BMJ

BMJ 2012;344:e281 doi: 10.1136/bmj.e281 (Published 26 January 2012)

PRACTICE

GUIDELINES

Diagnosis and management of the epilepsies in adults and children: summary of updated NICE guidance

Vanessa Delgado Nunes *senior research fellow and project manager*[1], Laura Sawyer *senior health economist*[1], Julie Neilson *senior research fellow*[1], Grammati Sarri *senior research fellow*[1], J Helen Cross *clinical adviser to the guideline*[2] *The Prince of Wales's chair of childhood epilepsy*[3]

[1]National Clinical Guideline Centre, Royal College of Physicians, London NW1 4LE, UK; [2]UCL-Institute of Child Health, Great Ormond Street Hospital for Children, London ; [3]Young Epilepsy, Lingfield RH7 6PW, UK

This is one of a series of *BMJ* summaries of new guidelines based on the best available evidence; they highlight important recommendations for clinical practice, especially where uncertainty or controversy exists.

Epilepsy is a common neurological disorder characterised by recurring epileptic seizures; it is not a single diagnosis but is a symptom with many underlying causes, more accurately termed the epilepsies. Antiepileptic drugs (AEDs) to prevent recurrence of seizures form the mainstay of treatment. Diagnosis can be challenging, making accurate prevalence estimates difficult. With a prevalence of active epilepsy of 5-10 cases per 1000,[1] epilepsy has been estimated to affect between 362 000 and 415 000 people in England, but with a further 5-30% (up to another 124 500 people) misdiagnosed with epilepsy.[2] Consequently, it is a physician or paediatrician with expertise in epilepsy who should diagnose and manage the condition. The 2004 guideline from the National Institute for Health and Clinical Excellence on the management of the epilepsies in adults and children was recently partially updated with regard to drug management. This article summarises the main recommendations of the updated version; new recommendations are indicated in parentheses.[3]

Recommendations

NICE recommendations are based on the best available evidence and explicit consideration of cost effectiveness. When minimal evidence is available, recommendations are based on the Guideline Development Group's experience and opinion of what constitutes good practice. Evidence levels for the recommendations are given in italic in square brackets.

After a first seizure

- Children, young people, and adults presenting to an emergency department after a suspected seizure should be screened initially for epilepsy. This should be done by an adult or paediatric physician with onward referral to a specialist when an epileptic seizure is suspected or there is diagnostic doubt. (A specialist is defined in the guidance as either a "medical practitioner with training and expertise in epilepsy" (for adults) or a "paediatrician with training and expertise in epilepsy" (for children and young people). [*Based on the experience and opinion of the Guideline Development Group (GDG)*]

Diagnosis

- All children, young people, and adults with a suspected seizure of recent onset should be seen urgently (within two weeks) by a specialist. This is to ensure precise and early diagnosis and start of therapy as appropriate to their needs. [*Based on evidence from descriptive studies*]
- A definite diagnosis of epilepsy may not be possible. If the diagnosis cannot be clearly established, consider further investigations and/or referral to a tertiary epilepsy specialist. Always arrange follow-up. [*Based on the experience and opinion of the GDG*]

Investigations

- Children, young people, and adults needing electroencephalography should have the test performed soon (within four weeks) after it has been requested. [*Based on the experience and opinion of the GDG and evidence from descriptive studies*]
- Do 12 lead electrocardiography in adults with suspected epilepsy. [*Based on the experience and opinion of the GDG and evidence from descriptive studies*]
- In children and young people, consider 12 lead electrocardiography in cases of diagnostic uncertainty.

Correspondence to: V D Nunes vanessa.nunes@rcplondon.ac.uk

[*Based on the experience and opinion of the GDG and evidence from descriptive studies*]

- Magnetic resonance imaging should be the imaging investigation of choice in everyone with epilepsy. [*Based on evidence from descriptive studies*]
- Magnetic resonance imaging is particularly important in those:
  -Who develop epilepsy before the age of 2 years or in adulthood
  -Who have any suggestion of a focal onset on history, examination, or electroencephalography (unless there is clear evidence of benign focal epilepsy)
  -In whom seizures continue despite first line medication.

