probability score, enabling earlier appropriate referral or diagnosis. However, the model does not yet capture indirect costs of diagnostic delay such as driving restriction consequences, employment impacts, SUDEP risk, or mental health burden during the waiting period. These represent additional unmodelled benefits that would further strengthen BioEP's economic case. Neuronostics is prepared to provide an economic model for the committee's consideration if requested to provide an alternative perspective of the economic analysis	

		established epilepsy, reflecting emergency department attendances, unplanned hospitalisations, repeated investigations, and inappropriate treatment trials during the diagnostic period. Kerr et al. (2016) demonstrated that misdiagnosis compounds diagnostic delay: in 297 PNES patients, the mean diagnostic delay was 8.4 years, during which patients received inappropriate anti-seizure medications that exponentially increased time to correct diagnosis with each successive trial. The failure to model these costs means the EAG's analysis systematically excludes a substantial proportion of the economic burden of the current diagnostic pathway. BioEP's mechanism of action has the potential to reduce diagnostic delay by enabling earlier clinical decision-making and reducing the need for sequential further EEG investigations, each of which carries its own waiting time.			
Neuronostics Ltd, [REDACTED]	15	Markov model designed but not populated or run (Section 6.5, pages 118-120). The EAG has designed a full Markov model with separate diagnosis and management phases, covering long-term	Neuronostics requests that the Markov model be populated and run as the primary analysis for the committee's consideration, using the best available evidence for all parameters.	Neuronostics is prepared to provide an economic model for the committee's consideration if requested to provide an alternative perspective of the economic analysis.	See response to comment 8 (Redacted EAR comments) and comment 8 (Economic model comments).

		treatment states, drug resistance, surgical referral, QoL consequences, and mortality - the exact structure needed to capture BioEP's long-term value propositions. The EAG chose not to populate or run this model, citing lack of data and clinical feedback. As a result, the primary analysis (a decision tree with a 1-year utility horizon) is structurally incapable of capturing BioEP's most important value propositions. The EAG itself acknowledges the early model 'was not intended to support routine use guidance' and that the Markov model 'could be used to explore all value propositions in the future, if data were available to support this.'	Neuronostics is prepared to provide data from their own economic model development to support parameterisation.		

Diagnostics Advisory Committee Interests Register

Topic: HTE10086 Software for electroencephalography (EEG) interpretation to support diagnosing epilepsy

NICE's declaration of interest policy can be accessed [here](#)

Name	Role with NICE	Type of interest	Description of interest	Interest arose	Interest declared	Interest ceased	Comments
Tom Clutton-Brock	Standing Committee Member (Chair)	Financial Interests	None	n/a	4 Nov 2025	n/a	No further action
		Non-financial professional and personal interests	None	n/a	4 Nov 2025	n/a	No further action
		Indirect interests	None	n/a	4 Nov 2025	n/a	No further action
Sam Creavin	Standing Committee Member	Financial Interests	None	n/a	4 Nov 2025	n/a	No further action
		Financial Interests	I am working with the FASTBALL study to diagnose dementia using EEG. I am a co applicant on the study. I am being paid.	1 Apr 2023	20 Feb 2026	30 Jun 2027	Declare and participate
		Non-financial professional and	None	n/a	4 Nov 2025	n/a	No further action

		personal interests					
		Indirect interests	None	n/a	4 Nov 2025	n/a	No further action
Matt Stevenson	Standing Committee Member	Financial Interests	None	n/a	4 Nov 2025	n/a	No further action
		Non-financial professional and personal interests	None	n/a	4 Nov 2025	n/a	No further action
		Indirect interests	None	n/a	4 Nov 2025	n/a	No further action
André Nunes	Standing Committee Member	Financial Interests	None	n/a	4 Nov 2025	n/a	No further action
		Non-financial professional and personal interests	None	n/a	4 Nov 2025	n/a	No further action
		Indirect interests	None	n/a	4 Nov 2025	n/a	No further action
Brian Shine	Standing Committee Member	Financial Interests	None	n/a	3 Dec 2025	n/a	No further action
		Non-financial professional and	None	n/a	3 Dec 2025	n/a	No further action

		personal interests					
		Indirect interests	None	n/a	3 Dec 2025	n/a	No further action
Ruth Ajayi	Standing Committee Member	Financial Interests	None	n/a	3 Dec 2025	n/a	No further action
		Non-financial professional and personal interests	None	n/a	3 Dec 2025	n/a	No further action
		Indirect interests	None	n/a	3 Dec 2025	n/a	No further action
John Cairns	Standing Committee Member	Financial Interests	Advising Johnson & Johnson Innovative on multiple myeloma submission	May 2025	2 Dec 2025	May 2025	Declare and participate
			Advice to BeiGene on economic modelling of a treatment for small cell lung cancer	October 2024	2 Dec 2025	September 2025	Declare and participate
			Advice to Johnson & Johnson Innovative on a treatment for generalized myasthenia gravis	October 2025	2 Dec 2025	October 2025	Declare and participate
		Non-financial professional and personal interests	None	n/a	2 Dec 2025	n/a	No further action
		Indirect interests	None	n/a	2 Dec 2025	n/a	No further action

Joy Allen	Standing Committee Member	Financial Interests	Employee of Roche Diagnostics	Aug 2021	2 Dec 2025	Present	Declare and participate
		Non-financial professional and personal interests	None	n/a	2 Dec 2025	n/a	No further action
		Indirect interests	None	n/a	2 Dec 2025	n/a	No further action
Neil Hawkins	Standing Committee Member	Financial Interests	I am a director a company that provides consultancy regarding health technology assessment to pharmaceutical and biotech companies. No services have been provided to any of the potential stakeholders that I have been made aware of or in respect to the technologies being assessed	2019	2 Dec 2025	Ongoing	Declare and participate
		Non-financial professional and personal interests	None	n/a	2 Dec 2025	n/a	No further action
		Indirect interests	None	n/a	2 Dec 2025	n/a	No further action
Michael Morton	Standing Committee Member	Financial Interests	None	n/a	2 Dec 2025	n/a	No further action
		Non-financial professional and personal interests	None	n/a	2 Dec 2025	n/a	No further action

		Indirect interests	None	n/a	2 Dec 2025	n/a	No further action
Amit Parekh	Standing Committee Member	Financial Interests	None	n/a	4 Dec 2025	n/a	No further action
		Non-financial professional and personal interests	None	n/a	4 Dec 2025	n/a	No further action
		Indirect interests	None	n/a	4 Dec 2025	n/a	No further action
Alex Novak	Standing Committee Member	Financial Interests	None	n/a	2 Dec 2025	n/a	No further action
		Non-financial professional and personal interests	None	n/a	2 Dec 2025	n/a	No further action
		Indirect interests	None	n/a	2 Dec 2025	n/a	No further action
Andrew Renehan	Standing Committee Member	Financial Interests	None	n/a	3 Dec 2025	n/a	No further action
		Non-financial professional and	None	n/a	3 Dec 2025	n/a	No further action

		personal interests					
		Indirect interests	None	n/a	3 Dec 2025	n/a	No further action
Farai Goromonzi	Standing Committee Member	Financial Interests	None	n/a	23 January 2026	n/a	No further action
		Non-financial professional and personal interests	None	n/a	23 January 2026	n/a	No further action
		Indirect interests	None	n/a	23 January 2026	n/a	No further action
Jonathan Weir-McCall	Standing Committee Member	Financial Interests	Private practice: Royal Papworth Private Radiology Group	01-AUG-2018	8 Dec 2025	30-Jun-2025	Declare and participate
			Private practice: Royal Brompton Hospital	01-JUL-2025	8 Dec 2025		Declare and participate
		Non-financial professional and personal interests	President Elect and Charity Trustee, British Society of Cardiovascular Imaging (this also functions as the Specialist Interest Group of the Royal College of Radiologists).	01-SEP-2022	8 Dec 2025		Declare and participate
			Charity Trustee, British Society of Cardiovascular Magnetic Resonance	01-SEP-2023	8 Dec 2025		Declare and participate
			Guideline committee member, Society of Cardiovascular Computed Tomography	01-AUG-2021	8 Dec 2025		Declare and participate

		Indirect interests	Board of Directors, Society of Cardiovascular Computed Tomography	01-JUL-2023	8 Dec 2025		Declare and participate
Kate Xu	Standing Committee Member	Financial Interests	None	n/a	27 January 2026	n/a	No further action
		Non-financial professional and personal interests	None	n/a	27 January 2026	n/a	No further action
		Indirect interests	None	n/a	27 January 2026	n/a	No further action
Keith Abrams	Standing Committee Member	Financial Interests	Partner & Director, Visible Analytics Limited – HTA Consultancy company (not involved in any diagnostics projects VA are undertaking or projects related to eating disorders)	01.05.2019	20 April 2026		Declare and participate
			Consultant to Bayer – surrogacy in prostate cancer	01.09.2024	20 April 2026		Declare and participate
			Consultant to Roche – Bayesian dynamic borrowing	01.10.2024	20 April 2026		Declare and participate
			Consultant to NICE – Surrogacy in AML	01.10.2024	20 April 2026	30.01.2025	Declare and participate
			Advisory Boards – Johnson & Johnson - Relapsed Lenalidomide-Refractory Multiple Myeloma	01.02.2026	20 April 2026		Declare and participate
			Advisory Board - Novartis - Secondary Progressive Multiple Sclerosis (SPMS)	16.12.2025	20 April 2026	16.12.2025	Declare and participate
			Advisory Boards – UCB/Paraxel - antibody-positive generalised myasthenia gravis	01.12.2025	20 April 2026		Declare and participate

			Advisory Boards – Abbvie - acute migraine	28.10.2025	20 April 2026		Declare and participate
			Advisory Board - Teva/Sanofi - Inflammatory Bowel Disease (IBD) inclusive of Ulcerative Colitis (UC) and Crohn's Disease (CD)	13.11.2025	20 April 2026	13.11.2025	Declare and participate
			Advisory Board – Deciphre/ReMap – Methods advice	12.11.2025	20 April 2026	12.11.2025	Declare and participate
			Advisory Board – Daiichi-Sankyo/SourceHE – Gastric Cancer	16.04.2026	20 April 2026	16.04.2026	Declare and participate
		Non-financial professional and personal interests	Oct 2022 - date: NIHR i4i Cytecom Limited (a diagnostics company) via University of Warwick, value £1.3M	01.20.2022	20 April 2026		Declare and participate
			July 2024 – date: NIHR i4i OLS Real World Evidence Programme DDM Health Limited, digital company providing digital pathway Gro Health W8Buddy (in obesity) via University of Warwick £1.6M	01.07.2024	20 April 2026		Declare and participate
			Member, NICE DTSU	01.10.2005	20 April 2026		Declare and participate
			Member, West Midlands (formerly Warwick Evidence) EAG Strategic Advisory Committee	01.01.2023	20 April 2026		Declare and participate
			£6.1M EU Horizon 2023 (4 years) Interests form (advisory committees) October 2022 4 of 5 Mader J, Choudhary P, Kjær J, Haardt J, Valabhji J, Adler A, TorpPedersen C, Müllenborn M, Rogers G, Abrams K, Vettoretti M, Lind M, de Galan B, Holl R: Real-world Evidence for Decisions in Diabetes (REDDIE)	01.01.2023	20 April 2026		Declare and participate
			£450K MRC/NIHR Better Methods, Better Research 2024 (3 years) Kimani P, Stallard N, Abrams KR, Metcalfe A, Chataway J: Efficient and unbiased estimation in adaptive platform trials.	01.10.2023	20 April 2026		Declare and participate

		Indirect interests	None	n/a	20 April 2026	n/a	No further action
Patrick McGinley	Standing Committee Member	Financial Interests	I provide paid ad hoc financial advice on payment and costing systems in NHS to MTech Access. This does not include either any company involved using AI software for electroencephalogram (EEG) interpretation in epilepsy.	January 2020	20 Jan 2026	Ongoing	Declare and participate
		Non-financial professional and personal interests	None	n/a	20 Jan 2026	n/a	No further action
		Indirect interests	Hon Treasurer of Association for the Study of Obesity (ASO)	October 2020	20 Jan 2026	Ongoing	Declare and Participate
Rashmi Kumar	Standing Committee Member	Financial Interests	None	n/a	21 January 2026	n/a	No further action
		Non-financial professional and personal interests	None	n/a	21 January 2026	n/a	No further action
		Indirect interests	None	n/a	21 January 2026	n/a	No further action
Michael Mackenzie		Financial Interests	None	n/a	May 2026	n/a	No further action

	Standing Committee Member	Non-financial professional and personal interests	Committee member, International Executive Committee, Royal College of Physicians Edinburgh Committee member, Rural and Remote Medicine, Royal College of Physicians of Edinburgh		May 2026		Declare and participate
		Indirect interests	None	n/a	May 2026	n/a	No further action
Darren Kell	Standing Committee Member (MTAC)	Financial Interests	Currently employed by ScubaTx a medical device startup company developing a device for donor heart preservation		April 2024		Declare and observe
David Holder	Professional Expert	Financial Interests	Nil	n/a	06/11/2025	n/a	No further action
		Non-financial professional and personal interests	Nil relevant. I am a clinical academic with a chair in Biophysics and Clinical Neurophysiology. I undertake research into the development of new methods for investigating and imaging brain and nerve function. Therefore this topic is of direct interest to me, as I am also a practitioner in Clinical Neurophysiology undertaking EEG reporting. However, my interest in the topic – AI in EEG reporting – is entirely objective as I have no vested interest other than objective evaluation.	Consultant since 1997, Chair 2007	06/11/2025	Still active in full employment	Declare and participate
		Non-financial professional and personal interests	Spinout Cyqiq Ltd. In 2020, I started a spinout based in my research laboratory in Medical Physics at UCL. The purpose of this is to assist in development of new methods for imaging nervous system function, relating to work in my research group on the new technique of EIT (electrical impedance tomography). The aim of the spinout is to make prototype systems available for use by interested collaborators, and raise funds for research in the academic group. It is known to and supported by the Head of Department and the UCL tech transfer arm (UCLb). However, it has no activity in EEG or the use of AI and so no conflict of interest arises.	2020	06/11/2025	active	Declare and participate

