NHS

National Institute for Clinical Excellence

# The epilepsies

The diagnosis and management of the epilepsies in adults and children in primary and secondary care

**Clinical Guideline 20**
October 2004

Developed by the National Collaborating Centre for Primary Care

**Clinical Guideline 20**
**The epilepsies: the diagnosis and management of the epilepsies in adults and children in primary and secondary care**

**Issue date:** October 2004

This document, which contains the Institute's full guidance on the epilepsies, is available from the NICE website (www.nice.org.uk/CG020NICEguideline).

Two abridged versions of this guidance ('quick reference guides') are also available from the NICE website, one for the diagnosis and management of the epilepsies in adults and one for the diagnosis and management of the epilepsies in children (www.nice.org.uk/CG020adultsquickrefguide and www.nice.org.uk/CG020childrenquickrefguide). Printed copies of the quick reference guides can be obtained from the NHS Response Line: telephone 0870 1555 455 and quote reference numbers N0739 and N0740, respectively.

Information for the Public is available from the NICE website or from the NHS Response Line (quote reference number N0741 for a version in English and N0742 for a version in English and Welsh).

**This guidance is written in the following context:**

This guidance represents the view of the Institute, which was arrived at after careful consideration of the evidence available. Health professionals are expected to take it fully into account when exercising their clinical judgement. The guidance does not, however, override the individual responsibility of health professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

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The quick reference guides for this guideline have been distributed to the following:

- Primary care trust (PCT) chief executives
- Local health board (LHB) chief executives
- NHS trust chief executives in England and Wales
- Strategic health authority chief executives in England and Wales
- Medical and nursing directors in England and Wales
- Clinical governance leads in England and Wales
- Audit leads in England and Wales
- NHS trust, PCT and LHB libraries in England and Wales
- Patient advice and liaison co-ordinators in England
- Consultant neurologists in England and Wales
- Consultant neuropsychiatrists in England and Wales
- Accident & Emergency consultants in England and Wales
- Epilepsy nurse specialists in England and Wales
- Directorate nurse managers/modern matrons for accident and emergency in England and Wales
- GPs in England and Wales
- Chief pharmacists, heads of drug purchasing, heads of drug information, GP prescribing advisors and purchase advisors in England and Wales
- Prison healthcare managers in England and Wales
- NHS Director Wales
- Chief Executive of the NHS in England
- Chief Medical, Nursing and Pharmaceutical Officers in England and Wales
- Medical Director and Head of NHS Quality – Welsh Assembly Government
- Community health councils in Wales
- Commission for Healthcare Audit and Inspection
- NHS Clinical Governance Support Team
- Patient advocacy groups
- Representative bodies for health services, professional organisations and statutory bodies and the Royal Colleges

The quick reference guide for the diagnosis and management of the epilepsies in children has also been distributed to consultant paediatricians in England and Wales.

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## Key priorities for implementation

### *Diagnosis*

- All individuals with a recent onset suspected seizure should be seen urgently[a] by a specialist[b]. This is to ensure precise and early diagnosis and initiation of therapy as appropriate to their needs.

- The seizure type(s) and epilepsy syndrome, aetiology and co-morbidity should be determined.

### *Management*

- Healthcare professionals should adopt a consulting style that enables the individual 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.

- All individuals with epilepsy should have a comprehensive care plan that is agreed between the individuals, their family and/or carers as appropriate, and primary and secondary care providers.

- The AED (anti-epileptic drug) treatment strategy should be individualised according to the seizure type, epilepsy syndrome, co-medication and co-morbidity, the individual's lifestyle, and the preferences of the individual, their family and/or carers as appropriate.

### *Review and referral*

- All individuals with epilepsy should have a regular structured review. In children, this review should be carried out at least yearly (but may be between 3 and 12 months by arrangement) by a specialist. In adults, this review should be carried out at least yearly by either a generalist or

[a] The Guideline Development Group considered that 'urgently' meant being seen within 2 weeks.

[b] For adults, a specialist is defined throughout as a medical practitioner with training and expertise in epilepsy. For children, a specialist is defined throughout as a paediatrician with training and expertise in epilepsy.

specialist, depending on how well the epilepsy is controlled and/or the presence of specific lifestyle issues.

- At the review, individuals should have access to: written and visual information; counselling services; information about voluntary organisations; epilepsy specialist nurses; timely and appropriate investigations; referral to tertiary services, including surgery if appropriate.

- If seizures are not controlled and/or there is diagnostic uncertainty or treatment failure, individuals should be referred to tertiary services soon[c] for further assessment.

### *Special considerations for women of childbearing potential*

- Women with epilepsy and their partners, as appropriate, must be given accurate information and counselling about contraception, conception, pregnancy, caring for children, breastfeeding and menopause.

[c] The Guideline Development Group considered that 'soon' meant being seen within 4 weeks.

