

National Institute for Health and Care Excellence

Final

Epilepsies in children, young people and adults

Supplement 2: Health economics

NICE guideline NG217

Health economics

April 2022

Final

Developed by the National Guideline Alliance which is a part of the Royal College of Obstetricians and Gynaecologists

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Search strategy

Health economics global search

One global search was conducted for economic evidence.

Database(s): MEDLINE & Embase (Multifile) - OVID

Embase Classic+Embase 1947 to 2021 March 31; Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily 1946 to March 31, 2021

Date of last search: 31 March 2021

Multifile database codes: emczd=Embase Classic+Embase; ppez= MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily

#	searches
1	exp epilepsy/ or exp seizure/ or "seizure, epilepsy and convulsion"/
2	1 use emczd
3	exp epilepsy/ or seizures/ or seizures, febrile/ or exp status epilepticus/
4	3 use ppez
5	(epilep* or seizure* or convuls*).ti,ab. or (continuous spike wave of slow sleep or infant* spasm*).ti,ab.
6	(seizure and absence).sh. use emczd, emcr or seizures/ use ppez or ((absence adj2 (convulsion* or seizure*)) or ((typical or atypical) adj absenc*) or petit mal* or pyknolepsy or typical absence*).ti,ab.
7	(atonic seizure or tonic seizure).sh. use emczd, emcr or exp seizures/ use ppez or ((drop or akinetic or atonic or tonic) adj2 (attack* or epileps* or seizure* or convulsion*).ti,ab. or brief seizure.ti,ab. or (tonic adj3 atonic adj3 (attack* or epileps* or seizure* or convulsion*).ti,ab.
8	exp benign childhood epilepsy/ use emczd, emcr or epilepsy, rolandic/ use ppez or (bcects or bects or brec or benign epilepsy or (benign adj2 (childhood or neonatal or pediatric or paediatric) adj2 epileps*) or (benign adj2 (childhood or neonatal or pediatric or paediatric) adj2 (convulsion* or epileps* or seizure* or spasm*)) or (benign adj3 (convulsion* or epileps*) adj2 centrottemporal adj2 spike*) or cects or ((centralopathic or centrottemporal or temporal-central focal) adj (convulsion* or epileps* or seizure*)) or ((osylvian or postrolandic or roland*) adj2 (convulsion* or epileps* or seizure* or spasm*))).ti,ab.
9	exp generalized epilepsy/ use emczd, emcr or exp epilepsy, generalized/ use ppez
10	((((akinetic or atonic or central or diffuse or general or general?ed or idiopathic or tonic) adj3 (epilep* or seizure*)) or ((childhood absence or juvenile absence or myoclonic or myoclonia or myoclonic astatic or myoclonus or gtcs) adj2 epilep*) or (epilepsy adj2 eyelid myoclonia) or (ige adj2 phantom absenc*) or impulsive petit mal or (janz adj3 (epilep* or petit mal)) or jeavons syndrome* or ((janz or lafora or lafora body or lundborg or unverricht) adj2 (disease or syndrome)) or ((jme or jmes) and epilep*) or perioral myoclon*).ti,ab.
11	infantile spasm/ use emczd, emcr or spasms, infantile/ use ppez or (((early or infantile) adj2 myoclonic adj2 encephalopath*) or ((early or infantile) adj2 epileptic adj2 encephalopath*) or epileptic spasm* or ((flexor or infantile or neonatal) adj2 (seizure* or spasm*)) or general?ed flexion epileps* or hypsarrhythmia* or ((jackknife or jack nife or lightning or nodding or salaam) adj (attack* or convulsion* or seizure* or spasm*)) or massive myoclonia or minor motor epilepsy or propulsive petit mal or spasm in*1 flexion or spasmus nutans or west syndrome*).ti,ab.
12	landau kleffner syndrome/ use emczd, emcr, ppez or (dravet or lennox gastaut or lgs or (landau adj2 kleffner) or smei).ti,ab.
13	lennox gastaut syndrome/ use emczd, emcr or lennox gastaut syndrome/ use ppez or generalized epilepsy/ use emczd, emcr or epileptic syndromes/ use ppez
14	(child* epileptic encephalopath* or gastaut or lennox or lgs).ti,ab.
15	myoclonus seizure/ use emczd, emcr or seizures/ use ppez or ((myoclon* adj2 (absence* or epileps* or seizure* or jerk* or progressive familial epilep* or spasm* or convulsion*)) or ((lafora or unverricht) adj2 disease) or muscle jerk).ti,ab.
16	myoclonic astatic epilepsy/ use emczd, emcr or exp epilepsies, myoclonic/ use ppez or ((myoclonic adj2 (astatic or atonic)) or (myoclonic adj3 (seizure* or spasm*)) or doose* syndrome or mae or general?ed idiopathic epilepsy).ti,ab. or ((absence or astatic or atonic or tonic or tonic clonic) adj2 (seizure* or spasm*)).ti,ab.