		Indirect interests	Nil	n/a	06/11/2025	n/a	No further action
Richard Grunewald	Professional Expert	Financial Interests	Nil	n/a	07/11/2025	n/a	No further action
		Non-financial professional and personal interests	Nil	n/a	07/11/2025	n/a	No further action
		Indirect interests	Nil	n/a	07/11/2025	n/a	No further action
Phil Tittensor	Professional Expert	Financial Interests	Advisory board for pharmaceutical product, Alturix Pharma	16/12/2025	01/12/2025	16/12/2025	Declare and participate
		Financial Interests	European seizure freedom advisory board – Angelini Pharma	23/07/2024	01/12/2025	01/07/2025	Declare and participate
		Financial Interests	Nurse education advisory board – Jazz Pharma	01/10/2025	01/12/2025	14/03/2026	Declare and participate
		Financial Interests	Author honoraria – Karger Publishing	01/03/2023	01/12/2025	Ongoing	Declare and participate
		Financial Interests	Speaker honoraria - Jazz Pharma	20/03/2025	01/12/2025	21/03/2025	Declare and participate
		Non-financial professional and personal interests	Researcher and clinical lead – ATMOSPHERE project re: seizure forecasting technology	Mar-23	01/12/2025	Ongoing	Declare and participate

		Non-financial professional and personal interests	UK PI REACH – European post marketing study of cenobamate – Angelini Pharma	28/02/2025	01/12/2025	Ongoing	Declare and participate
		Non-financial professional and personal interests	CI PRISTINE trial, PI ECLIPSE trial, CI real world clinical evaluation, of BioEP algorithm to analyse non-contributory EEG - Neuronostics - PROVIDED MORE DETAILS, EMAIL SAVED IN HIS FOLDER	Jun-23	01/12/2025	Ongoing	Declare and participate
		Non-financial professional and personal interests	CI and senior clinician X-SEPT, AI algorithm to use music as treatment for epilepsy – X-Systems	Sep-23	01/12/2025	Ongoing	Declare and participate
		Non-financial professional and personal interests	CI LEG-RTC trial of implantable EEG to enable rapid treatment changes - UNEEG	Jan-25	01/12/2025	Ongoing	Declare and participate
		Indirect interests	Chairperson - Epilepsy Nurses Association – ESNA. UK and Ireland based professional organisation for the development of guidelines, standards, competencies and education, primarily for nurses with interest in epilepsy	Jun-15	01/12/2025	Ongoing	Declare and participate
		Indirect interests	Researcher Cornwall Intellectual Disabilities Equitable Research group - CIDER	Jun-25	01/12/2025	Ongoing	Declare and participate
		Indirect interests	Member – N-Code. Multi-disciplinary research group involved with using AI & ML to solve neurological challenges	Mar-23	01/12/2025	Ongoing	Declare and participate

		Indirect interests	Member – International League Against Epilepsy British Branch (ILAE). Premier global professional multi-disciplinary organisation for epilepsy, involved in setting, standards, guidelines and terminology as well as providing world leading educational resources.	1998	01/12/2025	Ongoing	Declare and participate
Krishna Das	Professional Expert	Financial Interests	Nil	n/a	05/11/2025	n/a	No further action
		Non-financial professional and personal interests	Nil	n/a	05/11/2025	n/a	No further action
		Indirect interests	Nil	n/a	05/11/2025	n/a	No further action
Sarah Eglese	Professional Expert	Financial Interests	Nil	n/a	10/12/2025	n/a	No further action
		Non-financial professional and personal interests	Nil	n/a	10/12/2025	n/a	No further action
		Indirect interests	Nil	n/a	10/12/2025	n/a	No further action
Helen Cross	Professional Expert	Financial Interests	Nil	n/a	21/11/2025	n/a	No further action
		Non-financial professional and	Immediate Past President (elected) International League Against Epilepsy	2025	21/11/2025	n/a	Declare and participate

		personal interests					
		Non-financial professional and personal interests	Chair Medical Board Matthews Friends (ketogenic diet charity)	2011	21/11/2025	n/a	Declare and participate
		Non-financial professional and personal interests	Chair Medical Board Dravet Syndrome UK	2015	21/11/2025	n/a	Declare and participate
		Non-financial professional and personal interests	Clinical Advisor to Childrens Epilepsy Surgery Service	2012	21/11/2025	n/a	Declare and participate
		Indirect interests	Clinical investigator on clinical trial of treatments, payment to institution, for the following Encoded Stoke Therapeutics Ultragenyx Epigenyx UCB	2024 2023 2023 2024 2023	21/11/2025	n/a	Declare and participate
Peter Walsh	Professional Expert	Financial Interests	Consultant Clinical Scientist Grey Walter Department of Clinical Neurophysiology Southmead Hospital Noeth Bristol NHS Trust	March 1994	03/12/2025	Ongoing	Declare and participate
		Non-financial professional	Association of Neurophysiological Scientists Council Member	Sept 2000	03/12/2025	Ongoing	Declare and participate

		nal and personal interests					
			British Society of Clinical Neurophysiology Member	Sept 2008	03/12/2025	Ongoing	Declare and participate
		Indirect interests	Nil	n/a	03/12/2025	n/a	No further action
Joel Winston	Professional Expert	Financial Interests	I am the co-founder of a neurotech company ("NeuralPulse") that uses some AI methodology to predict epileptic seizures	June 2025	21/11/2025	N/A	Declare and participate
		Financial Interests	I supervise a part-time clinical fellow who is funded by Jazz Pharmaceuticals	September 2024	21/11/2025	N/A	Declare and participate
		Indirect interests	I have a manuscript in preparation with colleagues from Birmingham University on differentiating patients with epilepsy from patients with non-epileptic attacks using quantitative EEG measures (and AI). One of the co-authors is Wessel Woldman who is also affiliated with Neuronostics who are active commercially in the AI/EEG space. I don't have any affiliation to or other connection with Neuronostics, but this seemed worth mentioning. None of the work we are doing together is directly related to Neuronostics' commercial product.) No financial arrangement; it's a research collaboration (I guess you can say that is part of my paid employment as an academic at KCL). My first involvement was in July 2024 and we are currently writing the manuscript, hopefully to be published over the next year. I don't actually know the extent to which this has anything to do with Neuronostics as the direct collaboration is between academics at KCL and Birmingham. One of these academics is Wessel Woldman who is involved with Neuronostics and will list this as one of his affiliations on the paper.	July 2024	09/01/2026	to be published over the next year	Declare and participate

		Non-financial professional and personal interests	I am involved in research projects that use AI in epilepsy and EEG but none that currently overlap significantly with the technology under review here. Funding sources include Canadian Institutes for Health Research, Epilepsy Research Institute/Angelini Pharma, and the King's College Hospital Charity." (The background here is that Angelini Pharma co-sponsored a grant that was awarded and administered by the Epilepsy Research Institute.)	September 2021	21/11/2025 updated on 8 May 2026	-	Declare and participate
		Indirect interests	Nil	n/a	21/11/2025	n/a	No further action
Brython Hywel	Professional Expert	Financial Interests	I am a consultant neurologist and clinical neurophysiologist working in the NHS, reporting EEGs. I use Persyst and Autoscore in this capacity.	2019	27/11/2025	Ongoing	Declare and participate
		Financial Interests	I undertake private neurology and nerve conduction and electromyography. I do not currently undertake private EEG.	2023	27/11/2025	Ongoing	Declare and participate
		Non-financial professional and personal interests	Education Chair, British Society for Clinical Neurophysiology	2023	27/11/2025	Ongoing	Declare and participate
		Non-financial professional and personal interests	ABN Services committee member.	2023	27/11/2025	Ongoing	Declare and participate
		Non-financial professional and personal interests	Chief Clinical Information Officer, The Walton Centre NHS Foundation Trust	2024	27/11/2025	Ongoing	Declare and participate

		Indirect interests	Michael Wright, from Natus, a supplier of Autoscore, nominated me for this position.	November 2025	27/11/2025		Declare and participate
Emma Campbell	Patient Expert	Financial Interests	Paid employment in the School of Medicine at the University of Nottingham (current role is Senior Research Fellow on an NIHR-funded programme grant called Rapid Eczema Trials).	Feb-13	11/12/2025	ongoing	Declare and participate
		Financial Interests	Occasional voucher or payment from epilepsy charities for PPI work.	Aug-22	11/12/2025	ongoing	Declare and participate
		Non-financial professional and personal interests	Nil	n/a	11/12/2025	n/a	No further action
		Indirect interests	My 17 year-old daughter has epilepsy	Aug-22	11/12/2025	ongoing	No further action
William Welbank	Patient Expert	Financial Interests	Holder of shares in GSK	2021	10/12/2025	to date	Declare and participate
		Financial Interests	Holder of shares in AstraZeneca	2021	10/12/2025	to date	Declare and participate
		Non-financial professional and personal interests	Volunteer Befriender with the Charity 'Epilepsy Action' to give Peer Support for people with Epilepsy.	Oct-24	10/12/2025	to date	Declare and participate
		Indirect interests	Nil	n/a	10/12/2025	n/a	No further action

Rebecca Longley	Patient Expert	Financial Interests	Nil	n/a	10/12/2025	n/a	No further action
		Non-financial professional and personal interests	Nil	n/a	10/12/2025	n/a	No further action
		Indirect interests	Nil	n/a	10/12/2025	n/a	No further action

Standing Committee DOIs to be checked again when MS form for the committee meeting is completed.

Health Tech Programme

Diagnostics Advisory Committee

**HTG10086 Software for electroencephalography (EEG) interpretation to support
diagnosing epilepsy**

This document contains the Professional Expert Questionnaires submitted by all individuals who have been appointed to the role of professional expert for this evaluation.

4

Anonymous

33:51

Time to complete

This questionnaire is only to be completed and submitted by Health and care practitioners

This questionnaire should be completed by those whose role is, or is directly related to, one of the specialisms below. For each assessment, we engage with professionals with expertise relevant to the topic under evaluation. By completing this questionnaire, you acknowledge and consent to being considered for the role of professional expert on this assessment.

Please indicate which option best describes your area of expertise. If there is no option which you feel relates to your role, please select 'Other' and let us know your role and why you think we should include your knowledge and expertise on the assessment.

For expressions of interest and/or to share your lived experience please email pjp@nice.org.uk

Note:

This questionnaire will be saved if you submit a response. If you wish to edit any responses, you can do so until the response deadline **2 December 2025**.

Please ensure all necessary edits or amendments are completed on your questionnaire before the portal close date. All submissions will be downloaded after the deadline, and the portal will then be locked. Any changes made after the closing date will not be included in the final submission.

<https://techcommunity.microsoft.com/blog/microsoftformsblog/you-can-now-save-and-edit-your-survey-responses/3865033>

Which option below best relates to your own role? You will be asked to supply your job title and organisation in the next section.

If your role is not listed but you feel it ought to be included, please select 'Other' and let us know your role and why you think we should include your knowledge and expertise on the assessment. *

- ☐ Clinical physiologist
- ☐ Consultant clinical neurophysiologist
- ☐ Consultant neurologist
- ☐ Consultant paediatrician neurologist
- ☐ Consultant physiologist
- ☐ Epilepsy specialist nurse
- ☐ GP
- ☒ I am both a Consultant

Name: *

KRISHNA DAS

Job title *

Consultant Clinical Neurophysiology

Organisation *

Great Ormond Street Hospital for Children, London

Email Address *

Professional organisation or society membership/affiliation *

BSCN,BPNA

Nominated/ratified by (if applicable) *

NA

Registration number, and issuing organisation (e.g. GMC, NMC, HCPC) *

6032340

NOTES ON COMPLETING THE FORM

How NICE will use this information: The information that you provide on this form may be used to develop guidance on this topic.

Your advice and views represent your individual opinion and not that of your employer, professional society or a consensus view. Where relevant your name, job title, organisation and your responses, along with your declared interests may be published online on the NICE website as part of public consultation on the draft guidance, except in circumstances but not limited to, where comments are considered voluminous, or publication would be unlawful or inappropriate.

Please note: if you do not agree to the terms of the Personal Declaration (Section 3) or Confidentiality Agreement and Undertaking (Section 4-6), you will not be considered for the role of professional expert on this assessment.

For more information about how we process your data, please see the privacy notice on the NICE website: www.nice.org.uk/privacy-notice

Personal Declaration

The personal data submitted on this form will be used to record your agreement to the terms set out in this document.

For more information about how we process your data, please see the privacy notice on the NICE website: www.nice.org.uk/privacy-notice

I confirm that:

- I am a registered practising professional in the UK/NHS and in good professional standing
- I have specialist knowledge in the technology or disease area
- I will declare all conflicts of interest in relation to the technology under consideration
- I will abide by NICE's governance policies and comply with NICE's processes and methods
- I will abide by the scoping phase timelines for this assessment and will endeavour to engage in the assessments full schedule once known.

Personal data submitted to NICE can be used for the purposes of producing guidance in the HealthTech Programme. Personal data will be held on NICE's databases, and I may be contacted in the future by NICE after the completion of this topic. I understand that this information may be disclosed to the External Assessment Group (EAG) and Advisory Committee undertaking the assessment. I agree that my name, job title and organisational affiliation can appear on relevant documents in the assessment process and these may be posted on the NICE website along with any declared interests. I agree where relevant to my submitted Professional Expert Questionnaire being published on the NICE website. *

☒ Yes

☐ No

Name *

Krishna Das

Date *

11/5/2025



Confidentiality Agreement and Undertaking

The personal data submitted on this form will be used to record your agreement to the terms set out in this document.

For more information about how we process your data, please see the privacy notice on the NICE website: www.nice.org.uk/privacy-notice

By completing this Form,

1. I acknowledge that information may be disclosed to me in relation to my participation in NICE's consultation process which is confidential ("**Confidential Information**"). Often this material will be commercially sensitive, or provided to NICE on an academic-in-confidence basis (for example research that has not yet been published). Confidential Information may include, but is not limited to:

- (a) the fact that a technology has been notified to the programme and is being considered for NICE advice and/or NICE guidance
- (b) a medtech innovation briefing draft document;
- (c) medical technology guidance draft documents (including but not limited to scope, assessment report, overview, consultation, final guidance, reviews and updates);
- (d) information relating to the existence, content or outcome of confidential discussions.