[*Based on evidence from systematic reviews of diagnostic studies and descriptive studies*]

- Children, young people, and adults needing magnetic resonance imaging should have it done soon. [*Based on the experience and opinion of the GDG*]

General information about drug treatment

- Adopt a consulting style that enables the child, young person, or adult with epilepsy, and their family and/or carers as appropriate, to participate as partners in all decisions about their healthcare and take fully into account their race, culture, and any specific needs. [*Based on the experience and opinion of the GDG*]
- Everyone with epilepsy should have a comprehensive care plan that is agreed between the person, their family and/or carers as appropriate, and primary and secondary care providers. [*Based on the experience and opinion of the GDG and evidence from descriptive studies*]
- Individualise the strategy for AED treatment according to the seizure type; epilepsy syndrome; comedication and comorbidity; the lifestyle of the child, young person, or adult; and the preferences of the person, their family, and/or carers as appropriate. [*Based on the experience and opinion of the GDG*]
- If using carbamazepine, offer controlled release preparations. (New recommendation.) [*Based on the experience and opinion of the GDG*]

For specific advice for women and girls of childbearing potential about AEDs, including sodium valproate, see later in this article.

Starting drug treatment

- When possible, offer an AED chosen on the basis of the presenting epilepsy syndrome. If the epilepsy syndrome is not clear at presentation, base the decision on the presenting seizure type(s). (New recommendation.) [*Based on the experience and opinion of the GDG*]. Tables 1⇓ and 2⇓ summarise the different drug options according to seizure type and syndrome.

First line treatment for newly diagnosed focal seizures

- Offer carbamazepine or lamotrigine as first line treatment. (New recommendation.) [*Based on moderate to very low quality evidence from randomised controlled trials and on cost effectiveness evidence*]
- Levetiracetam is not cost effective at June 2011 unit costs (the estimated cost of a 1500 mg daily dose was £2.74 (€3.30; $4.20) in June 2011[4]). Offer levetiracetam, oxcarbazepine, or sodium valproate (provided the acquisition cost of levetiracetam falls to at least 50% of the June 2011 value documented in the National Health Service Drug Tariff for England and Wales) if carbamazepine and lamotrigine are unsuitable or not tolerated. If the first AED tried is ineffective, offer an alternative from these five AEDs. (New recommendation.) [*Based on moderate to very low quality evidence from randomised controlled trials, cost effectiveness evidence, and the experience and opinion of the GDG*]
- Consider adjunctive treatment if a second, well tolerated AED is ineffective. (New recommendation.) [*Based on moderate to very low quality evidence from randomised controlled trials, cost effectiveness evidence, and the experience and opinion of the GDG*]

Adjunctive treatment for refractory focal seizures

- If first line treatments are ineffective or not tolerated, offer carbamazepine, clobazam, gabapentin, lamotrigine, levetiracetam, oxcarbazepine, sodium valproate, or topiramate as adjunctive treatment . (New recommendation.) [*Based on moderate to very low quality evidence from randomised controlled trials, cost effectiveness evidence, and experience and opinion of the GDG*]
- If adjunctive treatment is ineffective or not tolerated, discuss with, or refer to, a tertiary epilepsy specialist, who may consider other AEDs: eslicarbazepine acetate, lacosamide, phenobarbital, phenytoin, pregabalin, tiagabine, vigabatrin, and zonisamide. Carefully balance the risks and benefits when using vigabatrin because of the risk of an irreversible effect on visual fields. (New recommendation.) [*Based on moderate to very low quality evidence from randomised controlled trials, cost effectiveness evidence, and experience and opinion of the GDG*]