#	searches
17	exp epilepsies, partial/ use ppez or exp focal epilepsy/ use emczd, emcr or ((focal or focal onset or local or partial or simple partial) adj3 (epileps* or seizure*)).ti,ab.
18	severe myoclonic epilepsy in infancy/ use emczd, emcr or exp epilepsies, myoclonic/ use ppez
19	(dravet*1 or (intractable childhood epilepsy adj2 (generalised tonic clonic or gtc)) or icegct* or (severe adj2 (myoclonic or polymorphic) adj2 epilepsy adj2 infancy) or smeb or smei).ti,ab.
20	epilepsy, tonic-clonic/ use ppez or epilepsy, generalized/ use ppez or generalized epilepsy/ use emczd, emcr or grand mal epilepsy/ use emczd, emcr or (((clonic or grand mal or tonic or (tonic adj3 clonic)) adj2 (attack* or contraction* or convuls* or seizure*)) or gtcs or (generali* adj (contraction* or convuls* or insult or seizure*))).ti,ab.
21	or/2,4-20
22	exp budgets/ or exp "costs and cost analysis"/ or exp economics, hospital/ or exp economics, medical/ or economics, nursing/ or economics, pharmaceutical/ or economics/ or exp "fees and charges"/ or value of life/
23	22 use ppez
24	budget/ or exp economic evaluation/ or exp fee/ or funding/ or health economics/ or exp health care cost/
25	24 use emczd
26	budget*.ti,ab.
27	cost*.ti.
28	(economic* or pharmaco economic* or pharmacoeconomic*).ti.
29	(price* or pricing*).ti,ab.
30	(cost* adj2 (effective* or utilit* or benefit* or minimi* or unit* or estimat* or variable*)).ab.
31	(financ* or fee or fees).ti,ab.
32	(value adj2 (money or monetary)).ti,ab.
33	or/23,25-32
34	21 and 33
25	limit 34 to english language

Database(s): NHS Economic Evaluation Database (NHS EED), HTA database – CRD

Date of last search: 31 March 2021

hes
descriptor epilepsy explode all trees
descriptor seizures this term only
descriptor seizures, febrile this term only
descriptor status epilepticus explode all trees
o* or seizure* or convuls*) or ("continous spike wave of slow sleep" or "infant* spasm*")
absence near2 (convulsion* or seizure*) or ((typical or atypical) next absenc*) or "petit mal*" or pyknolepsy or "typical absence*")
descriptor seizures explode all trees
or akinetic or atonic or tonic) near2 (attack* or epileps* or seizure* or convulsion*) or "brief seizure" or (tonic near3 atonic near3 (attack* or epileps* or seizure* or convulsion*))
descriptor epilepsy, rolandic this term only
ts or bects or brecc or "benign epilepsy" or (benign near2 (childhood or neonatal or pediatric or paediatric) near2 epileps*) or (benign near2 (childhood or neonatal or pediatric or paediatric) near2 (convulsion* or epileps* or seizure* or spasm*)) or (benign near3 (convulsion* or epileps*) near2 centrottemporal near2 spike*) or cects or ((centralopathic or centrottemporal or "temporal-central focal") near (convulsion* or epileps* or seizure*)) or ((osylvian or postrolandic or roland*) near2 (convulsion* or epileps* or seizure* or spasm*))
descriptor epilepsy, generalized this term only
retic or atonic or central or diffuse or general or generalied or idiopathic or tonic) near3 (epilep* or seizure*) or ("childhood absence" or "juvenile absence" or myoclonic or myoclonia or "myoclonic astatic" or myoclonus or gtcs) near2 epilep*) or (epilepsy near2 "eyelid myoclonia") or (ige near2 phantom absenc*) or "impulsive petit mal" or (janz near3 (epilep* or "petit mal")) or "jeavons syndrome*" or ((janz or lafora or "lafora body" or lundborg or unverricht) near2 (disease or syndrome)) or ((jme or jmes) and epilep*) or "perioral myoclon*")
descriptor spasms, infantile this term only
ly or infantile) near2 myoclonic near2 encephalopath*) or ((early or infantile) near2 epileptic near2 encephalopath*) or "epileptic spasm*" or ((flexor or infantile or neonatal) near2 (seizure* or spasm*)) or "generalied flexion epileps*" or hysarrhythmia* or ((jackknife or "jack nife" or lightning or nodding or