Confidentiality Agreement and Undertaking

2. Subject to paragraph 3 below, I undertake to NICE that I shall:

- (a) keep all Confidential Information strictly confidential and, except as expressly permitted under this agreement shall not disclose, use, copy in whole or in part or modify or adapt any Confidential Information in any way without NICE's prior written consent which may be given or withheld in its absolute discretion;
- (b) not use any Confidential Information for any purpose other than participating in the consultation process and any appeal that we may lodge;
- (c) return all Confidential Information to NICE on written demand; and
- (d) in the event that NICE authorises any disclosure of Confidential Information by me to a third party I shall procure that such third party complies with this agreement as if he were a party to it.

3. The undertakings set out in paragraph 2 above ("the **Undertakings**") shall not apply to information which:

- (a) is in the public domain otherwise than through a breach of any of the Undertakings or a breach of any other confidentiality obligation owed by any person to NICE;
- (b) was lawfully within my possession before it was disclosed to me by NICE and neither I nor my alternative source of the information owed any confidentiality obligation to the Institute in respect of it;
- (c) is required to be disclosed by any court of competent jurisdiction or any government agency lawfully requesting the same provided that I use my best endeavours to notify NICE in advance of such disclosure; or
- (d) is approved for release by prior written authorisation of NICE.

Confidentiality Agreement and Undertaking

4. I acknowledge that:

- (a) breach by me of any of the Undertakings could cause NICE harm that is irreparable and that cannot be compensated by damages, and that in the event of any actual or threatened breach by me of any Undertaking NICE shall be entitled to apply for and obtain (regardless of any rights NICE may have to claim damages) an injunction or other equitable relief against me;
- (b) this agreement constitutes the entire agreement between myself and NICE relating to the Confidential Information;
- (c) any amendments to or waiver of any of the terms of this agreement must be set out in writing and signed by me and on behalf of NICE;
- (d) this agreement is governed by English law and subject to the exclusive jurisdiction of the English courts.

Please indicate if you would like to **opt in** to NICE contacting you regarding other technologies/treatments in the future for your advice, or if you would **only** like to be contacted regarding this specific technology: *

- ☒ Yes, I agree that NICE can use my contact details to contact me for future requests for advice
- ☐ No, I agree that NICE can use my details to contact me for advice on this topic only, but not for others.

Name *

KRISHNA DAS

Date *

11/5/2025



Organisation name (if applicable) *

GREAT ORMOND STREET HOSPITAL FOR CHILDREN, LONDON

Experience

Please answer the following questions as fully as possible to provide further information about the procedure/technologies and/or your experience

Please describe your level of experience with the procedure/technologies, for example:

- Are you familiar with the procedure/technologies?
- Have you used it or are you currently using it? If so, please indicate your experience with this.
- Do you know how widely this procedure/technology is used in the NHS? Is this procedure/technology performed/used by clinicians in specialities other than your own?

I am a Consultant Clinical Neurophysiologist and Paediatric Neurologist . My daily job involves interpretation of all types of EEG studies in children (routine, prolonged, Videotelemetry & invasive recordings). Some of the EEG review software use AI related technologies to aid interpretation. I have some familiarity with Persyst , one of the available commercial EEG analysis software systems .

Please indicate your research experience relating to this procedure or technology (please choose one or more if relevant): (Please highlight your choice(s))

- ☐ I have done bibliographic research on this procedure or technology
- ☐ I have done research on this procedure or technology in laboratory settings (e.g. device-related research).
- ☐ I have done clinical research on this procedure or technology involving patients or healthy volunteers.
- ☐ I have published this research.
- ☒ I have had no involvement in research on this procedure or technology.
- ☐ Other _____

Current management

Please describe the current standard of care that is used in the NHS. Please note any clinical guidelines used in the NHS which are relevant to the care pathway. What setting would this technology be used in (primary care, general hospitals, specialist centres for example).

This technology is sparsely used at present - mainly for seizure detection in prolonged EEG recordings , especially in ITU settings and Videotelemetry units

Does this procedure/technology have the potential to replace current standard care or would it be used as an addition to existing standard care? Where would the technologies/procedure fit in the care pathway?

Yes . Think initially for prolonged EEG recordings. If proven reliable , could be rolled out for shorter studies.

- What are the main aims of these procedures or technologies?
- How innovative are they?
- Can you name any technologies which are available in the UK and have this function/mode of action?
- Are there any competing or alternative procedures available to the NHS which have a similar function/mode of action to this?
- If so, how do these differ from the technology/procedure indicated here?

To reduce EEG interpretation time and waiting times
 Improve accuracy and set standards
 Persyst is a commercially available software used in some centres
 Aim would be use it routinely in all EEG recordings

Approximately how many people each year would be eligible for an intervention with this procedure/technology, (give either as an estimated number, or a proportion of the target population)?

Depends on what types of EEG recordings it will be used in.
Routine EEGs - several thousands/yr
Videotelemetry - thousands/yr
Prolonged /ITU recordings - several hundreds/yr

Potential patient benefits and impact on the health system

What do you consider to be the potential benefits to patients from using this procedure/technology?

reduced waiting times for EEG interpretation & results
leading less waiting times overall

- Are there any groups of patients who would particularly benefit from this procedure/technology?
- Are there any groups in which the technology would be less effective or would be less likely to benefit?
- Are there any potential equality issues that should be considered for this condition and procedure/technology?

should benefit all groups of patients having an EEG

- What do you consider to be the potential benefits to the system from using this procedure/technology?
- Could it lead, for example, to a reduced number of appointments, improved care pathway, more efficient NHS staff time use?

more efficient use of resources
reduced waiting times

What clinical facilities (or changes to existing facilities) are needed to do this procedure/implement this technology safely?

Nil

Is any specific training needed in order to use the procedure/technology with respect to efficacy or safety?

staff will need to be trained up in the use of this software(s) accurately

Safety and efficacy of the procedure/technologies

What are the potential harms of the procedure/technology?

- Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence:
- Adverse events reported in the literature (if possible, please cite literature)
- Anecdotal adverse events (known from experience)
- Theoretical adverse events

Sensitivity and specificity of this technology needs to be established
Should not miss seizures - if untreated, can cause harm
Should not overinterpret - leading to false positives - wrong management decisions will be taken
Spike counts can be unreliable

Please list the key efficacy and safety outcomes for this procedure/technology? Please suggest the most appropriate method of measurement for these outcomes and the timescales over which these should be measured (where appropriate) and if there are any challenges in collecting key outcomes.

Accurate Seizure detection rates
Differentiate from other types of events
Spike counts should be accurate

Please list any uncertainties or concerns about the efficacy and safety of this procedure/technology?

All the above are not established satisfactorily for routine clinical care
False positives & true negatives are an issue

Are you aware of any additional issues which would prevent (or have prevented) this procedure/technology being adopted in your organisation or across the wider NHS? This could include costs, resource, staffing for example.

Reliability of the technology

Please list any abstract, real-world evidence, conference proceedings or any major trials or registries that you are aware of for this topic.

Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important. If you would like to share any studies which are confidential due to their publication status, please contact us via email.

No answer provided.

Is there any research that you feel would be needed to address uncertainties in the evidence base?

most products are commercial software. So their accuracy needs to be independently verified

Further Comments

Please add any further comments on your particular experiences or knowledge of the procedure/technology.

it is highly variable, works for some studies, but not for all

Thank you for completing the professional expert questionnaire.

Applicants for the role of professional expert will also be asked to complete a declaration of interests form as part of the application process, which will be emailed to the address shared on this form.

Your contribution will now be reviewed by the NICE team.

5

Anonymous

26:27

Time to complete

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- ☐ Clinical physiologist
- ☒ Consultant clinical neurophysiologist
- ☐ Consultant neurologist
- ☐ Consultant paediatrician neurologist
- ☐ Consultant physiologist
- ☐ Epilepsy specialist nurse
- ☐ GP
- ☐ Other

Name: *

David Holder

Job title *

Professor of Biophysics and Clinical Neurophysiology

Organisation *

University College London

Email Address *

Professional organisation or society membership/affiliation *

BSCN

Nominated/ratified by (if applicable) *

NA

Registration number, and issuing organisation (e.g. GMC, NMC, HCPC) *

GMC 2442028

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I confirm that:

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- I have specialist knowledge in the technology or disease area
- I will declare all conflicts of interest in relation to the technology under consideration
- I will abide by NICE's governance policies and comply with NICE's processes and methods
- I will abide by the scoping phase timelines for this assessment and will endeavour to engage in the assessments full schedule once known.

Personal data submitted to NICE can be used for the purposes of producing guidance in the HealthTech Programme. Personal data will be held on NICE's databases, and I may be contacted in the future by NICE after the completion of this topic. I understand that this information may be disclosed to the External Assessment Group (EAG) and Advisory Committee undertaking the assessment. I agree that my name, job title and organisational affiliation can appear on relevant documents in the assessment process and these may be posted on the NICE website along with any declared interests. I agree where relevant to my submitted Professional Expert Questionnaire being published on the NICE website. *

☒ Yes

☐ No

Name *

David Holder

Date *

11/5/2025



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- (b) a medtech innovation briefing draft document;
- (c) medical technology guidance draft documents (including but not limited to scope, assessment report, overview, consultation, final guidance, reviews and updates);
- (d) information relating to the existence, content or outcome of confidential discussions.

Confidentiality Agreement and Undertaking

2. Subject to paragraph 3 below, I undertake to NICE that I shall:

- (a) keep all Confidential Information strictly confidential and, except as expressly permitted under this agreement shall not disclose, use, copy in whole or in part or modify or adapt any Confidential Information in any way without NICE's prior written consent which may be given or withheld in its absolute discretion;
- (b) not use any Confidential Information for any purpose other than participating in the consultation process and any appeal that we may lodge;
- (c) return all Confidential Information to NICE on written demand; and
- (d) in the event that NICE authorises any disclosure of Confidential Information by me to a third party I shall procure that such third party complies with this agreement as if he were a party to it.

3. The undertakings set out in paragraph 2 above ("the **Undertakings**") shall not apply to information which:

- (a) is in the public domain otherwise than through a breach of any of the Undertakings or a breach of any other confidentiality obligation owed by any person to NICE;
- (b) was lawfully within my possession before it was disclosed to me by NICE and neither I nor my alternative source of the information owed any confidentiality obligation to the Institute in respect of it;
- (c) is required to be disclosed by any court of competent jurisdiction or any government agency lawfully requesting the same provided that I use my best endeavours to notify NICE in advance of such disclosure; or
- (d) is approved for release by prior written authorisation of NICE.

Confidentiality Agreement and Undertaking

4. I acknowledge that:

- (a) breach by me of any of the Undertakings could cause NICE harm that is irreparable and that cannot be compensated by damages, and that in the event of any actual or threatened breach by me of any Undertaking NICE shall be entitled to apply for and obtain (regardless of any rights NICE may have to claim damages) an injunction or other equitable relief against me;
- (b) this agreement constitutes the entire agreement between myself and NICE relating to the Confidential Information;
- (c) any amendments to or waiver of any of the terms of this agreement must be set out in writing and signed by me and on behalf of NICE;
- (d) this agreement is governed by English law and subject to the exclusive jurisdiction of the English courts.

Please indicate if you would like to **opt in** to NICE contacting you regarding other technologies/treatments in the future for your advice, or if you would **only** like to be contacted regarding this specific technology: *

- ☒ Yes, I agree that NICE can use my contact details to contact me for future requests for advice
- ☐ No, I agree that NICE can use my details to contact me for advice on this topic only, but not for others.

Name *

david Holder

Date *

11/5/2025



Organisation name (if applicable) *

UCL

Experience

Please answer the following questions as fully as possible to provide further information about the procedure/technologies and/or your experience

Please describe your level of experience with the procedure/technologies, for example:

- Are you familiar with the procedure/technologies?
- Have you used it or are you currently using it? If so, please indicate your experience with this.
- Do you know how widely this procedure/technology is used in the NHS? Is this procedure/technology performed/used by clinicians in specialities other than your own?

Highly experienced in EEG use in clinical Neurology, also technical aspects through bioengineering research

Please indicate your research experience relating to this procedure or technology (please choose one or more if relevant): (Please highlight your choice(s))

- ☒ I have done bibliographic research on this procedure or technology
- ☒ I have done research on this procedure or technology in laboratory settings (e.g. device-related research).
- ☒ I have done clinical research on this procedure or technology involving patients or healthy volunteers.
- ☒ I have published this research.
- ☐ I have had no involvement in research on this procedure or technology.
- ☐ Other _____

Current management

Please describe the current standard of care that is used in the NHS. Please note any clinical guidelines used in the NHS which are relevant to the care pathway. What setting would this technology be used in (primary care, general hospitals, specialist centres for example).

Standard BSCN guidelines on technical performance and also EEG interpretation

Does this procedure/technology have the potential to replace current standard care or would it be used as an addition to existing standard care? Where would the technologies/procedure fit in the care pathway?

Additional technique to human interpretation

- What are the main aims of these procedures or technologies?
- How innovative are they?
- Can you name any technologies which are available in the UK and have this function/mode of action?
- Are there any competing or alternative procedures available to the NHS which have a similar function/mode of action to this?
- If so, how do these differ from the technology/procedure indicated here?

This is AI methods to automate EEG interpretation. These methods are usefull but currently not sufficiently reliable to replace human guidance - they may become so in the future. They could save time and might also improve accuracy.

Approximately how many people each year would be eligible for an intervention with this procedure/technology, (give either as an estimated number, or a proportion of the target population)?

I do not know the total provision of EEG recordings annually in the UK but could estimate it is ~50000.

Potential patient benefits and impact on the health system

What do you consider to be the potential benefits to patients from using this procedure/technology?

No answer provided.

- Are there any groups of patients who would particularly benefit from this procedure/technology?
- Are there any groups in which the technology would be less effective or would be less likely to benefit?
- Are there any potential equality issues that should be considered for this condition and procedure/technology?