The following guidance is evidence based. The grading scheme used for the recommendations (A, B, C, D, NICE or good practice point [GPP]) is described in Appendix A; a summary of the evidence on which the guidance is based is provided in the full guideline (see Section 5).

# 1 Guidance

A – recommendation number for adults C – recommendation number for children

Note: In this guideline, adults are defined as aged 18 years and older and children as aged 28 days to 17 years. Young people are defined as being 12 to 17 years of age. However, it is recognised that there is a variable age range (15–19 years) at which care is transferred between child and adult health services by local healthcare trusts and primary care organisations.

## *1.1 Principle of decision making*

1.1.1 Healthcare professionals should adopt a consulting style that enables the individual 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. **D**

## *1.2 Coping with epilepsy*

1.2.1 People with epilepsy and their families and/or carers should be empowered to manage their condition as well as possible. **GPP**

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| 1.2.2 A Adults should receive appropriate information and education about all aspects of epilepsy. This may be best achieved and maintained through | 1.2.2C In children, self-management of epilepsy may be best achieved through active child-centred training models |

| | |
|---|---|
| structured self-management plans. **A** | and interventions. **A** |

1.2.3 Healthcare professionals should highlight the Expert Patients Programme (www.expertpatients.nhs.uk) to individuals with epilepsy who wish to manage their condition more effectively. **GPP**

## *1.3 Information*

1.3.1 Individuals with epilepsy and their families and/or carers should be given, and have access to sources of, information about (where appropriate): **C**

- epilepsy in general
- diagnosis and treatment options
- medication and side effects
- seizure type(s), triggers and seizure control
- management and self-care
- risk management
- first aid, safety and injury prevention at home and at school or work
- psychological issues
- social security benefits and social services
- insurance issues
- education and healthcare at school
- employment and independent living for adults
- importance of disclosing epilepsy at work, if relevant (if further information or clarification is needed, voluntary organisations should be contacted)
- road safety and driving
- prognosis
- sudden death in epilepsy (SUDEP)
- status epilepticus

- lifestyle, leisure and social issues (including recreational drugs, alcohol, sexual activity and sleep deprivation)
- family planning and pregnancy
- voluntary organisations, such as support groups and charitable organisations, and how to contact them.

1.3.2 The time at which this information should be given will depend on the certainty of the diagnosis, and the need for confirmatory investigations. **GPP**

1.3.3 Information should be provided in formats, languages and ways that are suited to the individual's requirements. Consideration should be given to developmental age, gender, culture and stage of life of the individual. **GPP**

1.3.4 If individuals and families and/or carers have not already found high-quality information from voluntary organisations and other sources, healthcare professionals should inform them of different sources (using the Internet, if appropriate: see, for example, the website of the Joint Epilepsy Council of the UK and Ireland, www.jointepilepsycouncil.org.uk). **GPP**

1.3.5 Adequate time should be set aside in the consultation to provide information, which should be revisited on subsequent consultations. **GPP**

1.3.6 Checklists should be used to remind both individuals and healthcare professionals about information that should be discussed during consultations. **GPP**

1.3.7 Everyone providing care or treatment for individuals with epilepsy should be able to provide essential information. **GPP**

1.3.8 The person with epilepsy and their family and/or carers as appropriate should know how to contact a named individual when information is needed. This named individual should be a member of the healthcare

team and be responsible for ensuring that the information needs of the individual and/or their family and/or carers are met. **GPP**

1.3.9 The possibility of having seizures should be discussed, and information on epilepsy should be provided before seizures occur, for people at high risk of developing seizures (such as after severe brain injury), people with a learning disability, or people who have a strong family history of epilepsy. **GPP**

1.3.10 People with epilepsy should be given appropriate information before they make important decisions (for example, regarding pregnancy or employment). **C adults, GPP children**

**Sudden death in epilepsy (SUDEP)**

1.3.11 Information on SUDEP should be included in literature on epilepsy to show why preventing seizures is important. Tailored information on the individual's relative risk of SUDEP should be part of the counselling checklist for people with epilepsy and their families and/or carers. **C**

1.3.12 The risk of SUDEP can be minimised by: **GPP**

- optimising seizure control
- being aware of the potential consequences of nocturnal seizures.