hes
salaam next (attack* or convulsion* or seizure* or spasm*) or "massive myoclonia" or "minor motor epilepsy" or "propulsive petit mal" or "spasm in* flexion" or "spasmus nutans" or "west syndrome")
descriptor landau kleffner syndrome this term only
st or "lennox gastaut" or lgs or (landau near2 kleffner) or smei)
descriptor lennox gastaut syndrome this term only
descriptor epileptic syndromes this term only
l* epileptic encephalopath*" or gastaut or lennox or lgs)
clon* near2 (absence* or epileps* or seizure* or jerk* or "progressive familial epilep*" or spasm* or convulsion*) or ((lafora or unverricht) near2 disease) or "muscle jerk")
descriptor epilepsies, myoclonic explode all trees
clonic near2 (astatic or atonic) or (myoclonic near3 (seizure* or spasm*)) or "doose* syndrome" or mae or "generalized idiopathic epilepsy" or ((absence or astatic or atonic or tonic or "tonic clonic") near2 (seizure* or spasm*))
descriptor epilepsies, partial explode all trees
l or "focal onset" or local or partial or "simple partial") near3 (epileps* or seizure*))
descriptor epilepsies, myoclonic this term only
st*1 or ("intractable childhood epilepsy" near2 ("generalised tonic clonic" or gtc)) or icegtc* or (severe near2 (myoclonic or polymorphic) near2 epilepsy near2 infancy) or smeb or smei)
descriptor epilepsy, tonic-clonic this term only
descriptor epilepsy, generalized this term only
ic or "grand mal" or tonic or (tonic near3 clonic)) near2 (attack* or contraction* or convuls* or seizure*)) or gtcs or (general* next (contraction* or convuls* or insult or seizure*))
#2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29

Economic evidence study selection

Health economics global search

Figure 1: Flow diagram of economic article selection for global health economic search