Any patient requiring EEG, and especially the smaller subgroup who require continuous recording over many hours or days to monitor for epileptic seizures. Reviewing these latter is time consuming for EEG physiologists. An automatic method could save time.

- What do you consider to be the potential benefits to the system from using this procedure/technology?
- Could it lead, for example, to a reduced number of appointments, improved care pathway, more efficient NHS staff time use?

As above. It could lead to improved diagnostic accuracy. I doubt in the short term it would save cost.

What clinical facilities (or changes to existing facilities) are needed to do this procedure/implement this technology safely?

merely purchase of additional software and training in its use

Is any specific training needed in order to use the procedure/technology with respect to efficacy or safety?

Yes as above

Safety and efficacy of the procedure/technologies

What are the potential harms of the procedure/technology?

- Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence:
- Adverse events reported in the literature (if possible, please cite literature)
- Anecdotal adverse events (known from experience)
- Theoretical adverse events

It could well be harmful if it is employed by practitioners without adequate training as a cost-saving exercise

Please list the key efficacy and safety outcomes for this procedure/technology? Please suggest the most appropriate method of measurement for these outcomes and the timescales over which these should be measured (where appropriate) and if there are any challenges in collecting key outcomes.

Diagnostic accuracy of EEG interpretation, measured against expert human interpretation

Please list any uncertainties or concerns about the efficacy and safety of this procedure/technology?

It is not yet completely reliable and its use must be undertaken with great caution as to its accuracy.

Are you aware of any additional issues which would prevent (or have prevented) this procedure/technology being adopted in your organisation or across the wider NHS? This could include costs, resource, staffing for example.

No

Please list any abstract, real-world evidence, conference proceedings or any major trials or registries that you are aware of for this topic.

Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important. If you would like to share any studies which are confidential due to their publication status, please contact us via email.

Moderat existing literature. i have published on this mayself after trialling machine learning on the EEG a decade ago

Is there any research that you feel would be needed to address uncertainties in the evidence base?

Yes a large scale study using the unique benefits of the NHS coupled to an advanced AI organisation such as DeepMind in the UK could be beneficial

Further Comments

Please add any further comments on your particular experiences or knowledge of the procedure/technology.

as above - i am a clinical academic practising CLinical Neurophysiology at UCH but also have a bioengineering research group in Medical Physics at UCL, developing new methods for imaging the brain and nerve. AI in EEG is not my main research topic but it is claosely aligned and I have undertaken and published work in this area in the past. My view is that AI could provide a valuable tool but it is still highly unreliable and must be used with a proper understanding and evaluation of its strengths and weaknesses by suitable skilled staff.

Thank you for completing the professional expert questionnaire.

Applicants for the role of professional expert will also be asked to complete a declaration of interests form as part of the application process, which will be emailed to the address shared on this form.

Your contribution will now be reviewed by the NICE team.

7

Anonymous

39:00

Time to complete

This questionnaire is only to be completed and submitted by Health and care practitioners

This questionnaire should be completed by those whose role is, or is directly related to, one of the specialisms below. For each assessment, we engage with professionals with expertise relevant to the topic under evaluation. By completing this questionnaire, you acknowledge and consent to being considered for the role of professional expert on this assessment.

Please indicate which option best describes your area of expertise. If there is no option which you feel relates to your role, please select 'Other' and let us know your role and why you think we should include your knowledge and expertise on the assessment.

For expressions of interest and/or to share your lived experience please email pip@nice.org.uk

Note:

This questionnaire will be saved if you submit a response. If you wish to edit any responses, you can do so until the response deadline **2 December 2025**.

Please ensure all necessary edits or amendments are completed on your questionnaire before the portal close date. All submissions will be downloaded after the deadline, and the portal will then be locked. Any changes made after the closing date will not be included in the final submission.

<https://techcommunity.microsoft.com/blog/microsoftformsblog/you-can-now-save-and-edit-your-survey-responses/3865033>

Which option below best relates to your own role? You will be asked to supply your job title and organisation in the next section.

If your role is not listed but you feel it ought to be included, please select 'Other' and let us know your role and why you think we should include your knowledge and expertise on the assessment. *

- ☐ Clinical physiologist
- ☐ Consultant clinical neurophysiologist
- ☒ Consultant neurologist
- ☐ Consultant paediatrician neurologist
- ☐ Consultant physiologist
- ☐ Epilepsy specialist nurse
- ☐ GP
- ☐ Other

Name: *

Richard Grunewald

Job title *

Locum Consultant Neurologist

Organisation *

Sheffield Teaching Hospitals NHS FT

Email Address *

Professional organisation or society membership/affiliation *

Sheffield Teaching Hospitals NHS FT

Nominated/ratified by (if applicable) *

not applicable

Registration number, and issuing organisation (e.g. GMC, NMC, HCPC) *

3130966 GMC

NOTES ON COMPLETING THE FORM

How NICE will use this information: The information that you provide on this form may be used to develop guidance on this topic.

Your advice and views represent your individual opinion and not that of your employer, professional society or a consensus view. Where relevant your name, job title, organisation and your responses, along with your declared interests may be published online on the NICE website as part of public consultation on the draft guidance, except in circumstances but not limited to, where comments are considered voluminous, or publication would be unlawful or inappropriate.

Please note: if you do not agree to the terms of the Personal Declaration (Section 3) or Confidentiality Agreement and Undertaking (Section 4-6), you will not be considered for the role of professional expert on this assessment.

For more information about how we process your data, please see the privacy notice on the NICE website: www.nice.org.uk/privacy-notice

Personal Declaration

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For more information about how we process your data, please see the privacy notice on the NICE website: www.nice.org.uk/privacy-notice

I confirm that:

- I am a registered practising professional in the UK/NHS and in good professional standing
- I have specialist knowledge in the technology or disease area
- I will declare all conflicts of interest in relation to the technology under consideration
- I will abide by NICE's governance policies and comply with NICE's processes and methods
- I will abide by the scoping phase timelines for this assessment and will endeavour to engage in the assessments full schedule once known.

Personal data submitted to NICE can be used for the purposes of producing guidance in the HealthTech Programme. Personal data will be held on NICE's databases, and I may be contacted in the future by NICE after the completion of this topic. I understand that this information may be disclosed to the External Assessment Group (EAG) and Advisory Committee undertaking the assessment. I agree that my name, job title and organisational affiliation can appear on relevant documents in the assessment process and these may be posted on the NICE website along with any declared interests. I agree where relevant to my submitted Professional Expert Questionnaire being published on the NICE website. *

☒ Yes

☐ No

Name *

Richard Grunewald

Date *

11/7/2025



Confidentiality Agreement and Undertaking

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By completing this Form,

1. I acknowledge that information may be disclosed to me in relation to my participation in NICE's consultation process which is confidential ("**Confidential Information**"). Often this material will be commercially sensitive, or provided to NICE on an academic-in-confidence basis (for example research that has not yet been published). Confidential Information may include, but is not limited to:

- (a) the fact that a technology has been notified to the programme and is being considered for NICE advice and/or NICE guidance
- (b) a medtech innovation briefing draft document;
- (c) medical technology guidance draft documents (including but not limited to scope, assessment report, overview, consultation, final guidance, reviews and updates);
- (d) information relating to the existence, content or outcome of confidential discussions.

Confidentiality Agreement and Undertaking

2. Subject to paragraph 3 below, I undertake to NICE that I shall:

- (a) keep all Confidential Information strictly confidential and, except as expressly permitted under this agreement shall not disclose, use, copy in whole or in part or modify or adapt any Confidential Information in any way without NICE's prior written consent which may be given or withheld in its absolute discretion;
- (b) not use any Confidential Information for any purpose other than participating in the consultation process and any appeal that we may lodge;
- (c) return all Confidential Information to NICE on written demand; and
- (d) in the event that NICE authorises any disclosure of Confidential Information by me to a third party I shall procure that such third party complies with this agreement as if he were a party to it.

3. The undertakings set out in paragraph 2 above ("the **Undertakings**") shall not apply to information which:

- (a) is in the public domain otherwise than through a breach of any of the Undertakings or a breach of any other confidentiality obligation owed by any person to NICE;
- (b) was lawfully within my possession before it was disclosed to me by NICE and neither I nor my alternative source of the information owed any confidentiality obligation to the Institute in respect of it;
- (c) is required to be disclosed by any court of competent jurisdiction or any government agency lawfully requesting the same provided that I use my best endeavours to notify NICE in advance of such disclosure; or
- (d) is approved for release by prior written authorisation of NICE.

Confidentiality Agreement and Undertaking

4. I acknowledge that:

- (a) breach by me of any of the Undertakings could cause NICE harm that is irreparable and that cannot be compensated by damages, and that in the event of any actual or threatened breach by me of any Undertaking NICE shall be entitled to apply for and obtain (regardless of any rights NICE may have to claim damages) an injunction or other equitable relief against me;
- (b) this agreement constitutes the entire agreement between myself and NICE relating to the Confidential Information;
- (c) any amendments to or waiver of any of the terms of this agreement must be set out in writing and signed by me and on behalf of NICE;
- (d) this agreement is governed by English law and subject to the exclusive jurisdiction of the English courts.

Please indicate if you would like to **opt in** to NICE contacting you regarding other technologies/treatments in the future for your advice, or if you would **only** like to be contacted regarding this specific technology: *

- ☒ Yes, I agree that NICE can use my contact details to contact me for future requests for advice
- ☐ No, I agree that NICE can use my details to contact me for advice on this topic only, but not for others.

Name *

Richard Grunewald

Date *

11/7/2025



Organisation name (if applicable) *

Not applicable

Experience

Please answer the following questions as fully as possible to provide further information about the procedure/technologies and/or your experience

Please describe your level of experience with the procedure/technologies, for example:

- Are you familiar with the procedure/technologies?
- Have you used it or are you currently using it? If so, please indicate your experience with this.
- Do you know how widely this procedure/technology is used in the NHS? Is this procedure/technology performed/used by clinicians in specialities other than your own?

I am familiar with the use of EEG in clinical practice, and use it regularly. I am aware of the potential for AI interpretation but have no direct experience of its utility.

Please indicate your research experience relating to this procedure or technology (please choose one or more if relevant): (Please highlight your choice(s))

- ☐ I have done bibliographic research on this procedure or technology
- ☐ I have done research on this procedure or technology in laboratory settings (e.g. device-related research).
- ☐ I have done clinical research on this procedure or technology involving patients or healthy volunteers.
- ☐ I have published this research.
- ☒ I have had no involvement in research on this procedure or technology.
- ☐ Other _____

Current management

Please describe the current standard of care that is used in the NHS. Please note any clinical guidelines used in the NHS which are relevant to the care pathway. What setting would this technology be used in (primary care, general hospitals, specialist centres for example).

EEGs are routinely used in the investigation of children and young people with suspected or definite epileptic seizures to clarify the syndromic diagnosis. In older patients EEG is used to distinguish epileptic from psychogenic non epileptic seizures and to lateralise and localise seizure onset prior to the consideration of resective surgery. The investigation is undertaken in specialist Neurology centres. EEG also has a role in management of patients in intensive care. The investigation is usually undertaken by technical staff, and the interpretation by trained clinical staff, usually Consultant Neurophysiologists.

Does this procedure/technology have the potential to replace current standard care or would it be used as an addition to existing standard care? Where would the technologies/procedure fit in the care pathway?

It has the potential to replace standard EEG interpretation, i.e. some of the workload of Consultant Neurophysiologists.

- What are the main aims of these procedures or technologies?
- How innovative are they?
- Can you name any technologies which are available in the UK and have this function/mode of action?
- Are there any competing or alternative procedures available to the NHS which have a similar function/mode of action to this?
- If so, how do these differ from the technology/procedure indicated here?

The aim is to improve the specificity and sensitivity of EEG in diagnosis of epilepsy and syndromic classification, and also to provide a faster and more accessible analysis replacing part of the workload of clinical Neurophysiologists. This is highly innovative. I know of no AI technology which is routinely clinically implemented at present, though I am aware of attempts to use AI in the diagnosis using clinical information, for example the diagnosis of psychogenic non-epileptic seizures. Such studies are at an early stage. AI has been used to analyse electrocardiographic data, and I understand has been shown to have promising sensitivity and specificity in identifying dysrhythmias, left ventricular systolic dysfunction and cardiomyopathy.

Approximately how many people each year would be eligible for an intervention with this procedure/technology, (give either as an estimated number, or a proportion of the target population)?

This would have the potential to analyse the majority (i.e. at a guess 80%) of standard EEGs

Potential patient benefits and impact on the health system

What do you consider to be the potential benefits to patients from using this procedure/technology?

Rapid screening and potentially better accuracy.

- Are there any groups of patients who would particularly benefit from this procedure/technology?
- Are there any groups in which the technology would be less effective or would be less likely to benefit?
- Are there any potential equality issues that should be considered for this condition and procedure/technology?

Patients with genetic generalised epilepsy would likely benefit from rapid confirmation of the diagnosis.

It would likely be less effective in those with psychogenic seizures and older patients where non-specific abnormalities often need to be interpreted in the clinical context.

I do not see any equality issues here.

- What do you consider to be the potential benefits to the system from using this procedure/technology?
- Could it lead, for example, to a reduced number of appointments, improved care pathway, more efficient NHS staff time use?

Quicker diagnosis and potentially less subjective assessment of EEG recordings

This could lead to more efficient working in Neurophysiology departments, more efficient use of Neurophysiology staff time and more rapid care pathways for patients with seizures.

What clinical facilities (or changes to existing facilities) are needed to do this procedure/implement this technology safely?

Standard EEG facilities would likely need data storage and analysis equipment, but this is unlikely to be particularly challenging as existing neurophysiology equipment is already expensive and bulky

Is any specific training needed in order to use the procedure/technology with respect to efficacy or safety?

Technical staff would need to be trained in the use of the equipment.

Safety and efficacy of the procedure/technologies

What are the potential harms of the procedure/technology?

- Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence:
- Adverse events reported in the literature (if possible, please cite literature)
- Anecdotal adverse events (known from experience)
- Theoretical adverse events

It is possible that clinicians may become over-reliant on analysis models which are inadequately trained and have limited diagnostic accuracy. This could result in misdiagnosis. Poorly applied EEG electrodes could result in unreliable data.

I know of no adverse events reported.

Please list the key efficacy and safety outcomes for this procedure/technology? Please suggest the most appropriate method of measurement for these outcomes and the timescales over which these should be measured (where appropriate) and if there are any challenges in collecting key outcomes.

Proportion of EEGs appropriately classified by the technology compared to gold standard (clinician).
Speed of analysis compared with gold standard
Cost of analysis - will depend on cost of hardware

Please list any uncertainties or concerns about the efficacy and safety of this procedure/technology?

It is likely that AI will initially be trained using datasets with very obvious diagnoses and clear abnormalities, but extrapolating the results to more equivocal datasets may be problematic

Are you aware of any additional issues which would prevent (or have prevented) this procedure/technology being adopted in your organisation or across the wider NHS? This could include costs, resource, staffing for example.

Cost of hardware and software.

Please list any abstract, real-world evidence, conference proceedings or any major trials or registries that you are aware of for this topic.

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None

Is there any research that you feel would be needed to address uncertainties in the evidence base?

I don't know enough about the literature in this field

Further Comments

Please add any further comments on your particular experiences or knowledge of the procedure/technology.

No answer provided.

Thank you for completing the professional expert questionnaire.

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Your contribution will now be reviewed by the NICE team.

10

Anonymous

377:50

Time to complete

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- ☒ Consultant clinical neurophysiologist
- ☐ Consultant neurologist
- ☐ Consultant paediatrician neurologist
- ☐ Consultant physiologist
- ☐ Epilepsy specialist nurse
- ☐ GP
- ☐ Other

Name: *

Joel Winston

Job title *

Senior lecturer in neurophysiology and honorary consultant in clinical neurophysiology

Organisation *

King's College London / King's College Hospital

Email Address *

Professional organisation or society membership/affiliation *

British Society for Clinical Neurophysiology

Nominated/ratified by (if applicable) *

Gareth Payne

Registration number, and issuing organisation (e.g. GMC, NMC, HCPC) *

GMC # 6149423

NOTES ON COMPLETING THE FORM

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☒ Yes

☐ No

Name *

Joel Winston

Date *

11/21/2025



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2. Subject to paragraph 3 below, I undertake to NICE that I shall:

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- (b) not use any Confidential Information for any purpose other than participating in the consultation process and any appeal that we may lodge;
- (c) return all Confidential Information to NICE on written demand; and
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- (b) was lawfully within my possession before it was disclosed to me by NICE and neither I nor my alternative source of the information owed any confidentiality obligation to the Institute in respect of it;
- (c) is required to be disclosed by any court of competent jurisdiction or any government agency lawfully requesting the same provided that I use my best endeavours to notify NICE in advance of such disclosure; or
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- (b) this agreement constitutes the entire agreement between myself and NICE relating to the Confidential Information;
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- ☐ No, I agree that NICE can use my details to contact me for advice on this topic only, but not for others.

Name *

Joel Winston

Date *

11/21/2025



Organisation name (if applicable) *

N/A

Experience

Please answer the following questions as fully as possible to provide further information about the procedure/technologies and/or your experience

Please describe your level of experience with the procedure/technologies, for example:

- Are you familiar with the procedure/technologies?
- Have you used it or are you currently using it? If so, please indicate your experience with this.
- Do you know how widely this procedure/technology is used in the NHS? Is this procedure/technology performed/used by clinicians in specialities other than your own?

I am involved in research projects around AI and EEG. I have seen talks/lectures, promotional material and journal articles concerning new software tools that use AI for EEG interpretation.
I am not currently using AI for EEG interpretation clinically. I do not believe that any clinician in the NHS is currently doing so. Related techniques are used or are more familiar in other specialities (e.g. automated ECG interpretation in cardiology, AI use in radiology).

Please indicate your research experience relating to this procedure or technology (please choose one or more if relevant): (Please highlight your choice(s))

- ☒ I have done bibliographic research on this procedure or technology
- ☒ I have done research on this procedure or technology in laboratory settings (e.g. device-related research).
- ☒ I have done clinical research on this procedure or technology involving patients or healthy volunteers.
- ☐ I have published this research.
- ☐ I have had no involvement in research on this procedure or technology.
- ☐ Other _____

Current management

Please describe the current standard of care that is used in the NHS. Please note any clinical guidelines used in the NHS which are relevant to the care pathway. What setting would this technology be used in (primary care, general hospitals, specialist centres for example).

There are several relevant guidelines for EEG acquisition published by national and international bodies (BSCN, IFCN, ILAE) e.g. https://www.bscn.org.uk/content_wide.aspx?Group=guidelines&Page=guidelines_eeg <<https://www.ilae.org/files/dmfile/eeg-minimum-standards.pdf>>

EEGs are predominantly performed in specialist centres and general hospitals.

In brief, EEGs are acquired through the application of electrodes to the scalp in a precise arrangement by a trained clinical physiologist. Low voltage electrical signals from the brain are amplified and stored as digital data on a computer, as well as being displayed in real time to the clinical physiologist.

There are several types of scalp EEG study; broadly these can be divided into short recordings to study brain activity between epileptic seizures (or superficially similar events) and long recordings ("telemetry") to attempt to capture and characterise the clinical events.

The digitised signals are generally interpreted ("read") by at least two trained individuals (typically the physiologist who applied the electrodes and conducted the test and a consultant clinical neurophysiologist), and they write a report comprising a factual description of the circumstances of the test (authored by the physiologist) and a conclusion or interpretation (typically authored by the consultant clinical neurophysiologist).

Does this procedure/technology have the potential to replace current standard care or would it be used as an addition to existing standard care? Where would the technologies/procedure fit in the care pathway?

This technology would essentially be used in addition to standard care. However, in the longer term, it has the potential to change how standard care is performed, for example changing the efficiency of the interpretation of the test. The technology would essentially be applied after EEG acquisition but before interpretation of the record by the consultant clinical neurophysiologist. The AI would provide an interpretation of the record which the consultant could use as a second expert opinion (based upon the existing data, it would provide an opinion equal to or better than the consultant). The consultant can use the opinion to adjust their own thinking about the findings or to guide them to the most important segments of the recording to ensure that they agree with the AI.

I suspect that the uptake of the technology will change practice slowly - initially the AI will be used as a second opinion; then as trust is gained, it will be used as a pre-screening tool (so the consultant will review the highlights of the record rather than the whole recording); potentially the clinical physiologist may need to spend less time reviewing the recording and/or authoring a factual report. It is conceivable but unlikely on a short timescale that the consultant opinion on the EEG will not be considered necessary, and the interpretation could be fully automated.

- What are the main aims of these procedures or technologies?
- How innovative are they?
- Can you name any technologies which are available in the UK and have this function/mode of action?
- Are there any competing or alternative procedures available to the NHS which have a similar function/mode of action to this?
- If so, how do these differ from the technology/procedure indicated here?

The main aim is to increase the efficiency of EEG reporting. The technology is innovative; previous attempts at machine reading of EEG have not produced anything like human level performance. No existing technologies exist in the UK and are licensed for use that have this mode of action. Several technologies aim to support human EEG reading through alternative representation of the data or recognition of specific EEG features (e.g. Persyst or other automated spike detection algorithms). Some are moderately effective for specific purposes but none demonstrate human-level performance in overall EEG feature reporting (i.e. none declare that the EEG is normal or abnormal, or overtly specify in what way it is abnormal).

Approximately how many people each year would be eligible for an intervention with this procedure/technology, (give either as an estimated number, or a proportion of the target population)?

Any patient in the UK attending for an EEG could in principle have their record read by AI if the software tools allowed this. I do not know the figures but this would probably be at least 50,000 patients.

Potential patient benefits and impact on the health system

What do you consider to be the potential benefits to patients from using this procedure/technology?

The published data suggest that the AI interpretation of the recording matches human experts. In principle this means that every patient who undergoes an EEG has a human expert level interpretation applied. (Note that here "interpretation" means identification of EEG features, rather than a clinical interpretation in context.) In the short term, this offers advantages in terms of quality assurance; in the longer term, there may be some efficiency gains which can lead to a more efficiently delivered service (I expect that these efficiency gain will be relatively small).

- Are there any groups of patients who would particularly benefit from this procedure/technology?
- Are there any groups in which the technology would be less effective or would be less likely to benefit?
- Are there any potential equality issues that should be considered for this condition and procedure/technology?

I am uncertain as to how well the technology performs under circumstances that humans find challenging - a typical example might be a very difficult-to-acquire EEG in which the patient struggles to relax during the procedure due to learning difficulties and/or severe autism. Humans easily learn to avoid over-interpretation of EEG artefact; it is not clear to me that a more algorithmic approach will perform similarly. Over-reliance on this sort of technology could therefore cause some problems with equality.

I believe that existing solutions do not work and/or are not tested/licensed for use in very young patients undergoing EEG (e.g. infants under the age of 1 and neonates) - it is worth noting these are common use cases for EEG in some centres.

- What do you consider to be the potential benefits to the system from using this procedure/technology?
- Could it lead, for example, to a reduced number of appointments, improved care pathway, more efficient NHS staff time use?

The main potential benefit should be shorter times to expert-level interpretation. Theoretically, this could lead to more efficient NHS staff-time use.

What clinical facilities (or changes to existing facilities) are needed to do this procedure/implement this technology safely?

I am uncertain as to the computational power required to implement the technologies but my impression is that they can be implemented on current generations of typical PC hardware. It is possible that some centres would need upgrades to hardware as well as software to implement the technology.

Is any specific training needed in order to use the procedure/technology with respect to efficacy or safety?

Some minimal training would be needed to understand the particular way the technology is implemented. However, it will mostly be provided as an extension of existing software tools, not entirely dissimilar from the way that predecessor (much less effective) decision support tools were provided, and many experts will already be fairly familiar with the general principles. There may be some details of implementation that are necessary to understand (e.g. any patient groups for whom the technology is not licensed) and potentially the implementation of some protection from its misuse in those scenarios.

Safety and efficacy of the procedure/technologies

What are the potential harms of the procedure/technology?

- Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence:
- Adverse events reported in the literature (if possible, please cite literature)
- Anecdotal adverse events (known from experience)
- Theoretical adverse events

No answer provided.

Please list the key efficacy and safety outcomes for this procedure/technology? Please suggest the most appropriate method of measurement for these outcomes and the timescales over which these should be measured (where appropriate) and if there are any challenges in collecting key outcomes.

No answer provided.

Please list any uncertainties or concerns about the efficacy and safety of this procedure/technology?

The technology is untested in the UK, but for most centres the standardisation of electrode application and recording technology is such that this need not be a concern. Some centres in the UK continue to use alternative patterns of electrode spacing (the "modified Maudsley montage") and the published literature is not clear as to the efficacy or robustness of the algorithm in that setting.

It will be important to remember that the interpretation of the findings is not the same as the interpretation of the recording - it might be assumed that AI that can "read" EEG to human expert level performance implies that the human experts are no longer needed and that the record can be read only by the AI. The accurate identification of EEG features is only one aspect of being a consultant clinical neurophysiologist when writing a conclusion to an EEG report; their integration within the patient's clinical context is in many ways the more substantial part of the role and the AI does not assist with that.

Are you aware of any additional issues which would prevent (or have prevented) this procedure/technology being adopted in your organisation or across the wider NHS? This could include costs, resource, staffing for example.

There is likely to be a substantial charge for the software, which because of the vertically integrated business model of the EEG hardware companies will only work with 1-2 company's acquisition hardware. There would therefore be substantial potential costs in acquiring the technology, and significant time before centres not currently using the seller's hardware would be prepared to change acquisition systems in order to acquire it.

Please list any abstract, real-world evidence, conference proceedings or any major trials or registries that you are aware of for this topic.

Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important. If you would like to share any studies which are confidential due to their publication status, please contact us via email.

No answer provided.

Is there any research that you feel would be needed to address uncertainties in the evidence base?

As far as I am aware there are no (or limited) data on cost-effectiveness, prospective real-world performance, performance of the algorithms in the setting of long-term EEG recordings (although here there are already modes to use the software), performance in the context of alternative electrode montages or challenging patient groups specifically.

Further Comments

Please add any further comments on your particular experiences or knowledge of the procedure/technology.

No answer provided.

Thank you for completing the professional expert questionnaire.

Applicants for the role of professional expert will also be asked to complete a declaration of interests form as part of the application process, which will be emailed to the address shared on this form.

Your contribution will now be reviewed by the NICE team.

11

Anonymous

40:49

Time to complete

This questionnaire is only to be completed and submitted by Health and care practitioners

This questionnaire should be completed by those whose role is, or is directly related to, one of the specialisms below. For each assessment, we engage with professionals with expertise relevant to the topic under evaluation. By completing this questionnaire, you acknowledge and consent to being considered for the role of professional expert on this assessment.

Please indicate which option best describes your area of expertise. If there is no option which you feel relates to your role, please select 'Other' and let us know your role and why you think we should include your knowledge and expertise on the assessment.

For expressions of interest and/or to share your lived experience please email pip@nice.org.uk

Note:

This questionnaire will be saved if you submit a response. If you wish to edit any responses, you can do so until the response deadline **2 December 2025**.

Please ensure all necessary edits or amendments are completed on your questionnaire before the portal close date. All submissions will be downloaded after the deadline, and the portal will then be locked. Any changes made after the closing date will not be included in the final submission.

<https://techcommunity.microsoft.com/blog/microsoftformsblog/you-can-now-save-and-edit-your-survey-responses/3865033>

Which option below best relates to your own role? You will be asked to supply your job title and organisation in the next section.