First line treatment for newly diagnosed generalised tonic-clonic seizures

- Offer sodium valproate as first line treatment. (New recommendation.) [*Based on low to very low quality evidence from randomised controlled trials, cost effectiveness evidence, and experience and opinion of the GDG*]
- If sodium valproate is unsuitable, offer lamotrigine. If the person has myoclonic seizures or is suspected of having juvenile myoclonic epilepsy, be aware that lamotrigine may exacerbate myoclonic seizures. (New recommendation.) [*Based on low to very low quality evidence from randomised controlled trials, cost effectiveness evidence and experience, and opinion of the GDG*]
- Consider carbamazepine and oxcarbazepine, but be aware of the risk of exacerbating myoclonic or absence seizures. (New recommendation.) [*Based on low to very low quality evidence from randomised controlled trials and experience and opinion of the GDG*]

Adjunctive treatment for generalised tonic-clonic seizures

- If first line treatments are ineffective or not tolerated, offer clobazam, lamotrigine, levetiracetam, sodium valproate, or topiramate as adjunctive treatment. (New recommendation.) [*Based on high to very low quality evidence from randomised controlled trials and cost effectiveness evidence*]
- If myoclonic seizures are absent or if juvenile myoclonic epilepsy is suspected, do not offer carbamazepine, gabapentin, oxcarbazepine, phenytoin, pregabalin, tiagabine, or vigabatrin. (New recommendation.) [*Based on experience and opinion of the GDG*]

Continuation of drug treatment

- Maintain a high level of vigilance for the emergence of adverse effects associated with the drug treatment (such as reduced bone density) and neuropsychiatric problems (as there is a small risk of suicidal thoughts and behaviour; available data suggest that this risk applies to all AEDs and may occur as early as a week after starting treatment[5]). (New recommendation.) [*Based on experience and opinion of the GDG*]

Ketogenic diet

- Refer children and young people with epilepsy whose seizures have not responded to appropriate AEDs to a tertiary paediatric epilepsy specialist for consideration of introducing a ketogenic diet. (New recommendation) [*Based on low to very low quality evidence from randomised controlled trials and experience and opinion of the GDG*]

Prolonged or repeated seizures and convulsive status epilepticus

- Only prescribe buccal midazolam or rectal diazepam for use in the community for those who have had a previous episode of prolonged or serial convulsive seizures. (New recommendation.) [*Based on experience and opinion of the GDG*]
- Administer buccal midazolam as first line treatment in the community. Administer rectal diazepam if preferred or if buccal midazolam is not available. If intravenous access is already established and resuscitation facilities are available, administer intravenous lorazepam. (New recommendation.) [*Based on high to very low quality evidence from randomised controlled trials*]

Advice for women and girls with epilepsy

- Discuss with women and girls of childbearing potential (including young girls who are likely to need to continue treatment into their childbearing years)—and their parents and/or carers if appropriate—the risk of AEDs causing malformations and possible neurodevelopmental impairments in an unborn child. Assess the risks and benefits of treatment with individual drugs. Data are limited on the risks to the unborn child that are associated with newer drugs. Specifically discuss the risk to the unborn child of continued use of sodium valproate, being aware that higher doses of sodium valproate (>800 mg a day) and multidrug treatment, particularly with sodium valproate, are associated with greater risk. (New recommendation.) [*Based on low to very low quality evidence from systematic reviews of cohort studies and data registries, and experience and opinion of the GDG*]
- Discuss with women and girls taking lamotrigine the evidence that the simultaneous use of any oestrogen based contraceptive can result in a significant reduction in lamotrigine levels and loss of seizure control. When starting or stopping these contraceptives, the dose of lamotrigine may need adjustment. (New recommendation.) [*Based on the experience and opinion of the GDG*]

People with learning disabilities

- Ensure adequate time for consultation to achieve effective management of epilepsy. (New recommendation.) [*Based on the experience and opinion of the GDG*]
- Do not discriminate against people with learning disabilities; offer the same services, investigations, and treatments to them as to the general population. (New recommendation.) [*Based on the experience and opinion of the GDG*]

Older people with epilepsy

- Do not discriminate against older people; offer the same services, investigations, and treatments to them as to the general population. (New recommendation.) [*Based on the experience and opinion of the GDG*]
- Pay particular attention to pharmacokinetic and pharmacodynamic problems with multidrug treatment and comorbidity. Consider using lower doses of AEDs, and, if using carbamazepine, offer controlled release carbamazepine preparations. (New recommendation.) [*Based on moderate to very low quality evidence from randomised controlled trials*]