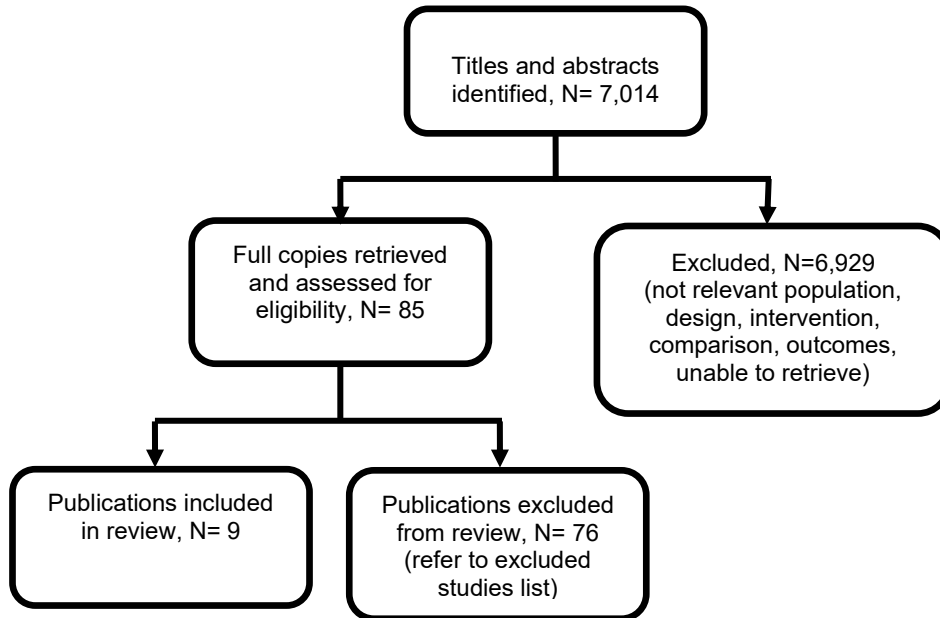


Table 1: Number of economic studies identified by review topic

Review topic	Number of economic studies included in the review
Effectiveness of genetic testing in determining the aetiology of epilepsy	1
Monotherapy for generalised tonic-clonic and focal onset seizures	1
Effectiveness of antiseizure therapies in the treatment of tonic or atonic seizures/drop attacks	2 [†]
Effectiveness of antiseizure therapies in the treatment of genetic generalised epilepsy, including juvenile myoclonic epilepsy	3
Effectiveness of antiseizure therapies in the treatment of Lennox-Gastaut syndrome	2 [†]
Effectiveness of a nurse specialist in the management of epilepsy	2

[†] Studies identified for 'Effectiveness of antiseizure therapies in the treatment of tonic or atonic seizures/drop attacks' and 'Effectiveness of antiseizure therapies in the treatment of Lennox-Gastaut syndrome' reviews are identical.

Excluded studies

Excluded studies following full text review

Study	Title	Reason for exclusion
Abend 2015	Could EEG Monitoring in Critically Ill Children Be a Cost-effective Neuroprotective Strategy?	Study conducted in the USA
Abend 2015	How much does it cost to identify a critically ill child experiencing electrographic seizures?	Study conducted in the USA
Ali 2014	The direct medical costs of epilepsy in children and young people: A population-based study of health resource utilisation	Non-comparative cost analysis - UK
Anonymous 2014	Correction: Clinical- and cost-effectiveness of a nurse led self-management intervention to reduce emergency visits by people with epilepsy (PLoS ONE)	No study design
Balabanov 2006	A pharmacoeconomic comparison of monotherapy with Tegretol, Finlepsin and Trileptal (preliminary data)	Not relevant to any review question
Barrachina-Martinez 2018	Budget Impact Analysis of Brivaracetam Adjunctive Therapy for Partial-Onset Epileptic Seizures in Valencia Community, Spain	Not relevant to any review question
Barrachina-Martinez 2018	Correction to: Budget Impact Analysis of Brivaracetam Adjunctive Therapy for Partial-Onset Epileptic Seizures in Valencia Community, Spain (Clinical Drug Investigation, (2018), 38, 4, (353-363), 10.1007/s40261-017-0615-z)	Not relevant to any review question
Beecham 2010	Health and social care costs for young adults with epilepsy in the UK	Non-comparative cost analysis - UK
Beghi 2008	Economic analysis of newer antiepileptic drugs	Not relevant to any review question
Berrigan 2016	Cost-utility analysis of magnetoencephalography used to inform intracranial electrode placement in patients with drug resistant epilepsy: a model based analysis	Not relevant to any review question
Blais 2005	Economic evaluation of levetiracetam as an add-on therapy in patients with refractory epilepsy	Not relevant to any review question
Bolin 2010	Lacosamide as treatment of epileptic seizures-cost utility results for Sweden	Not relevant to any review question
Bolin 2012	The cost effectiveness of newer epilepsy treatments: A review of the literature on partial-onset seizures	Systematic review
Borghs 2017	Health care cost associated with the use of enzyme-inducing and non-enzyme-active antiepileptic drugs in the UK: a long-term retrospective matched cohort study	Costing study
Bowen 2012	Epilepsy care in Ontario: An economic analysis of increasing access to epilepsy surgery	Not relevant to any review question
Burch 2012	The clinical effectiveness and cost-effectiveness of technologies used to visualise the seizure focus in people with refractory epilepsy being considered for surgery: A systematic review and decision-analytical model	Not relevant to any review question