If your role is not listed but you feel it ought to be included, please select 'Other' and let us know your role and why you think we should include your knowledge and expertise on the assessment. *

- ☐ Clinical physiologist
- ☐ Consultant clinical neurophysiologist
- ☐ Consultant neurologist
- ☒ Consultant paediatrician neurologist
- ☐ Consultant physiologist
- ☐ Epilepsy specialist nurse
- ☐ GP
- ☐ Other

Name: *

Helen Cross

Job title *

Director, and Professor of Childhood Epilepsy

Organisation *

UCI Great Ormond Street Institute of Child Health

Email Address *

Professional organisation or society membership/affiliation *

British Paediatric Neurology Association

Nominated/ratified by (if applicable) *

N/A

Registration number, and issuing organisation (e.g. GMC, NMC, HCPC) *

GMC 2027017

NOTES ON COMPLETING THE FORM

How NICE will use this information: The information that you provide on this form may be used to develop guidance on this topic.

Your advice and views represent your individual opinion and not that of your employer, professional society or a consensus view. Where relevant your name, job title, organisation and your responses, along with your declared interests may be published online on the NICE website as part of public consultation on the draft guidance, except in circumstances but not limited to, where comments are considered voluminous, or publication would be unlawful or inappropriate.

Please note: if you do not agree to the terms of the Personal Declaration (Section 3) or Confidentiality Agreement and Undertaking (Section 4-6), you will not be considered for the role of professional expert on this assessment.

For more information about how we process your data, please see the privacy notice on the NICE website: www.nice.org.uk/privacy-notice

Personal Declaration

The personal data submitted on this form will be used to record your agreement to the terms set out in this document.

For more information about how we process your data, please see the privacy notice on the NICE website: www.nice.org.uk/privacy-notice

I confirm that:

- I am a registered practising professional in the UK/NHS and in good professional standing
- I have specialist knowledge in the technology or disease area
- I will declare all conflicts of interest in relation to the technology under consideration
- I will abide by NICE's governance policies and comply with NICE's processes and methods
- I will abide by the scoping phase timelines for this assessment and will endeavour to engage in the assessments full schedule once known.

Personal data submitted to NICE can be used for the purposes of producing guidance in the HealthTech Programme. Personal data will be held on NICE's databases, and I may be contacted in the future by NICE after the completion of this topic. I understand that this information may be disclosed to the External Assessment Group (EAG) and Advisory Committee undertaking the assessment. I agree that my name, job title and organisational affiliation can appear on relevant documents in the assessment process and these may be posted on the NICE website along with any declared interests. I agree where relevant to my submitted Professional Expert Questionnaire being published on the NICE website. *

☒ Yes

☐ No

Name *

Helen Cross

Date *

11/21/2025



Confidentiality Agreement and Undertaking

The personal data submitted on this form will be used to record your agreement to the terms set out in this document.

For more information about how we process your data, please see the privacy notice on the NICE website: www.nice.org.uk/privacy-notice

By completing this Form,

1. I acknowledge that information may be disclosed to me in relation to my participation in NICE's consultation process which is confidential ("**Confidential Information**"). Often this material will be commercially sensitive, or provided to NICE on an academic-in-confidence basis (for example research that has not yet been published). Confidential Information may include, but is not limited to:

- (a) the fact that a technology has been notified to the programme and is being considered for NICE advice and/or NICE guidance
- (b) a medtech innovation briefing draft document;
- (c) medical technology guidance draft documents (including but not limited to scope, assessment report, overview, consultation, final guidance, reviews and updates);
- (d) information relating to the existence, content or outcome of confidential discussions.

Confidentiality Agreement and Undertaking

2. Subject to paragraph 3 below, I undertake to NICE that I shall:

- (a) keep all Confidential Information strictly confidential and, except as expressly permitted under this agreement shall not disclose, use, copy in whole or in part or modify or adapt any Confidential Information in any way without NICE's prior written consent which may be given or withheld in its absolute discretion;
- (b) not use any Confidential Information for any purpose other than participating in the consultation process and any appeal that we may lodge;
- (c) return all Confidential Information to NICE on written demand; and
- (d) in the event that NICE authorises any disclosure of Confidential Information by me to a third party I shall procure that such third party complies with this agreement as if he were a party to it.

3. The undertakings set out in paragraph 2 above ("the **Undertakings**") shall not apply to information which:

- (a) is in the public domain otherwise than through a breach of any of the Undertakings or a breach of any other confidentiality obligation owed by any person to NICE;
- (b) was lawfully within my possession before it was disclosed to me by NICE and neither I nor my alternative source of the information owed any confidentiality obligation to the Institute in respect of it;
- (c) is required to be disclosed by any court of competent jurisdiction or any government agency lawfully requesting the same provided that I use my best endeavours to notify NICE in advance of such disclosure; or
- (d) is approved for release by prior written authorisation of NICE.

Confidentiality Agreement and Undertaking

4. I acknowledge that:

- (a) breach by me of any of the Undertakings could cause NICE harm that is irreparable and that cannot be compensated by damages, and that in the event of any actual or threatened breach by me of any Undertaking NICE shall be entitled to apply for and obtain (regardless of any rights NICE may have to claim damages) an injunction or other equitable relief against me;
- (b) this agreement constitutes the entire agreement between myself and NICE relating to the Confidential Information;
- (c) any amendments to or waiver of any of the terms of this agreement must be set out in writing and signed by me and on behalf of NICE;
- (d) this agreement is governed by English law and subject to the exclusive jurisdiction of the English courts.

Please indicate if you would like to **opt in** to NICE contacting you regarding other technologies/treatments in the future for your advice, or if you would **only** like to be contacted regarding this specific technology: *

- ☒ Yes, I agree that NICE can use my contact details to contact me for future requests for advice
- ☐ No, I agree that NICE can use my details to contact me for advice on this topic only, but not for others.

Name *

Helen Cross

Date *

11/21/2025



Organisation name (if applicable) *

UCL Great Ormond Street Institute of Child Health

Experience

Please answer the following questions as fully as possible to provide further information about the procedure/technologies and/or your experience

Please describe your level of experience with the procedure/technologies, for example:

- Are you familiar with the procedure/technologies?
- Have you used it or are you currently using it? If so, please indicate your experience with this.
- Do you know how widely this procedure/technology is used in the NHS? Is this procedure/technology performed/used by clinicians in specialities other than your own?

I am a clinical epileptologist with 30 years experience. Reading EEG is integral to my clinical practice; for a part of my career i was formally employed as part of my contract within the EEG department to report Video EEG telemetry. I continue to interpret Video EEG as part of presurgical evaluation in children. I am aware of how widely EEG is used. In paediatrics EEG is used as an investigation outside my specialty by neonatologists and paediatricians with an expertise in epilepsy. I am aware of AI developments in reading of routine EEG, invasive EEG and neonatal EEG.

Please indicate your research experience relating to this procedure or technology (please choose one or more if relevant): (Please highlight your choice(s))

- ☒ I have done bibliographic research on this procedure or technology
- ☐ I have done research on this procedure or technology in laboratory settings (e.g. device-related research).
- ☒ I have done clinical research on this procedure or technology involving patients or healthy volunteers.
- ☒ I have published this research.
- ☐ I have had no involvement in research on this procedure or technology.
- ☐ Other _____

Current management

Please describe the current standard of care that is used in the NHS. Please note any clinical guidelines used in the NHS which are relevant to the care pathway. What setting would this technology be used in (primary care, general hospitals, specialist centres for example).

A routine EEG is undertaken whenever a diagnosis of epilepsy is suspected. This will be reported by the EEG neurophysiologist, and interpreted by a consultant clinical neurophysiologist. This is quite labour intensive. Prolonged recordings (video EEG telemetry) will be interpreted in the same way. AI programmes are available for localisation of abnormality, and in some instance for spike counting - the latter are not totally reliable. The technology would be useful in general hospital EEG departments and specialist centres, supported by consultant review. Neonatal EEG has been facilitated through AI - rhythms may more readily be identified.

Does this procedure/technology have the potential to replace current standard care or would it be used as an addition to existing standard care? Where would the technologies/procedure fit in the care pathway?

I think it would be seen as an addition to standard care

Where it fits in the care pathway depends on what specifically it is designed to do - diagnostics at the beginning of the pathway, localisation in specialist settings

- What are the main aims of these procedures or technologies?
- How innovative are they?
- Can you name any technologies which are available in the UK and have this function/mode of action?
- Are there any competing or alternative procedures available to the NHS which have a similar function/mode of action to this?
- If so, how do these differ from the technology/procedure indicated here?

The main aim of an EEG is to determine abnormal activity that supports a diagnosis of epilepsy. EEG itself is not innovative; reliable AI interpretation is innovative. I am aware of neurodiagnostics but this is still at the validation phase. I am aware of cloud based neonatal seizure detection used by neonatal units. I am not aware of alternative procedures

Approximately how many people each year would be eligible for an intervention with this procedure/technology, (give either as an estimated number, or a proportion of the target population)?

30000

Potential patient benefits and impact on the health system

What do you consider to be the potential benefits to patients from using this procedure/technology?

More rapid access to EEG, and faster interpretation of results. This said the EEG still needs to be recorded; interpretation would be faster and therefore give more rapid access to results. Neurophysiology time may also be freed up, as less need for interpretation

- Are there any groups of patients who would particularly benefit from this procedure/technology?
- Are there any groups in which the technology would be less effective or would be less likely to benefit?
- Are there any potential equality issues that should be considered for this condition and procedure/technology?

Children may need adjustment of any AI in view of different seizure characteristics.

- What do you consider to be the potential benefits to the system from using this procedure/technology?
- Could it lead, for example, to a reduced number of appointments, improved care pathway, more efficient NHS staff time use?

It would likely lead to more efficient use of NHS staff time, and improved care pathway. It is unlikely to lead to reduced number of appointments

What clinical facilities (or changes to existing facilities) are needed to do this procedure/implement this technology safely?

I would anticipate appropriate computational and computer capacity would be required,

Is any specific training needed in order to use the procedure/technology with respect to efficacy or safety?

It is likely training would be required

Safety and efficacy of the procedure/technologies

What are the potential harms of the procedure/technology?

- Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence:
- Adverse events reported in the literature (if possible, please cite literature)
- Anecdotal adverse events (known from experience)
- Theoretical adverse events

Potential harm would be over or underinterpretation and consequent misdiagnosis

Please list the key efficacy and safety outcomes for this procedure/technology? Please suggest the most appropriate method of measurement for these outcomes and the timescales over which these should be measured (where appropriate) and if there are any challenges in collecting key outcomes.

the main safety issue would be reliability eg risk of false positives

Please list any uncertainties or concerns about the efficacy and safety of this procedure/technology?

Validation with regard to over/underinterpretation would be required

Are you aware of any additional issues which would prevent (or have prevented) this procedure/technology being adopted in your organisation or across the wider NHS? This could include costs, resource, staffing for example.

Reliability, standardisation. Resource

Please list any abstract, real-world evidence, conference proceedings or any major trials or registries that you are aware of for this topic.

Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important. If you would like to share any studies which are confidential due to their publication status, please contact us via email.

Not aware

Is there any research that you feel would be needed to address uncertainties in the evidence base?

No answer provided.

Further Comments

Please add any further comments on your particular experiences or knowledge of the procedure/technology.

There is alot of work internationally being undertaken in this space, although nothing consistently used

Thank you for completing the professional expert questionnaire.

Applicants for the role of professional expert will also be asked to complete a declaration of interests form as part of the application process, which will be emailed to the address shared on this form.

Your contribution will now be reviewed by the NICE team.

14

Anonymous

18:15

Time to complete

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<https://techcommunity.microsoft.com/blog/microsoftformsblog/you-can-now-save-and-edit-your-survey-responses/3865033>

Which option below best relates to your own role? You will be asked to supply your job title and organisation in the next section.

If your role is not listed but you feel it ought to be included, please select 'Other' and let us know your role and why you think we should include your knowledge and expertise on the assessment. *

- ☐ Clinical physiologist
- ☒ Consultant clinical neurophysiologist
- ☐ Consultant neurologist
- ☐ Consultant paediatrician neurologist
- ☐ Consultant physiologist
- ☐ Epilepsy specialist nurse
- ☐ GP
- ☐ Other _____

Name: *

Brython Hywel

Job title *

Consultant Neurologist and Clinical Neurophysiologist, Clinical Lead for Neurophysiology and Chief Clinical Information Officer

Organisation *

The Walton Centre NHS Foundation Trust, Liverpool

Email Address *

Professional organisation or society membership/affiliation *

British Society for Clinical Neurophysiology - Education Chair. ABN and RCP member.

Nominated/ratified by (if applicable) *

Michael Wright, Natus

Registration number, and issuing organisation (e.g. GMC, NMC, HCPC) *

GMC - 7014906

NOTES ON COMPLETING THE FORM

How NICE will use this information: The information that you provide on this form may be used to develop guidance on this topic.

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I confirm that:

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☒ Yes

☐ No

Name *

Brython Hywel

Date *

11/27/2025



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- (b) a medtech innovation briefing draft document;
- (c) medical technology guidance draft documents (including but not limited to scope, assessment report, overview, consultation, final guidance, reviews and updates);
- (d) information relating to the existence, content or outcome of confidential discussions.

Confidentiality Agreement and Undertaking

2. Subject to paragraph 3 below, I undertake to NICE that I shall:

- (a) keep all Confidential Information strictly confidential and, except as expressly permitted under this agreement shall not disclose, use, copy in whole or in part or modify or adapt any Confidential Information in any way without NICE's prior written consent which may be given or withheld in its absolute discretion;
- (b) not use any Confidential Information for any purpose other than participating in the consultation process and any appeal that we may lodge;
- (c) return all Confidential Information to NICE on written demand; and
- (d) in the event that NICE authorises any disclosure of Confidential Information by me to a third party I shall procure that such third party complies with this agreement as if he were a party to it.

3. The undertakings set out in paragraph 2 above ("the **Undertakings**") shall not apply to information which:

- (a) is in the public domain otherwise than through a breach of any of the Undertakings or a breach of any other confidentiality obligation owed by any person to NICE;
- (b) was lawfully within my possession before it was disclosed to me by NICE and neither I nor my alternative source of the information owed any confidentiality obligation to the Institute in respect of it;
- (c) is required to be disclosed by any court of competent jurisdiction or any government agency lawfully requesting the same provided that I use my best endeavours to notify NICE in advance of such disclosure; or
- (d) is approved for release by prior written authorisation of NICE.