Review and referral

- Provide a regular structured review to everyone with epilepsy. In children and young people, conduct the review at least yearly (but this may be reduced to between 3 and 12 months by arrangement) by a specialist. In adults, conduct the review at least yearly by a generalist or a specialist, depending on how well the epilepsy is controlled and/or the presence of specific lifestyle problems (such as sleep pattern, alcohol consumption). [*Based on the experience and opinion of the GDG and on evidence from a Cochrane review of randomised trials and evidence from surveys and audits*]

Overcoming barriers

The Guideline Development Group was aware of concerns about prescribing sodium valproate to girls and women of childbearing age. The updated recommendations offer alternative prescribing options for this group and also provide additional relevant information when considering prescribing antiepileptic drugs to women of childbearing age. The group also wished to ensure that people with learning disabilities and older people had optimal treatment and had the same opportunities as other adults to access treatments and specialist epilepsy services; the group expressed concern that this is not necessarily current practice.

The members of the Guideline Development Group were Nick Kosky (chair), Helen Cross (clinical adviser), Amanda Freeman, Diane Flower,

Further information on the guidance

The original NICE guideline on epilepsy was published in 2004, but since then five more antiepileptic drugs have become licensed for use in the United Kingdom to treat epilepsy. The updated 2012 guideline focuses on drug management and on recommendations for seizure type, but also, even more importantly, on epilepsy syndrome, emphasising the need to diagnose the syndrome when possible. It provides first line and adjunctive guidance on drug treatment, including clear guidance on which AEDs not to offer for specific seizure types and syndromes. Previous recommendations (which were not reviewed for this update) otherwise remain unchanged, and still stand for implementation.

Methods

The Guideline Development Group followed the standard NICE methods in the development of this guideline (www.nice.org.uk/aboutnice/howwework/developingniceclinicalguidelines/developing_nice_clinical_guidelines.jsp). This involved systematic searching, critically appraising, and summarising the clinical and cost effectiveness evidence. The group also conducted a new cost effectiveness analysis, comparing different AEDs as first line and adjunctive treatments in focal and generalised tonic-clonic seizures. The draft guideline went through a rigorous reviewing process, in which stakeholder organisations were invited to comment; the group took all comments into consideration when producing the final version of the guideline.

The GDG comprised a psychiatrist (chair), two patient representatives, two paediatric neurologists (one of whom was the clinical adviser), two adult neurologists, a general practitioner, a paediatrician, a clinical pharmacologist, and two nurses.

Evidence statements in this summary relate to the guideline update. Quality ratings were based on GRADE methodology (www.gradeworkinggroup.org). These relate to the quality of the available evidence for assessed outcomes rather than the quality of the clinical study. Outcomes assessed included the proportion of seizure-free participants; the proportion of participants having at least a 50% reduction in seizure frequency; the proportion of participants having their treatment withdrawn; the time to the end of the study or to the withdrawal of allocated treatment; the time to the first seizure; the time to 12 months' remission; the incidence of adverse events; any outcomes relating to cognitive effects; and any outcomes relating to quality of life.

Cost effectiveness analysis for first line and adjunctive drug treatment for newly diagnosed and refractory focal seizures in children and adults

An economic model was developed to compare the cost effectiveness of seven different AEDs licensed for treatment of adults with newly diagnosed focal seizures. Of these seven, lamotrigine was the most cost effective in the base case, but results of sensitivity analyses around cost showed that carbamazepine may also be cost effective. For patients in whom these drugs were considered unsuitable, sodium valproate and oxcarbazepine were likely to represent the most cost effective alternatives. Results of modelling showed that there is substantial uncertainty around the cost effectiveness of levetiracetam, driven by a limited clinical evidence base and questions about its future cost. Lamotrigine and carbamazepine consistently represented better value for money than levetiracetam across a range of potential cost reductions. Levetiracetam became more cost effective than sodium valproate and oxcarbazepine only when it could be acquired for less than 50% of its June 2011 unit cost. An economic model was developed to assess the AEDs licensed for treatment of children with newly diagnosed focal seizures, but given the extremely limited evidence base, conclusions were subject to considerable uncertainty.