1.3.13 Tailored information and discussion between the individual with epilepsy, their family and/or carers (as appropriate) and healthcare professionals should take account of the small but definite risk of SUDEP. **C**

1.3.14 Where families and/or carers have been affected by SUDEP, healthcare professionals should contact families and/or carers to offer their condolences, invite them to discuss the death, and offer referral to bereavement counselling and a SUDEP support group. **C**

## *1.4 Following a first seizure*

1.4.1 Individuals presenting to an Accident and Emergency department following a suspected seizure should be screened initially. This should

be done by an adult or paediatric physician with onward referral to a specialist[d] when an epileptic seizure is suspected or there is diagnostic doubt. **GPP**

1.4.2 Protocols should be in place that ensure proper assessment in the emergency setting for individuals presenting with an epileptic seizure (suspected or confirmed). **D**

| | |
|---|---|
| 1.4.3 A The information that should be obtained from the individual and/or family or carer after a suspected seizure is contained in Appendix F. **GPP** | 1.4.3C The information that should be obtained from the child and/or parent or carer after a suspected seizure is contained in Appendix F. **GPP** |

| | |
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| 1.4.4 A It is recommended that all people having a first seizure should be seen as soon as possible[e] by a specialist in the management of the epilepsies to ensure precise and early diagnosis and initiation of therapy as appropriate to their needs. **A (NICE)** | 1.4.4C It is recommended that all children who have had a first non-febrile seizure should be seen as soon as possible[e] by a specialist in the management of the epilepsies to ensure precise and early diagnosis and initiation of therapy as appropriate to their needs. **A (NICE)** |

1.4.5 At the initial assessment for a recent onset seizure, the specialist should have access to appropriate investigations. **GPP**

[d] For adults, a specialist is defined throughout as a medical practitioner with training and expertise in epilepsy. For children, a specialist is defined throughout as a paediatrician with training and expertise in epilepsy.
[e] The GDG considered that with a recent onset suspected seizure, referrals should be urgent, meaning that patients should be seen within 2 weeks.

1.4.6 In an individual presenting with an attack, a physical examination should be carried out. This should address the individual's cardiac, neurological and mental status, and should include a developmental assessment where appropriate. **C**

1.4.7 Essential information on how to recognise a seizure, first aid, and the importance of reporting further attacks should be provided to a person who has experienced a possible first seizure, and their family/carer/parent as appropriate. This information should be provided while the individual is awaiting a diagnosis and should also be provided to their family and/or carers. **GPP**

## *1.5 Diagnosis*

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| 1.5.1 A The diagnosis of epilepsy in adults should be established by a specialist medical practitioner with training and expertise in epilepsy. **C** | 1.5.1 C The diagnosis of epilepsy in children should be established by a specialist paediatrician with training and expertise in epilepsy. **C** |

1.5.2 Individuals and their families and/or carers should be given an opportunity to discuss the diagnosis with an appropriate healthcare professional. **GPP adults, C children**

1.5.3 A detailed history should be taken from the individual and an eyewitness to the attack, where possible, to determine whether or not an epileptic seizure is likely to have occurred. **C**

1.5.4 The clinical decision as to whether an epileptic seizure has occurred should then be based on the combination of the description of the attack and different symptoms. Diagnosis should not be based on the presence or absence of single features. **B**

1.5.5 It may not be possible to make a definite diagnosis of epilepsy. If the diagnosis cannot be clearly established, further investigations (see

Section 1.6) and/or referral to a tertiary centre (See Section 1.8.38) should be considered. Follow-up should always be arranged. **GPP**

1.5.6 Where non-epileptic attack disorder is suspected, suitable referral should be made to psychological or psychiatric services for further investigation and treatment. **GPP**

1.5.7 Prospective recording of events, including video recording and written descriptions, can be very helpful in reaching a diagnosis. **GPP**

## *1.6 Investigations*

1.6.1 Information should be provided to individuals and families and/or carers as appropriate on the reasons for tests, their results and meaning, the requirements of specific investigations, and the logistics of obtaining them. **D**

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| | 1.6.2 C All investigations should be performed in a child-centred environment. **GPP** |

**EEG**

1.6.3 Individuals requiring an EEG should have the test performed soon after it has been requested.[f] **GPP**

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|---|---|
| 1.6.4 A An EEG should be performed only to support a diagnosis of epilepsy in adults in whom the clinical history suggests that the seizure is likely to be epileptic in origin. **C** | 1.6.4 C An EEG should be performed only to support a diagnosis of epilepsy in children. If an EEG is considered necessary, it should be performed after the second epileptic seizure but may, in certain circumstances, as evaluated by the specialist, |

[f] The Guideline Development Group considered that 'soon' meant being seen within 4 weeks.

| | |
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| | be considered after a first epileptic seizure. **C** |

1.6.5 An EEG should not be performed in the case of probable syncope because of the possibility of a false-positive result. **C**

1.6.6 The EEG should not be used to exclude a diagnosis of epilepsy in an individual in whom the clinical presentation supports a diagnosis of a non-epileptic event. **C**

1.6.7 The EEG should not be used in isolation to make a diagnosis of epilepsy. **C**

1.6.8 An EEG may be used to help determine seizure type and epilepsy syndrome in individuals in whom epilepsy is suspected. This enables individuals to be given the correct prognosis. **C**

1.6.9 In individuals presenting with a first unprovoked seizure, unequivocal epileptiform activity shown on EEG can be used to assess the risk of seizure recurrence. **B**