Confidentiality Agreement and Undertaking

4. I acknowledge that:

- (a) breach by me of any of the Undertakings could cause NICE harm that is irreparable and that cannot be compensated by damages, and that in the event of any actual or threatened breach by me of any Undertaking NICE shall be entitled to apply for and obtain (regardless of any rights NICE may have to claim damages) an injunction or other equitable relief against me;
- (b) this agreement constitutes the entire agreement between myself and NICE relating to the Confidential Information;
- (c) any amendments to or waiver of any of the terms of this agreement must be set out in writing and signed by me and on behalf of NICE;
- (d) this agreement is governed by English law and subject to the exclusive jurisdiction of the English courts.

Please indicate if you would like to **opt in** to NICE contacting you regarding other technologies/treatments in the future for your advice, or if you would **only** like to be contacted regarding this specific technology: *

- ☒ Yes, I agree that NICE can use my contact details to contact me for future requests for advice
- ☐ No, I agree that NICE can use my details to contact me for advice on this topic only, but not for others.

Name *

Brython Hywel

Date *

11/27/2025



Organisation name (if applicable) *

The Walton Centre

Experience

Please answer the following questions as fully as possible to provide further information about the procedure/technologies and/or your experience

Please describe your level of experience with the procedure/technologies, for example:

- Are you familiar with the procedure/technologies?
- Have you used it or are you currently using it? If so, please indicate your experience with this.
- Do you know how widely this procedure/technology is used in the NHS? Is this procedure/technology performed/used by clinicians in specialities other than your own?

I use EEG technology in my daily work. We have been using Persyst to help analyse EEG data for a few years now. I am named as a co-author in one paper analysing Persyst that is about to be published. We have recently started using Autoscore.

Please indicate your research experience relating to this procedure or technology (please choose one or more if relevant): (Please highlight your choice(s))

- ☒ I have done bibliographic research on this procedure or technology
- ☐ I have done research on this procedure or technology in laboratory settings (e.g. device-related research).
- ☒ I have done clinical research on this procedure or technology involving patients or healthy volunteers.
- ☐ I have published this research.
- ☐ I have had no involvement in research on this procedure or technology.
- ☐ Other _____

Current management

Please describe the current standard of care that is used in the NHS. Please note any clinical guidelines used in the NHS which are relevant to the care pathway. What setting would this technology be used in (primary care, general hospitals, specialist centres for example).

Currently EEG data is analysed by humans. This includes clinical physiologists collecting the data and doing a technical report and consultant clinical neurophysiologists giving a clinical opinion.

Does this procedure/technology have the potential to replace current standard care or would it be used as an addition to existing standard care? Where would the technologies/procedure fit in the care pathway?

I think AI technology could in the first instance enhance current care by highlighting parts of studies that require immediate review. In the medium term, I am sure that this technology will reduced the need for human input.

- What are the main aims of these procedures or technologies?
- How innovative are they?
- Can you name any technologies which are available in the UK and have this function/mode of action?
- Are there any competing or alternative procedures available to the NHS which have a similar function/mode of action to this?
- If so, how do these differ from the technology/procedure indicated here?

Persyst and Autoscore are two technologies we have trialled in our centre. The main aim is to enhance human evaluation of the data, making it quicker and more accurate.

Approximately how many people each year would be eligible for an intervention with this procedure/technology, (give either as an estimated number, or a proportion of the target population)?

In our 3.5 million population, we do 2500 tests a year (and some people in our area get tests from other providers).

Potential patient benefits and impact on the health system

What do you consider to be the potential benefits to patients from using this procedure/technology?

Quicker reports. An EEG can take 6 months to happen and then a further 6 months to be reported. We are in a staffing and demand crisis.

- Are there any groups of patients who would particularly benefit from this procedure/technology?
- Are there any groups in which the technology would be less effective or would be less likely to benefit?
- Are there any potential equality issues that should be considered for this condition and procedure/technology?

People with epilepsy and other brain disorders would benefit.
Learning disability patients are disproportionately affected by neurological conditions.

- What do you consider to be the potential benefits to the system from using this procedure/technology?
- Could it lead, for example, to a reduced number of appointments, improved care pathway, more efficient NHS staff time use?

Shorter waiting times, leading to faster treatments. More appointments, as clinical physiologists could do more tests if the interpretation is done by AI.

What clinical facilities (or changes to existing facilities) are needed to do this procedure/implement this technology safely?

Not much. These technologies normally come quite ready for integration into current EEG technology.

Is any specific training needed in order to use the procedure/technology with respect to efficacy or safety?

Relatively little.

Safety and efficacy of the procedure/technologies

What are the potential harms of the procedure/technology?

- Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence:
- Adverse events reported in the literature (if possible, please cite literature)
- Anecdotal adverse events (known from experience)
- Theoretical adverse events

Events or abnormalities could be missed by AI so we would need to test this.

Please list the key efficacy and safety outcomes for this procedure/technology? Please suggest the most appropriate method of measurement for these outcomes and the timescales over which these should be measured (where appropriate) and if there are any challenges in collecting key outcomes.

Speed of reporting.

Please list any uncertainties or concerns about the efficacy and safety of this procedure/technology?

None.

Are you aware of any additional issues which would prevent (or have prevented) this procedure/technology being adopted in your organisation or across the wider NHS? This could include costs, resource, staffing for example.

No.

Please list any abstract, real-world evidence, conference proceedings or any major trials or registries that you are aware of for this topic.

Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important. If you would like to share any studies which are confidential due to their publication status, please contact us via email.

No answer provided.

Is there any research that you feel would be needed to address uncertainties in the evidence base?

No answer provided.

Further Comments

Please add any further comments on your particular experiences or knowledge of the procedure/technology.

No answer provided.

Thank you for completing the professional expert questionnaire.

Applicants for the role of professional expert will also be asked to complete a declaration of interests form as part of the application process, which will be emailed to the address shared on this form.

Your contribution will now be reviewed by the NICE team.

15

Anonymous

92:01

Time to complete

This questionnaire is only to be completed and submitted by Health and care practitioners

This questionnaire should be completed by those whose role is, or is directly related to, one of the specialisms below. For each assessment, we engage with professionals with expertise relevant to the topic under evaluation. By completing this questionnaire, you acknowledge and consent to being considered for the role of professional expert on this assessment.

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For expressions of interest and/or to share your lived experience please email pip@nice.org.uk

Note:

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<https://techcommunity.microsoft.com/blog/microsoftformsblog/you-can-now-save-and-edit-your-survey-responses/3865033>

Which option below best relates to your own role? You will be asked to supply your job title and organisation in the next section.

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- ☐ Clinical physiologist
- ☐ Consultant clinical neurophysiologist
- ☐ Consultant neurologist
- ☐ Consultant paediatrician neurologist
- ☐ Consultant physiologist
- ☐ Epilepsy specialist nurse
- ☐ GP
- ☒ Consultant Nurse for the

Name: *

Phil Tittensor

Job title *

Consultant Nurse for the Epilepsies

Organisation *

The Royal Wolverhampton NHS Trust

Email Address *

Professional organisation or society membership/affiliation *

Epilepsy Nurses Association - ESNA (chairperson), Cornwall Intellectual Disabilities Equitable Research - CIDER (researcher), International League Against Epilepsy - ILAE (member)

Nominated/ratified by (if applicable) *

Becca Hogg - Neuronostics

Registration number, and issuing organisation (e.g. GMC, NMC, HCPC) *

NMC 87D0950E

NOTES ON COMPLETING THE FORM

How NICE will use this information: The information that you provide on this form may be used to develop guidance on this topic.

Your advice and views represent your individual opinion and not that of your employer, professional society or a consensus view. Where relevant your name, job title, organisation and your responses, along with your declared interests may be published online on the NICE website as part of public consultation on the draft guidance, except in circumstances but not limited to, where comments are considered voluminous, or publication would be unlawful or inappropriate.

Please note: if you do not agree to the terms of the Personal Declaration (Section 3) or Confidentiality Agreement and Undertaking (Section 4-6), you will not be considered for the role of professional expert on this assessment.

For more information about how we process your data, please see the privacy notice on the NICE website: www.nice.org.uk/privacy-notice

Personal Declaration

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I confirm that:

- I am a registered practising professional in the UK/NHS and in good professional standing
- I have specialist knowledge in the technology or disease area
- I will declare all conflicts of interest in relation to the technology under consideration
- I will abide by NICE's governance policies and comply with NICE's processes and methods
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☒ Yes

☐ No

Name *

Phil Tittensor

Date *

11/28/2025



Confidentiality Agreement and Undertaking

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1. I acknowledge that information may be disclosed to me in relation to my participation in NICE's consultation process which is confidential ("**Confidential Information**"). Often this material will be commercially sensitive, or provided to NICE on an academic-in-confidence basis (for example research that has not yet been published). Confidential Information may include, but is not limited to:

- (a) the fact that a technology has been notified to the programme and is being considered for NICE advice and/or NICE guidance
- (b) a medtech innovation briefing draft document;
- (c) medical technology guidance draft documents (including but not limited to scope, assessment report, overview, consultation, final guidance, reviews and updates);
- (d) information relating to the existence, content or outcome of confidential discussions.

Confidentiality Agreement and Undertaking

2. Subject to paragraph 3 below, I undertake to NICE that I shall:

- (a) keep all Confidential Information strictly confidential and, except as expressly permitted under this agreement shall not disclose, use, copy in whole or in part or modify or adapt any Confidential Information in any way without NICE's prior written consent which may be given or withheld in its absolute discretion;
- (b) not use any Confidential Information for any purpose other than participating in the consultation process and any appeal that we may lodge;
- (c) return all Confidential Information to NICE on written demand; and
- (d) in the event that NICE authorises any disclosure of Confidential Information by me to a third party I shall procure that such third party complies with this agreement as if he were a party to it.

3. The undertakings set out in paragraph 2 above ("the **Undertakings**") shall not apply to information which:

- (a) is in the public domain otherwise than through a breach of any of the Undertakings or a breach of any other confidentiality obligation owed by any person to NICE;
- (b) was lawfully within my possession before it was disclosed to me by NICE and neither I nor my alternative source of the information owed any confidentiality obligation to the Institute in respect of it;
- (c) is required to be disclosed by any court of competent jurisdiction or any government agency lawfully requesting the same provided that I use my best endeavours to notify NICE in advance of such disclosure; or
- (d) is approved for release by prior written authorisation of NICE.

Confidentiality Agreement and Undertaking

4. I acknowledge that:

- (a) breach by me of any of the Undertakings could cause NICE harm that is irreparable and that cannot be compensated by damages, and that in the event of any actual or threatened breach by me of any Undertaking NICE shall be entitled to apply for and obtain (regardless of any rights NICE may have to claim damages) an injunction or other equitable relief against me;
- (b) this agreement constitutes the entire agreement between myself and NICE relating to the Confidential Information;
- (c) any amendments to or waiver of any of the terms of this agreement must be set out in writing and signed by me and on behalf of NICE;
- (d) this agreement is governed by English law and subject to the exclusive jurisdiction of the English courts.

Please indicate if you would like to **opt in** to NICE contacting you regarding other technologies/treatments in the future for your advice, or if you would **only** like to be contacted regarding this specific technology: *

- ☒ Yes, I agree that NICE can use my contact details to contact me for future requests for advice
- ☐ No, I agree that NICE can use my details to contact me for advice on this topic only, but not for others.

Name *

Phil Tittensor

Date *

11/28/2025



Organisation name (if applicable) *

The Royal Wolverhampton NHS Trust

Experience

Please answer the following questions as fully as possible to provide further information about the procedure/technologies and/or your experience

Please describe your level of experience with the procedure/technologies, for example:

- Are you familiar with the procedure/technologies?
- Have you used it or are you currently using it? If so, please indicate your experience with this.
- Do you know how widely this procedure/technology is used in the NHS? Is this procedure/technology performed/used by clinicians in specialities other than your own?

EEG is an essential component in the assessment of epilepsy. In adults, it is often non-contributory. I am CI for the Pristine trial of BioEP, an EEG biomarker algorithm to support clinical decision-making with otherwise non-contributory EEG. This is the first clinical trial of this technology. I am also PI for Eclipse, a multicentre trial of BioEP. This is to test the utility of the algorithm for predicting response to antiseizure medication. My service will be the 1st to trial BioEP for nine months in routine clinical practice. We anticipate its use in our first seizure clinics but also to analyse previously non-contributory EEG in patients where there remains diagnostic uncertainty. We have a long association with this technology, having provided EEG data to train the algorithm. My colleague is PI for another multi-centre trial of the technology called Citadel.

Other centres are using this technology as part of clinical trials. I am not aware of another centre using it clinically.

Please indicate your research experience relating to this procedure or technology (please choose one or more if relevant): (Please highlight your choice(s))

- ☐ I have done bibliographic research on this procedure or technology
- ☐ I have done research on this procedure or technology in laboratory settings (e.g. device-related research).
- ☒ I have done clinical research on this procedure or technology involving patients or healthy volunteers.
- ☐ I have published this research.
- ☐ I have had no involvement in research on this procedure or technology.
- ☐ Other _____

Current management

Please describe the current standard of care that is used in the NHS. Please note any clinical guidelines used in the NHS which are relevant to the care pathway. What setting would this technology be used in (primary care, general hospitals, specialist centres for example).

EEG has a number of uses in the NHS. Primarily the technology is used in general hospitals and specialist centres.

In a first suspected seizure situation, an epileptiform EEG is the biggest single indicator that the patient is at risk of developing further seizures (i.e. epilepsy).

Epilepsy is more correctly defined as the epilepsies, because there are many different conditions that come under the epilepsy umbrella. Treatment and management of these individual conditions will vary, with some treatments contraindicated for certain types of epilepsy whilst being the drug of choice in other types. EEG is helpful in classifying the type of epilepsy that an individual has. However, as I previously mentioned, EEG, particularly in adults, is often non-contributory. This can lead to repeated EEGs, sleep deprived EEGs and either home or inpatient video telemetry. This is time consuming, can delay treatment for patients, in some cases can place patients onto the wrong treatment pathway and is costly to the NHS, both in terms of resources (limited neuro physiologists) and money.