Study	Title	Reason for exclusion
Carvalho 2018	Cost-Effectiveness of Evaluation of Children With Epilepsy in the Emergency Department: Need for Investment in Patient Education	Not a full economic analysis
Catchpool 2019	Cost-effectiveness of epileptic surgery compared with medical treatment in children with drug-resistant epilepsy	Not relevant to any review question
Coebergh 2013	Accurate diagnosis and long term management is problem in epilepsy, not cost of drugs	Not a full economic analysis
Connock 2006	The clinical effectiveness and cost-effectiveness of newer drugs for children with epilepsy. A systematic review	Systematic review
Craig 2013	Retigabine for the adjunctive treatment of adults with partial-onset seizures in epilepsy with and without secondary generalization: A NICE single technology appraisal	Not relevant to any review question
Darba 2014	Pharmacoeconomic outcomes for pregabalin: A systematic review in neuropathic pain, generalized anxiety disorder, and epilepsy from a Spanish perspective	Systematic review
de Kinderen 2015	An economic evaluation of the ketogenic diet versus care as usual in children and adolescents with intractable epilepsy: an interim analysis	Not relevant to any review question
de Kinderen 2016	Cost-effectiveness of the ketogenic diet and vagus nerve stimulation for the treatment of children with intractable epilepsy	Not relevant to any review question
Dewhurst 2015	A prospective service evaluation of acceptance and commitment therapy for patients with refractory epilepsy	Not a full economic evaluation
Elliott 2019	Decision Models for Assessing the Cost Effectiveness of Treatments for Pediatric Drug-Resistant Epilepsy: A Systematic Review of Economic Evaluations	Systematic review
Faulkner 2015	Comprehensive overview: Efficacy, tolerability, and cost-effectiveness of clobazam in lennox-gastaut syndrome	Study conducted in the USA
Fernandez 2019	Diagnostic yield of genetic tests in epilepsy: A meta-analysis and cost-effectiveness study	No quality adjusted outcomes reported
Forbes 2003	Cost-utility analysis of vagus nerve stimulators for adults with medically refractory epilepsy	Not relevant to any review question
Forbes 2008	Cost-utility of vagus nerve stimulation (VNS) therapy for medically refractory epilepsy-An update	Not a full economic analysis
Frew 2007	The cost-effectiveness of newer drugs as add-on therapy for children with focal epilepsies	Not relevant to any review question
Garcia-Lorenzo 2019	Stereoencephalography for Refractory Epileptic Patients Considered for Surgery: Systematic Review, Meta-Analysis, and Economic Evaluation	Not relevant to any review question
Geitona 2019	Lacosamide as a first-line treatment option in focal epilepsy: a cost-utility analysis for the Greek healthcare system	More applicable evidence identified

Study	Title	Reason for exclusion
Gharibnaseri 2012	Cost-effectiveness of adding-on new antiepileptic drugs to conventional regimens in controlling intractable seizures in children	Conducted from perspective of a non-OECD (Iran)
Hawkins 2005	Assessing the cost-effectiveness of new pharmaceuticals in epilepsy in adults: The results of a probabilistic decision model	More applicable evidence identified
Heaney 2006	Cost-effectiveness of carbamazepine in epilepsy	Not a full economic analysis
Howell 2018	A population-based cost-effectiveness study of early genetic testing in severe epilepsies of infancy	No quality adjusted outcomes reported
Jentink 2012	Economic evaluation of anti-epileptic drug therapies with specific focus on teratogenic outcomes	Not relevant to any review question
Jobst 2004	Prescribing antiepileptic drugs: Should patients be switched on the basis of cost?	Study conducted in the USA
Johnston 2007	Cost-effectiveness of pregabalin: A UK perspective	Not relevant to any review question
Knoester 2005	Cost-effectiveness of add-on lamotrigine therapy in clinical practice	Not a full economic analysis
Knoester 2007	A cost-effectiveness decision model for antiepileptic drug treatment in newly diagnosed epilepsy patients	More applicable evidence identified
Kristian 2013	Retigabine as add-on treatment of refractory epilepsy - a cost-utility study in a Swedish setting	Not relevant to any review question
Le Lorier 2004	Levetiracetam: An innovative and cost-effective add-on drug for refractory partial epilepsy	Not a full economic analysis
Lee 2013	The cost effectiveness of licensed oromucosal midazolam (Buccolam) for the treatment of children experiencing acute epileptic seizures: An approach when trial evidence is limited	Not relevant to any review question
Lee 2014	A comparison of the cost-effectiveness of treatment of prolonged acute convulsive epileptic seizures in children across Europe	Not relevant to any review question
Maloney 2017	Economic analysis of an epilepsy outreach model of care in a university hospital setting	Not relevant to any review question
Malphrus 2007	Use of the newer antiepileptic drugs in pediatric epilepsies	Not relevant to any review question
Mansouri 2015	Bridging the gap between evidence and practice for adults with medically refractory temporal lobe epilepsy: Is a change in funding policy needed to stimulate a shift in practice?	Not a full economic analysis
McCormack 2012	Rufinamide: a pharmaco-economic profile of its use as adjunctive therapy in Lennox-Gastaut syndrome	Not relevant to any review question