1.6.10 For individuals in whom epilepsy is suspected, but who present diagnostic difficulties, specialist investigations should be available. **GPP**

1.6.11 Repeated standard EEGs may be helpful when the diagnosis of the epilepsy or the syndrome is unclear. However, if the diagnosis has been established, repeat EEGs are not likely to be helpful. **C**

1.6.12 Repeated standard EEGs should not be used in preference to sleep or sleep-deprived EEGs. **C**

1.6.13 When a standard EEG has not contributed to diagnosis or classification, a sleep EEG should be performed. **C**

1.6.14 In children, a sleep EEG is best achieved through sleep deprivation or the use of melatonin[g]. **GPP**

1.6.15 Long-term video or ambulatory EEG may be used in the assessment of individuals who present diagnostic difficulties after clinical assessment and standard EEG. **C**

1.6.16 Provocation by suggestion may be used in the evaluation of non-epileptic attack disorder. However, it has a limited role and may lead to false positive results in some individuals. **C**

1.6.17 Photic stimulation and hyperventilation should remain part of standard EEG assessment. The individual and family and/or carer should be made aware that such activation procedures may induce a seizure and they have a right to refuse. **GPP**

**Neuroimaging**

1.6.18 Neuroimaging should be used to identify structural abnormalities that cause certain epilepsies. **C**

1.6.19 MRI should be the imaging investigation of choice in individuals with epilepsy. **C**

1.6.20 MRI is particularly important in those: **C**

- who develop epilepsy before the age of 2 years or in adulthood
- who have any suggestion of a focal onset on history, examination or EEG (unless clear evidence of benign focal epilepsy)
- in whom seizures continue in spite of first-line medication.

1.6.21 Individuals requiring MRI should have the test performed soon.[h] **GPP**

1.6.22 Neuroimaging should not be routinely requested when a diagnosis of idiopathic generalised epilepsy has been made. **C**

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[g] Melatonin is not currently licensed in the UK.
[h] The Guideline Development Group considered that 'soon' meant being seen within 4 weeks.

1.6.23 CT should be used to identify underlying gross pathology if MRI is not available or is contraindicated, and for children in whom a general anaesthetic or sedation would be required for MRI but not CT. **C**

1.6.24 In an acute situation, CT may be used to determine whether a seizure has been caused by an acute neurological lesion or illness. **GPP**

**Other tests**

1.6.25 Measurement of serum prolactin is not recommended for the diagnosis of epilepsy. **C**

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| 1.6.26A In adults, appropriate blood tests (for example, plasma electrolytes, glucose, calcium) to identify potential causes and/or to identify any significant co-morbidity should be considered. **GPP** | 1.6.26C In children, other investigations, including blood and urine biochemistry, should be undertaken at the discretion of the specialist to exclude other diagnoses, and to determine an underlying cause of the epilepsy. **GPP** |
| 1.6.27A A 12-lead ECG should be performed in adults with suspected epilepsy. **GPP** | 1.6.27C In children, a 12-lead ECG should be considered in cases of diagnostic uncertainty. **GPP** |

1.6.28 In cases of diagnostic uncertainty, a referral to a cardiologist should be considered. **GPP**

**Neuropsychological assessment**

1.6.29 Neuropsychological assessment should be considered in individuals in whom it is important to evaluate learning disabilities and cognitive dysfunction, particularly in regard to language and memory. **D**

1.6.30 Referral for a neuropsychological assessment is indicated:

- when an individual with epilepsy is having educational or occupational difficulties
- when an MRI has identified abnormalities in cognitively important brain regions
- when an individual complains of memory or other cognitive deficits and/or cognitive decline. **D**

## *1.7 Classification*

1.7.1 Epileptic seizures and epilepsy syndromes in individuals should be classified using a multi-axial diagnostic scheme. The axes that should be considered are: description of seizure (ictal phenomenology); seizure type; syndrome and aetiology. **D**

1.7.2 The seizure type(s) and epilepsy syndrome, aetiology, and co-morbidity should be determined, because failure to classify the epilepsy syndrome correctly can lead to inappropriate treatment and persistence of seizures. **C**

1.7.3 Individuals with epilepsy should be given information about their seizure type(s) and epilepsy syndrome, and the likely prognosis. **GPP**

## *1.8 Management*

1.8.1 People with epilepsy should have an accessible point of contact with specialist services. **GPP**

1.8.2 All people with epilepsy should have a comprehensive care plan that is agreed between the individual, family and/or carers where appropriate, and primary care and secondary care providers. This should include lifestyle issues as well as medical issues. **GPP**

1.8.3 Epilepsy specialist nurses (ESNs) should be an integral part of the network of care of individuals with epilepsy. The key roles of the ESNs are to support both epilepsy specialists and generalists, to ensure access to community and multi-agency services and to provide

information, training and support to the individual, families, carers and, in the case of children, others involved in the child's education, welfare and well-being. **D**