Finally, EEG in the acute setting is sometimes the only test to show that a patient is experiencing non-convulsive status epilepticus. In the ITU setting it is essential to assess the correct level of general anaesthesia-the treatment for status epilepticus.

Does this procedure/technology have the potential to replace current standard care or would it be used as an addition to existing standard care? Where would the technologies/procedure fit in the care pathway?

In the acute setting, it may be possible for algorithms to identify ongoing epileptiform activity in ITU and guide anesthesia.

More widely, it has great utility as a decision support tool where EEG is non-contributory. This must be seen as part of the epilepsy work up and overseen by expert epilepsy clinicians. At this stage I do not feel that it could be used as a stand-alone test. However, as part of an MDT assessment it could aid discussions for patients who can-not readily tolerate repeated EEGs (for example people with intellectual disability), or who are geographically isolated. This may limit the number of times that they need to come to hospital for repeat EEGs.

In a wider context, it could be useful in resource limited settings where an individual is only likely to be offered one EEG. Getting the most information possible out of that recording then becomes vital.

- What are the main aims of these procedures or technologies?
- How innovative are they?
- Can you name any technologies which are available in the UK and have this function/mode of action?
- Are there any competing or alternative procedures available to the NHS which have a similar function/mode of action to this?
- If so, how do these differ from the technology/procedure indicated here?

The main aims are to provide an additional support tool where EEG is non-contributory. In the acute setting, an algorithm to constantly monitor EEG, for example in ITU, would be extremely helpful.

The emerging technology is innovative. It can be used in different ways. For example, continuous EEG can be helpful to assess seizure burden and guide treatment. I am exploring this with the NIHR funded LEG-RTC trial of UNEEG, for example.

BioEP is the obvious example. UNEEG also have an implantable solution.

I'm not aware of any directly comparable alternative products

Approximately how many people each year would be eligible for an intervention with this procedure/technology, (give either as an estimated number, or a proportion of the target population)?

Only around 20-25% of people referred to 1st seizure clinics will have a contributory EEG. My own data suggest that in some centres this figure could be even less. Given the importance of EEG in the assessment of whether a first seizure will remain an isolated event, or the individual will go on to develop epilepsy, this technology could be used in all first seizure referrals where the standard EEG is non-contributory. In line with NICE guidelines, first seizure clinics are run by clinicians with expertise in epilepsy, so using the technology as decision support in this context should be safe.

For existing patients where there is diagnostic uncertainty, or where seizure control is suboptimal and the diagnosis is being revisited, this kind of technology could be extremely helpful. Given that optimal services should be able to offer people a 70% chance of seizure freedom, but the NHS only manages 54%, there's straightaway a treatment gap that this technology has the potential to narrow.

Potential patient benefits and impact on the health system

What do you consider to be the potential benefits to patients from using this procedure/technology?

Potentially fewer EEG investigations with improvements in waiting times that are often extremely long. This may also ease pressure on inpatient video telemetry units, where waiting lists can be in excess of the year. More rapid diagnostic certainty should lead to better treatment outcomes and reduced use of other NHS services, such as ED.

- Are there any groups of patients who would particularly benefit from this procedure/technology?
- Are there any groups in which the technology would be less effective or would be less likely to benefit?
- Are there any potential equality issues that should be considered for this condition and procedure/technology?

People who are geographically isolated from neurology centres. People who find it difficult to tolerate repeated EEG (e.g. people with intellectual disability).

We should not neglect people with functional dissociative seizures, where diagnostic reassurance is an essential first step to successful management of the condition. These people are often significant users of healthcare resources, particularly ED and ambulance services.

- What do you consider to be the potential benefits to the system from using this procedure/technology?
- Could it lead, for example, to a reduced number of appointments, improved care pathway, more efficient NHS staff time use?

As mentioned above, if successful, this technology could significantly improve care pathways to the benefit of patients and NHS efficiency.

What clinical facilities (or changes to existing facilities) are needed to do this procedure/implement this technology safely?

Interpretation of the algorithm is key and to that extent needs to be used by clinicians with expertise in epilepsy after training on the uses and crucially limitations of the technology.

Is any specific training needed in order to use the procedure/technology with respect to efficacy or safety?

As mentioned above, needs to be used by experienced clinicians who have been taught the utility and limitation of the particular algorithm

Safety and efficacy of the procedure/technologies

What are the potential harms of the procedure/technology?

- Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence:
- Adverse events reported in the literature (if possible, please cite literature)
- Anecdotal adverse events (known from experience)
- Theoretical adverse events

The technologies that I'm most familiar with could be harmful if used by inexperienced clinicians who do not have a background in epilepsy. For example, I would not advocate use in primary care. EEG itself is still prone to significant misinterpretation by nonspecialists and the same risks apply to this technology.

Please list the key efficacy and safety outcomes for this procedure/technology? Please suggest the most appropriate method of measurement for these outcomes and the timescales over which these should be measured (where appropriate) and if there are any challenges in collecting key outcomes.

Longitudinal studies are needed to follow patients and assess whether the forecast from the algorithm has been accurate.

Please list any uncertainties or concerns about the efficacy and safety of this procedure/technology?

Use by nonspecialists. For example, one of the algorithms is likely to give false negative reading if applied to people with structural brain lesions or who have a contributory basic EEG. Therefore, knowledge of the limitations of these systems is vital

Are you aware of any additional issues which would prevent (or have prevented) this procedure/technology being adopted in your organisation or across the wider NHS? This could include costs, resource, staffing for example.

There have been significant IP concerns about a clinical evaluation of the technology. Largely there has needed to be assurance that people requesting and interpreting the test have specialist knowledge of epilepsy and the technology. This links into many of my answers above. Given that the real world experience that we are about to undertake has been no cost to the NHS, I cannot comment on financial resources, but I imagine that business cases could be challenging.

Please list any abstract, real-world evidence, conference proceedings or any major trials or registries that you are aware of for this topic.

Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important. If you would like to share any studies which are confidential due to their publication status, please contact us via email.

The Pristine Study of BioEP will publish very soon. Conference abstracts from the ILAE in Bournemouth in September 2025 may be helpful. There was a platform presentation and abstract for the technology.

Is there any research that you feel would be needed to address uncertainties in the evidence base?

Longitudinal real-world studies as outlined above.

Further Comments

Please add any further comments on your particular experiences or knowledge of the procedure/technology.

My experience of this technology is that it could be incredibly useful. The null hypothesis must not be ignored here-reassuring patients that the seizure they've experienced is likely to be isolated. Also, people with functional dissociative seizures who need strong reassurance and reinforcement that their episodes are not due to epilepsy in order for them to access psychological treatment.

Thank you for completing the professional expert questionnaire.

Applicants for the role of professional expert will also be asked to complete a declaration of interests form as part of the application process, which will be emailed to the address shared on this form.

Your contribution will now be reviewed by the NICE team.

View results

Respondent

8

Anonymous

34:55

Time to complete

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- ☐ Consultant clinical neurophysiologist
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- ☐ Consultant paediatrician neurologist
- ☒ Consultant physiologist
- ☐ Epilepsy specialist nurse
- ☐ GP
- ☐ Other

Name: *

Peter Walsh

Job title *

Consultant Clinical Scientist

View results

Respondent

17

Anonymous

89:38

Time to complete

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- ☐ Consultant paediatrician neurologist
- ☐ Consultant physiologist
- ☐ Epilepsy specialist nurse
- ☐ GP
- ☐ Other

Name: *

Sarah Eglese

Job title *

Clinical Physiologist

Organisation *

The Walton Centre

Email Address *

Professional organisation or society membership/affiliation *

HCPC

Nominated/ratified by (if applicable) *

NA

Registration number, and issuing organisation (e.g. GMC, NMC, HCPC) *

CS023006

NOTES ON COMPLETING THE FORM

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☒ Yes

☐ No

Name *

Sarah Eglese

Date *

12/3/2025



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- (b) not use any Confidential Information for any purpose other than participating in the consultation process and any appeal that we may lodge;
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- (b) was lawfully within my possession before it was disclosed to me by NICE and neither I nor my alternative source of the information owed any confidentiality obligation to the Institute in respect of it;
- (c) is required to be disclosed by any court of competent jurisdiction or any government agency lawfully requesting the same provided that I use my best endeavours to notify NICE in advance of such disclosure; or
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- (a) breach by me of any of the Undertakings could cause NICE harm that is irreparable and that cannot be compensated by damages, and that in the event of any actual or threatened breach by me of any Undertaking NICE shall be entitled to apply for and obtain (regardless of any rights NICE may have to claim damages) an injunction or other equitable relief against me;
- (b) this agreement constitutes the entire agreement between myself and NICE relating to the Confidential Information;
- (c) any amendments to or waiver of any of the terms of this agreement must be set out in writing and signed by me and on behalf of NICE;
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- ☒ Yes, I agree that NICE can use my contact details to contact me for future requests for advice
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Name *

Sarah Eglese

Date *

12/3/2025



Organisation name (if applicable) *

The Walton Centre

Experience

Please answer the following questions as fully as possible to provide further information about the procedure/technologies and/or your experience

Please describe your level of experience with the procedure/technologies, for example:

- Are you familiar with the procedure/technologies?
- Have you used it or are you currently using it? If so, please indicate your experience with this.
- Do you know how widely this procedure/technology is used in the NHS? Is this procedure/technology performed/used by clinicians in specialities other than your own?

I am familiar with a few AI packages for EEG interpretation, namely Persyst and Autoscore. We are currently trialling both software packages in the department. I know of many centres in the UK currently using Persyst for long term monitoring and SEEG review.

Please indicate your research experience relating to this procedure or technology (please choose one or more if relevant): (Please highlight your choice(s))

- ☐ I have done bibliographic research on this procedure or technology
- ☐ I have done research on this procedure or technology in laboratory settings (e.g. device-related research).
- ☐ I have done clinical research on this procedure or technology involving patients or healthy volunteers.
- ☐ I have published this research.
- ☐ I have had no involvement in research on this procedure or technology.
- ☒ I have been involved with research on this topic

Current management

Please describe the current standard of care that is used in the NHS. Please note any clinical guidelines used in the NHS which are relevant to the care pathway. What setting would this technology be used in (primary care, general hospitals, specialist centres for example).

AI technology for EEG can be used across all centres with training and clinical validation.

Does this procedure/technology have the potential to replace current standard care or would it be used as an addition to existing standard care? Where would the technologies/procedure fit in the care pathway?

I believe these technologies would be used alongside the current standard of care, in a hybrid model alongside interpretation by clinical experts.

- What are the main aims of these procedures or technologies?
- How innovative are they?
- Can you name any technologies which are available in the UK and have this function/mode of action?
- Are there any competing or alternative procedures available to the NHS which have a similar function/mode of action to this?
- If so, how do these differ from the technology/procedure indicated here?

The Persyst software is used for spike and seizure detection in all modalities of EEG.

Autoscore is used for IED detection

Both technologies aim to assist in detection of epileptiform abnormalities. These technologies could be used in low staffed departments and may help to improve operational efficiency by speeding up the reporting time for clinicians.

Approximately how many people each year would be eligible for an intervention with this procedure/technology, (give either as an estimated number, or a proportion of the target population)?

All patients seen for EEG investigation

Potential patient benefits and impact on the health system

What do you consider to be the potential benefits to patients from using this procedure/technology?

Autoscore can be used to prioritise EEG workload and thereby reduce risk for those patients waiting for their EEG report.
Persyst can be used for all modalities of EEG but we have found it to be useful in continuous EEG on the ITU and for invasive EEG

- Are there any groups of patients who would particularly benefit from this procedure/technology?
- Are there any groups in which the technology would be less effective or would be less likely to benefit?
- Are there any potential equality issues that should be considered for this condition and procedure/technology?

Patients on continuous EEG monitoring
Patients on ambulatory and telemetry monitoring

- What do you consider to be the potential benefits to the system from using this procedure/technology?
- Could it lead, for example, to a reduced number of appointments, improved care pathway, more efficient NHS staff time use?

Improved care pathway via the prioritisation of the EEG reporting and speeding up review and reporting times

What clinical facilities (or changes to existing facilities) are needed to do this procedure/implement this technology safely?

No answer provided.

Is any specific training needed in order to use the procedure/technology with respect to efficacy or safety?

Staff training to use the software and data collection

Safety and efficacy of the procedure/technologies

What are the potential harms of the procedure/technology?

- Please list any adverse events and potential risks (even if uncommon) and, if possible, estimate their incidence:
- Adverse events reported in the literature (if possible, please cite literature)
- Anecdotal adverse events (known from experience)
- Theoretical adverse events

Over reliance on this technology, we need to remain aware that this software is still not able to differentiate between epileptiform activity and artefact in some cases

Please list the key efficacy and safety outcomes for this procedure/technology? Please suggest the most appropriate method of measurement for these outcomes and the timescales over which these should be measured (where appropriate) and if there are any challenges in collecting key outcomes.

key efficacy and safety outcomes for this procedure/technolog - :Diagnostic accuracy and efficiency by comparing AI outputs against a gold standard human consensus
Challenges- time and staffing

Please list any uncertainties or concerns about the efficacy and safety of this procedure/technology?

Misinterpretation of artefact

Are you aware of any additional issues which would prevent (or have prevented) this procedure/technology being adopted in your organisation or across the wider NHS? This could include costs, resource, staffing for example.

Funding and staffing

Please list any abstract, real-world evidence, conference proceedings or any major trials or registries that you are aware of for this topic.

Please note that NICE will do a comprehensive literature search; we are only asking you for any very recent abstracts or conference proceedings which might not be found using standard literature searches. You do not need to supply a comprehensive reference list but it will help us if you list any that you think are particularly important. If you would like to share any studies which are confidential due to their publication status, please contact us via email.

No answer provided.

Is there any research that you feel would be needed to address uncertainties in the evidence base?

No answer provided.

Further Comments

Please add any further comments on your particular experiences or knowledge of the procedure/technology.

No answer provided.

Thank you for completing the professional expert questionnaire.

Applicants for the role of professional expert will also be asked to complete a declaration of interests form as part of the application process, which will be emailed to the address shared on this form.

Your contribution will now be reviewed by the NICE team.