Another economic model was developed to compare the cost effectiveness of 11 different AEDs licensed for treatment of adults with refractory focal seizures. Results indicated that adjunctive therapy with some of these 11 drugs was cost effective, but a conclusion about which to prescribe was highly uncertain and was dependent on a patient's previous treatments. Lamotrigine and oxcarbazepine were the most cost effective adjunctive therapies in the base case. In key sensitivity analyses around unit costs, effect estimates, and assumptions about which treatments have previously been trialled, adjunctive therapy with gabapentin, topiramate, and levetiracetam emerged as potentially cost effective. Treatment with newer AEDs—including eslicarbazepine acetate, lacosamide, pregabalin, tiagabine, and zonisamide—was never found to be cost effective. A further analysis, which used alternative costs and utility estimates, was conducted to estimate the cost effectiveness of adjunctive AEDs licensed for the treatment of children. Results were broadly similar to those found in the analysis for an adult population and were also sensitive to variation of cost and previous treatment.

Cost effectiveness analysis for adjunctive drug treatment for refractory generalised tonic-clonic seizures in adults

An economic model was developed to compare the cost effectiveness of three different AEDs licensed for treatment of individuals with refractory generalised tonic-clonic seizures. Of these three, lamotrigine was found to be the most cost effective in the base case, and this finding was robust in all sensitivity analyses conducted. Levetiracetam was the most cost effective AED if lamotrigine had been trialled previously or was unsuitable. Topiramate, the only other adjunctive AED for which there were clinical data, was cost effective only when other options such as lamotrigine and levetiracetam were considered unsuitable.

Future research

- How do the newer AEDs compare in efficacy to the standard AEDs in the treatment of newly diagnosed epilepsy? (For focal seizures the new drugs are carbamazepine, eslicarbazepine acetate, lacosamide, lamotrigine, levetiracetam, pregabalin, and zonisamide; for generalised seizures the new drugs are lamotrigine, levetiracetam, sodium valproate, and zonisamide.)
- What are the initial and add-on AEDs of choice in the treatment of the epilepsy syndromes with onset in childhood (for example, myoclonic-astatic epilepsy and Dravet syndrome)?
- What is the most effective and safest anticonvulsant to treat the following conditions?
  -Established (usually lasting longer than 30 minutes) convulsive status epilepticus
  -Refractory convulsive status epilepticus.
- What is the malformation rate and longer term neurodevelopmental outcome of children born to mothers who have taken AEDs in pregnancy?
- What is the effectiveness and tolerability of the ketogenic diet in adults with epilepsy?

Greg Rogers, Ian Wong, John Duncan, Margaret Jackson, Michael Harnor, Richard Appleton, Sally Gomersall, Tracey Truscott, Vanessa Delgado Nunes, Laura Sawyer, Julie Neilson, Grammati Sarri, and Sue Latchem.

Contributors: VDN wrote the first draft, and all authors were involved in writing further drafts and reviewed and approved the final version for publication. VDN and JHC are the guarantors.

Competing interests: All authors have completed the ICMJE uniform disclosure form at http://www.icmje.org/coi_disclosure.pdf (available on request from the corresponding author) and declare: all authors were funded by NICE for the submitted work. In the previous three years JHC has been an expert witness in a proposed action on the possible effects of sodium valproate on the unborn child. She also led the first randomised controlled trial of use of the ketogenic diet in drug resistant epilepsy in children, published in 2008. She currently receives an educational grant to her department from the drug companies UCB and Eisai for a clinical training fellowship in epilepsy, and in 2011 she undertook advisory work for Eisai and Viropharma, with the fees given to her department.

Provenance and peer review: Commissioned; not externally peer reviewed.