1.8.4 Healthcare professionals have a responsibility to educate others about epilepsy so as to reduce the stigma associated with it. They should provide information about epilepsy to all people who come into contact with people with epilepsy, including school staff, social care professionals and others. **GPP**

**Pharmacological treatment**

Note: see Appendix G for further details of pharmacological treatment

1.8.5 Information that is provided about anti-epileptic drugs (AEDs) needs to be in the context of that provided by the manufacturer, for example, indications, side effects and licence status. **GPP**

1.8.6 The AED treatment strategy should be individualised according to the seizure type, epilepsy syndrome, co-medication and co-morbidity, the individual's lifestyle, and the preferences of the individual and their family and/or carers as appropriate (see Appendix G). **A**

1.8.7 The diagnosis of epilepsy needs to be critically evaluated if events continue despite an optimal dose of a first-line AED. **GPP**

1.8.8 Changing the formulation or brand of AED is not recommended because different preparations may vary in bioavailability or have different pharmacokinetic profiles and, thus, increased potential for reduced effect or excessive side effects. **D**

1.8.9 It is recommended that individuals should be treated with a single antiepileptic drug (monotherapy) wherever possible. If the initial treatment is unsuccessful, then monotherapy using another drug can be tried. Caution is needed during the changeover period. **A (NICE)**

1.8.10 If an AED has failed because of adverse effects or continued seizures, a second drug should be started (which may be an alternative first-line

or second-line drug) and built up to an adequate or maximum tolerated dose and then the first drug should be tapered off slowly. **GPP**

1.8.11 If the second drug is unhelpful, either the first or second drug may be tapered, depending on relative efficacy, side effects and how well the drugs are tolerated before starting another drug. **GPP**

1.8.12 It is recommended that combination therapy (adjunctive or 'add-on' therapy) should only be considered when attempts at monotherapy with AEDs have not resulted in seizure freedom. If trials of combination therapy do not bring about worthwhile benefits, treatment should revert to the regimen (monotherapy or combination therapy) that has proved most acceptable to the individual, in terms of providing the best balance between effectiveness in reducing seizure frequency and tolerability of side effects. **A (NICE)**

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| 1.8.13A The newer AEDs gabapentin, lamotrigine, levetiracetam, oxcarbazepine, tiagabine, topiramate and vigabatrin, within their licensed indications, are recommended for the management of epilepsy in people who have not benefited from treatment with the older antiepileptic drugs such as carbamazepine or sodium valproate, or for whom the older antiepileptic drugs are unsuitable because: | 1.8.13C The newer AEDs gabapentin, lamotrigine, oxcarbazepine, tiagabine, topiramate, and vigabatrin (as an adjunctive therapy for partial seizures), within their licensed indications, are recommended for the management of epilepsy in children who have not benefited from treatment with the older antiepileptic drugs such as carbamazepine or sodium valproate, or for |

| | |
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| • there are contraindications to the drugs<br>• they could interact with other drugs the person is taking (notably oral contraceptives)<br>• they are already known to be poorly tolerated by the individual<br>• the person is a woman of childbearing potential. **A (NICE)** | whom the older antiepileptic drugs are unsuitable because:<br>• there are contraindications to the drugs<br>• they could interact with other drugs the child is taking (notably oral contraceptives)<br>• they are already known to be poorly tolerated by the child<br>• the child is currently of childbearing potential or is likely to need treatment into her childbearing years. **A (NICE)** |
| | 1.8.14 C Vigabatrin is recommended as a first-line therapy for the management of infantile spasms. **A (NICE)** |

**Initiation of pharmacological treatment**

1.8.15 AED therapy should only be started once the diagnosis of epilepsy is confirmed, except in exceptional circumstances that require discussion and agreement between the prescriber, the specialist and the individual and their family and/or carers as appropriate. **GPP**

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| 1.8.16A AED therapy should be initiated in adults on the recommendation of a specialist. **GPP** | 1.8.16C AED therapy in children should be initiated by a specialist. **GPP** |

1.8.17 The decision to initiate AED therapy should be taken between the individual, their family and/or carers (as appropriate) and the specialist after a full discussion of the risks and benefits of treatment. This discussion should take into account details of the individual's epilepsy syndrome, prognosis and lifestyle. **GPP**

1.8.18 Treatment with AED therapy is generally recommended after a second epileptic seizure. **A**

1.8.19 AED therapy should be considered and discussed with individuals and their family and/or carers as appropriate after a first unprovoked seizure if: **B**

- the individual has a neurological deficit
- the EEG shows unequivocal epileptic activity
- the individual and/or their family and/or carers consider the risk of having a further seizure unacceptable
- brain imaging shows a structural abnormality.