Study	Title	Reason for exclusion
Nabbout 2019	The evaluation and costs of transition programs for youth with epilepsy	Not relevant to any review question
Nunes 2013	Profile of lacosamide and its role in the long-term treatment of epilepsy: A perspective from the updated NICE guideline	Not a full economic analysis
O'Brien 2008	The cost-effective use of 18 F-FDG PET in the presurgical evaluation of medically refractory focal epilepsy	Not a full economic analysis
Palmer 2018	Integrating exome sequencing into a diagnostic pathway for epileptic encephalopathy: Evidence of clinical utility and cost effectiveness	Not relevant to any review question
Perucca 2003	Current trends in antiepileptic drug therapy	Not a full economic analysis
Picot 2016	Cost-effectiveness analysis of epilepsy surgery in a controlled cohort of adult patients with intractable partial epilepsy: A 5-year follow-up study	Not a full economic analysis
Pillas 2005	Economic aspects of epilepsy and antiepileptic treatment: A review of the literature	Not a full economic analysis
Roberts 2018	Assessment of components included in published societal perspective or QALY outcome economic analyses for antiepileptic drug treatment in chronic epilepsy	Not a full economic analysis
Sacino 2018	An initial cost-effectiveness analysis of intraoperative magnetic resonance imaging (iMRI) in pediatric epilepsy surgery	Study conducted in the USA
Sanchez Fernandez 2017	Nonintravenous rescue medications for pediatric status epilepticus: A cost-effectiveness analysis	Not relevant to any review question
Sanchez Fernandez 2017	Meta-analysis and cost-effectiveness of second-line antiepileptic drugs for status epilepticus	Not relevant to any review question
Simoens 2010	Pharmacoeconomics of anti-epileptic drugs as adjunctive therapy for refractory epilepsy	More applicable evidence identified
Simoens 2011	Lacosamide as adjunctive therapy for partial-onset epileptic seizures: A review of the clinical and economic literature	Systematic review
Simoens 2012	Cost effectiveness of lacosamide in the adjunctive treatment of patients with refractory focal epilepsy in Belgium	More applicable evidence identified
Spackman 2007	The cost effectiveness of zonisamide as adjunctive therapy in adult partial seizure epilepsy	More applicable evidence identified
Van Hout 2003	The cost effectiveness of two new antiepileptic therapies in the absence of direct comparative data: A first approximation	Not a full economic analysis
Vera-Llonch 2008	Cost-effectiveness of add-on therapy with pregabalin in patients with refractory partial epilepsy	More applicable evidence identified
Whiting 2006	A systematic review of the effectiveness and cost-effectiveness of neuroimaging assessments used to visualise the seizure focus in people with refractory epilepsy being considered for surgery	Systematic review

Study	Title	Reason for exclusion
Whiting 2017	Decreased health care utilization and health care costs in the inpatient and emergency department setting following initiation of ketogenic diet in pediatric patients: The experience in Ontario, Canada	Not relevant to any review question
Widjaja 2011	Cost-effectiveness of pediatric epilepsy surgery compared to medical treatment in children with intractable epilepsy	Not relevant to any review question
Widjaja 2013	Diagnostic evaluation in patients with intractable epilepsy and normal findings on MRI: A decision analysis and cost-effectiveness study	Not relevant to any review question
Wijnen 2017	Long-term clinical outcomes and economic evaluation of the ketogenic diet versus care as usual in children and adolescents with intractable epilepsy	Not relevant to any review question
Wijnen 2017	An economic evaluation of a multicomponent self-management intervention for adults with epilepsy (ZMILE study)	Not relevant to any review question
Wijnen 2017	A systematic review of economic evaluations of treatments for patients with epilepsy	Systematic review
Yi 2019	Levetiracetam for epilepsy: An evidence map of efficacy, safety and economic profiles	Not a full economic analysis