1 Clinical Standards Advisory Group. Services for patients with epilepsy. London: Department of Health, 2000. www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4009240.
2 Chowdhury FA, Nashef L, Elwes RD. Misdiagnosis in epilepsy: a review and recognition of diagnostic uncertainty. *Eur J Neurology* 2008;15:1034-42.
3 National Institute for Health and Clinical Excellence. The epilepsies: the diagnosis and management of the epilepsies in adults and children in primary and secondary care (update). (Clinical guideline 137.) 2012. http://guidance.nice.org.uk/CG137.

4 National Health Service Drug Tariff for England and Wales. www.ppa.org.uk/ppa/edt_intro.htm.
5 Medicines and Healthcare Products Regulatory Agency. Antiepileptics. 2011. www.mhra.gov.uk/PrintPreview/DefaultSplashPP/CON019574?DynamicListQuery=&DynamicListSortBy=xCreationDate&DynamicListSortOrder=Desc&DynamicListTitle=&PageNumber=1&Title=Antiepileptics%20&ResultCount=10.

Cite this as: *BMJ* 2012;344:e281

Tables

Table 1| Antiepileptic drug options by seizure type

Seizure type	First line	Adjunctive	Others that may be considered on referral to tertiary care	Do not offer (may worsen seizures)
Generalised tonic-clonic	Carbamazepine, lamotrigine, oxcarbazepine*, sodium valproate	Clobazam*, lamotrigine, levetiracetam, sodium valproate, topiramate		If there are absence or myoclonic seizures, or if juvenile myoclonic epilepsy is suspected: carbamazepine, gabapentin, oxcarbazepine, phenytoin, pregabalin, tiagabine, vigabatrin
Tonic or atonic	Sodium valproate	Lamotrigine*	Rufinamide*, topiramate*	Carbamazepine, gabapentin, oxcarbazepine, pregabalin, tiagabine, vigabatrin
Absence	Ethosuximide, lamotrigine*, sodium valproate	Ethosuximide, lamotrigine*, sodium valproate	Clobazam*, clonazepam, levetiracetam*, topiramate*, zonisamide*	Carbamazepine, gabapentin, oxcarbazepine, phenytoin, pregabalin, tiagabine, vigabatrin
Myoclonic	Levetiracetam*, sodium valproate, topiramate*	Levetiracetam, sodium valproate, topiramate*	Clobazam*, clonazepam, piracetam, zonisamide*	Carbamazepine, gabapentin, oxcarbazepine, phenytoin, pregabalin, tiagabine, vigabatrin
Focal	Carbamazepine, lamotrigine, levetiracetam, oxcarbazepine, sodium valproate	Carbamazepine, clobazam*, gabapentin*, lamotrigine, levetiracetam, oxcarbazepine, sodium valproate, topiramate	Eslicarbazepine acetate*, lacosamide, phenobarbital, phenytoin, pregabalin*, tiagabine, vigabatrin, zonisamide*	
Prolonged or repeated seizures and convulsive status epilepticus in the community	Buccal midazolam, rectal diazepam†, intravenous lorazepam			
Convulsive status epilepticus in hospital	Intravenous lorazepam Intravenous diazepam, buccal midazolam	Intravenous phenobarbital Phenytoin		
Refractory convulsive status epilepticus	Intravenous midazolam†, propofol† (not in children), thiopental sodium†			

*At the time of publication of the main NICE guidance (January 2012), this drug did not have UK marketing authorisation for this indication and/or population. Informed consent should be obtained and documented.

†At the time of publication of the main NICE guidance (January 2012), this drug did not have UK marketing authorisation for this indication and/or population. Informed consent should be obtained and documented in line with normal standards in emergency care.