1.8.20 It should be recognised that some individuals (through their families and/or carers, in some instances) may choose not to take AED therapy following a full discussion of the risks and benefits. **GPP**

**Continuation of pharmacological treatment**

1.8.21 Continuing AED therapy should be planned by the specialist. It should be part of the individual's agreed treatment plan, which should include details of how specific drug choices were made, drug dosage, possible side effects, and action to take if seizures persist. **GPP**

1.8.22 The needs of the individual and their family and/or carers as appropriate should be taken into account when healthcare professionals take on the responsibility of continuing prescribing. **GPP**

1.8.23 If management is straightforward, continuing AED therapy can be prescribed in primary care if local circumstances and/or licensing allow. **GPP**

1.8.24 The prescriber must ensure that the individual and their family and/or carers as appropriate are fully informed about treatment including action to be taken after a missed dose or after a gastrointestinal upset. **GPP**

1.8.25 Adherence to treatment can be optimised with the following: **D**

- educating individuals and their families and/or carers in the understanding of their condition and the rationale of treatment
- reducing the stigma associated with the condition (see also Section 1.2)
- using simple medication regimens
- positive relationships between healthcare professionals, the individual with epilepsy and their family and/or carers.

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| 1.8.26A Regular blood test monitoring in adults is not recommended as routine, and should be done only if clinically indicated. **C** | 1.8.26C Regular blood test monitoring in children is not recommended as routine, and should be done only if clinically indicated and recommended by the specialist. **GPP** |

1.8.27 Indications for monitoring of AED blood levels are: **D**

- detection of non-adherence to the prescribed medication
- suspected toxicity

- adjustment of phenytoin dose
- management of pharmacokinetic interactions
- specific clinical conditions, for example, status epilepticus, organ failure and pregnancy.

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| 1.8.28 A Examples of blood tests include:<br>• before surgery – clotting studies in those on valproate<br>• full blood count, electrolytes, liver enzymes, vitamin D levels, and other tests of bone metabolism (for example, serum calcium and alkaline phosphatase) every 2–5 years for adults taking enzyme-inducing drugs. **GPP** | |

1.8.29 Asymptomatic minor abnormalities in test results are not necessarily an indication for changes in medication. **GPP**

**Withdrawal of pharmacological treatment**

1.8.30 The decision to continue or withdraw medication should be taken by the individual, their family and/or carers as appropriate, and the specialist after a full discussion of the risks and benefits of withdrawal. At the end of the discussion individuals, and their family and/or carers as appropriate, should understand the individual's risk of seizure recurrence on and off treatment. This discussion should take into account details of the individual's epilepsy syndrome, prognosis and lifestyle. **A**

1.8.31 Withdrawal of AEDs must be managed by, or be under the guidance of, the specialist. **GPP**

1.8.32 The risks and benefits of continuing or withdrawing AED therapy should be discussed with individuals, and their families and/or carers as appropriate, who have been seizure free for at least 2 years (see Appendix H[i] of the full guideline). **A**

1.8.33 When AED treatment is being discontinued in an individual who has been seizure free, it should be carried out slowly (at least 2–3 months) and one drug should be withdrawn at a time. **D**

1.8.34 Particular care should be taken when withdrawing benzodiazepines and barbiturates (may take up to 6 months or longer) because of the possibility of drug-related withdrawal symptoms and/or seizure recurrence. **GPP**

1.8.35 There should be a failsafe plan agreed with individuals and their families and/or carers as appropriate, whereby if seizures recur, the last dose reduction is reversed and medical advice is sought. **GPP**

**Referral for complex or refractory epilepsy**

1.8.36 All individuals with epilepsy should have access via their specialist to a tertiary service when circumstances require. **GPP**

1.8.37 Information should be provided to individuals and families and/or carers as appropriate about the reasons for considering surgery. The benefits and risks of the surgical procedure under consideration should be fully explained before the individual's informed consent is obtained. **C**

1.8.38 If seizures are not controlled and/or there is diagnostic uncertainty or treatment failure, individuals should be referred to tertiary services

[i] Appendix H of the full guideline provides tables for the prognosis for remission of seizures in adults.

soon[j] for further assessment. Referral should be considered when one or more of the following criteria are present:

- the epilepsy is not controlled with medication within 2 years **D**
- management is unsuccessful after two drugs **GPP**
- the individual is aged under 2 years **GPP**
- an individual experiences, or is at risk of, unacceptable side effects from medication **GPP**
- there is a unilateral structural lesion **GPP**
- there is psychological and/or psychiatric co-morbidity **GPP**
- there is diagnostic doubt as to the nature of the seizures and/or seizure syndrome. **GPP**

| | |
|---|---|
| | 1.8.39 C In children, the diagnosis and management of epilepsy within the first few years of life may be extremely challenging. For this reason, children with suspected epilepsy should be referred to tertiary services early, because of the profound developmental, behavioural and psychological effects that may be associated with continuing seizures. **D** |

1.8.40 Behavioural or developmental regression or inability to identify the epilepsy syndrome in an individual should result in immediate referral to tertiary services. **GPP**

[j] The Guideline Development Group considered that 'soon' meant being seen within 4 weeks.