Table 2| Antiepileptic drug options by epilepsy syndrome

Epilepsy syndrome	First line	Adjunctive	Others that may be considered on referral to tertiary care	Do not offer (may worsen seizures)
Childhood absence epilepsy or other absence syndromes	Ethosuximide, lamotrigine*, sodium valproate	Ethosuximide, lamotrigine*, sodium valproate	Clobazam*, clonazepam, levetiracetam*, topiramate*, zonisamide*	Carbamazepine, gabapentin, oxcarbazepine, phenytoin, pregabalin, tiagabine, vigabatrin
Juvenile absence epilepsy or other absence syndromes	Ethosuximide, lamotrigine*, sodium valproate	Ethosuximide Lamotrigine*, Sodium valproate	Clobazam*, clonazepam, levetiracetam*, topiramate*, zonisamide*	Carbamazepine, gabapentin, oxcarbazepine, phenytoin, pregabalin, tiagabine, vigabatrin
Juvenile myoclonic epilepsy	Lamotrigine*, levetiracetam*, sodium valproate, topiramate*	Lamotrigine*, levetiracetam, sodium valproate, topiramate*	Clobazam*, clonazepam, zonisamide*	Carbamazepine, gabapentin, oxcarbazepine, phenytoin, pregabalin, tiagabine, vigabatrin
Epilepsy with generalised tonic-clonic seizures only	Carbamazepine, lamotrigine, oxcarbazepine*, sodium valproate	Clobazam*, lamotrigine, levetiracetam, sodium valproate, topiramate		
Idiopathic generalised epilepsy	Lamotrigine*, sodium valproate, topiramate*	Lamotrigine*, levetiracetam*, sodium valproate, topiramate*	Clobazam*, clonazepam, zonisamide*	Carbamazepine, gabapentin, oxcarbazepine, phenytoin, pregabalin, tiagabine, vigabatrin
Infantile spasms not caused by tuberous sclerosis	Discuss with, or refer to, a tertiary paediatric epilepsy specialist. Steroid (prednisolone or tetracosactide*) or vigabatrin			
Infantile spasms caused by tuberous sclerosis	Discuss with, or refer to, a tertiary paediatric epilepsy specialist. Vigabatrin or steroid (prednisolone or tetracosactide*)			
Benign epilepsy with centrotemporal spikes	Carbamazepine*, lamotrigine*, levetiracetam*, oxcarbazepine*, sodium valproate	Carbamazepine*, clobazam*, gabapentin*, lamotrigine*, levetiracetam*, oxcarbazepine*, sodium valproate, topiramate*	Eslicarbazepine acetate*, lacosamide*, phenobarbital, phenytoin, pregabalin*, tiagabine*, vigabatrin*, zonisamide*	
Panayiotopoulos syndrome	Carbamazepine*, lamotrigine*, levetiracetam*, oxcarbazepine*, sodium valproate	Carbamazepine*, clobazam*, gabapentin*, lamotrigine*, levetiracetam*, oxcarbazepine*, sodium valproate, topiramate*	Eslicarbazepine acetate*, lacosamide*, phenobarbital, phenytoin, pregabalin*, tiagabine*, vigabatrin*, zonisamide*	
Late onset childhood occipital epilepsy (Gastaut-type)	Carbamazepine*, lamotrigine*, levetiracetam*, oxcarbazepine*, sodium valproate	Carbamazepine*, clobazam*, gabapentin*, lamotrigine*, levetiracetam*, oxcarbazepine*, sodium valproate, topiramate*	Eslicarbazepine acetate*, lacosamide*, phenobarbital, phenytoin, pregabalin*, tiagabine*, vigabatrin*, zonisamide*	
Dravet syndrome	Discuss with, or refer to, a tertiary paediatric epilepsy specialist. Sodium valproate, topiramate*	Clobazam*, stiripentol		Carbamazepine, gabapentin, lamotrigine, oxcarbazepine, phenytoin, pregabalin, tiagabine, vigabatrin
Continuous spike and wave during slow sleep	Refer to a tertiary paediatric epilepsy specialist			
Lennox-Gastaut syndrome	Discuss with, or refer to, a tertiary paediatric epilepsy specialist. Sodium valproate	Lamotrigine	Felbamate*, rufinamide, topiramate	Carbamazepine, gabapentin, oxcarbazepine, pregabalin, tiagabine, vigabatrin
Landau-Kleffner syndrome	Refer to a tertiary paediatric epilepsy specialist			
Myoclonic-astatic epilepsy	Refer to a tertiary paediatric epilepsy specialist			

*At the time of publication of the main NICE guidance (January 2012) this drug did not have UK marketing authorisation for this indication and/or population. Informed consent should be obtained and documented.