1.8.41 Individuals with specific syndromes such as Sturge–Weber syndrome, the hemispheric syndromes, Rasmussen's encephalitis and hypothalamic hamartoma should be referred to a tertiary epilepsy service. **GPP**

1.8.42 Psychiatric co-morbidity and/or negative baseline investigations should not be a contraindication for referral to a tertiary centre. **GPP**

1.8.43 The tertiary service should include a multidisciplinary team, experienced in the assessment of individuals with complex epilepsy, and have adequate access to investigations and treatment by both medical and surgical means. **GPP**

1.8.44 The expertise of multidisciplinary teams involved in managing complex epilepsy should include psychology, psychiatry, social work, occupational therapy, counselling, neuroradiology, clinical nurse specialists, neurophysiology, neurology, neurosurgery and neuroanaesthesia. Teams should have MRI and video telemetry facilities available to them. **GPP**

1.8.45 The neurosurgeon in the multidisciplinary team should have specialist experience of and/or training in epilepsy surgery and have access to invasive EEG recording facilities. **GPP**

**Psychological interventions**

| | |
|---|---|
| 1.8.46 A Psychological interventions (relaxation, cognitive behaviour therapy, biofeedback) may be used in conjunction with AED therapy in adults where either the individual or the specialist considers seizure control to be inadequate with optimal AED therapy. | 1.8.46C Psychological interventions (relaxation, cognitive behaviour therapy) may be used in children with drug-resistant focal epilepsy. **A** |

| | |
|---|---|
| This approach may be associated with an improved quality of life in some individuals. **A** | |

1.8.47 Psychological interventions may be used as adjunctive therapy. They have not been proven to affect seizure frequency and are not an alternative to pharmacological treatment. **A**

**Ketogenic diet**

| | |
|---|---|
| 1.8.48A The ketogenic diet should not be recommended for adults with epilepsy. **C** | 1.8.48C The ketogenic diet may be considered as an adjunctive treatment in children with drug-resistant epilepsy. **C** |

**Vagus nerve stimulation (VNS)**

| | |
|---|---|
| 1.8.49 A Vagus nerve stimulation is indicated for use as an adjunctive therapy in reducing the frequency of seizures in adults who are refractory to antiepileptic medication but who are not suitable for resective surgery. This includes adults whose epileptic disorder is dominated by partial seizures (with or without secondary | 1.8.49C Vagus nerve stimulation is indicated for use as an adjunctive therapy in reducing the frequency of seizures in children who are refractory to antiepileptic medication but who are not suitable for resective surgery. This includes children whose epileptic disorder is dominated by partial seizures (with or without secondary |

| | |
|---|---|
| generalisation) or generalised seizures. **A** | generalisation) or generalised seizures. **A** [k] |

## *1.9 Prolonged or repeated seizures in the community*

1.9.1 An individual who has prolonged convulsive seizures (lasting 5 minutes or more) or serial seizures (three or more seizures in an hour) in the community should receive urgent care and treatment. **A**

1.9.2 Rectal diazepam is safe and effective in first-line treatment of prolonged seizures and is recommended in the majority of cases. **A**

1.9.3 For many individuals and in many circumstances, buccal midazolam[l] is more acceptable than rectal diazepam and is easier to administer. It should be used according to an agreed protocol drawn up by the specialist and only used following training. **GPP**

1.9.4 Healthcare professionals should inform individuals, and their families and/or carers, that buccal midazolam is currently unlicensed. **GPP**

1.9.5 Treatment should be administered by trained clinical personnel or, if specified by an individually agreed protocol drawn up with the specialist, by family members or carers with appropriate training. **GPP**

1.9.6 Care must be taken to secure the individual's airway and assess his or her respiratory and cardiac function. **GPP**

1.9.7 Depending on response and the individual's situation, emergency services should be contacted, particularly if: **GPP**

- seizures develop into status epilepticus
- there is a high risk of recurrence
- this is the first episode
- there may be difficulties monitoring the individual's condition.

[k] Evidence from NICE Interventional Procedure Guidance no. 50 (March 2004)
[l] Buccal midazolam is currently unlicensed for the treatment of prolonged or repeated seizures.

## *1.10 Treatment of status epilepticus*

### Convulsive status epilepticus

1.10.1 In hospital, individuals with generalised tonic–clonic status epilepticus should be managed immediately, as follows (with local protocols being in place – see suggested guideline in Appendix C[m] of the full guideline): **GPP**

- secure airway
- give oxygen
- assess cardiac and respiratory function
- secure intravenous (IV) access in a large vein.

1.10.2 Lorazepam should be used as a first-line treatment in status epilepticus (see Appendix C of the full guideline). **D**

### Refractory convulsive status epilepticus

1.10.3 Treatment of refractory status epilepticus in secondary care should follow the suggested guidelines (see Appendix C of the full guideline). **D**

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| 1.10.4A In adults, propofol or thiopental should be used to control refractory status epilepticus. Adequate monitoring, including blood levels of thiopental, and critical life systems support is required (see Appendix C of the full guideline). **C** | 1.10.4C In children, midazolam or thiopental should be used to control refractory status epilepticus. Adequate monitoring, including blood levels of thiopental, and critical life systems support is required (see Appendix C of the full guideline). **C** |

[m] Appendix C provides suggested treatment guidelines for status epilepticus.

1.10.5 Regular medication should be continued at optimal doses and the reasons for status epilepticus should be investigated. **GPP**

1.10.6 As the treatment pathway progresses, the expertise of an anaesthetist/intensivist should be sought. **GPP**

1.10.7 If either the whole protocol or intensive care is required the tertiary centre should be consulted. **GPP**

1.10.8 An individual treatment pathway should be formulated for people who have recurrent convulsive status epilepticus. **GPP**

**Non-convulsive status epilepticus**

1.10.9 Non-convulsive status epilepticus is uncommon and management is less urgent. A suggested guideline can be found in Appendix C of the full guideline. **GPP**

## *1.11 Women with epilepsy*

1.11.1 In order to enable informed decisions and choice, and to reduce misunderstandings, women with epilepsy and their partners, as appropriate, must be given accurate information and counselling about contraception, conception, pregnancy, caring for children and breastfeeding, and menopause. **C**

1.11.2 Information about contraception, conception, pregnancy, or menopause should be given to girls and women in advance of sexual activity, pregnancy or menopause, and the information should be tailored to their individual needs. This information should also be given, as needed, to people who are closely involved with girls and women with epilepsy. These may include an individual's family and/or carers. **C**

1.11.3 All healthcare professionals who treat, care for, or support women with epilepsy should be familiar with relevant information and the availability of counselling. **GPP**

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|---|---|
| 1.11.4A In women of childbearing potential, the risk of the drugs (see 1.8.13A) causing harm to an unborn child should be discussed and an assessment made as to the risks and benefits of treatment with individual drugs. There are currently few data on which to base a definitive assessment of the risks to the unborn child associated with newer drugs. Specific caution is advised in the use of sodium valproate because of the risk of harm to the unborn child. **A (NICE)** | 1.11.4C In girls of childbearing potential, including young girls who are likely to need treatment into their childbearing years, the risk of the drugs (see 1.8.13C) causing harm to an unborn child should be discussed with the child and/or her carer, and an assessment made as to the risks and benefits of treatment with individual drugs. There are currently few data on which to base a definitive assessment of the risks to the unborn child associated with newer drugs. Specific caution is advised in the use of sodium valproate because of the risk of harm to the unborn child. **A (NICE)** |

1.11.5 Prescribers should be aware of the latest data on the risks to the unborn child associated with AED therapy when prescribing for women and girls of childbearing potential. **GPP**

1.11.6 All women on AEDs should be offered 5 mg per day of folic acid before any possibility of pregnancy. **D**

**Contraception**

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|---|---|
| 1.11.7A In women of childbearing potential, the possibility of interaction with oral | 1.11.7C In girls of childbearing potential, including young girls who are likely to need |

| | |
|---|---|
| contraceptives should be discussed and an assessment made as to the risks and benefits of treatment with individual drugs. **A (NICE)** | treatment into their childbearing years, the possibility of interaction with oral contraceptives should be discussed with the child and/or her carer, and an assessment made as to the risks and benefits of treatment with individual drugs. **A (NICE)** |

1.11.8 In women of childbearing potential, the risks and benefits of different contraceptive methods, including hormone-releasing IUDs, should be discussed. **GPP**

1.11.9 If a woman taking enzyme-inducing AEDs chooses to take the combined oral contraceptive pill, a minimum initial dose of 50 micrograms of oestrogen is recommended. If breakthrough bleeding occurs, the dose of oestrogen should be increased to 75 micrograms or 100 micrograms per day, and 'tricycling' (taking three packs without a break) should be considered. **D**

1.11.10 The progesterone-only pill is not recommended as reliable contraception in women taking enzyme-inducing AEDs. **D**

1.11.11 Women taking enzyme-inducing AEDs who choose to use depot injections of progesterone should be informed that a shorter repeat injection interval is recommended (10 weeks instead of 12 weeks). **D**

1.11.12 The progesterone implant is not recommended in women taking enzyme-inducing AEDs. **D**

1.11.13 The use of additional barrier methods should be discussed with women taking enzyme-inducing AEDs and oral contraception or having depot injections of progesterone. **GPP**

1.11.14 If emergency contraception is required for women taking enzyme-inducing AEDs, the dose of levonorgestrel should be increased to 1.5 mg and 750 micrograms 12 hours apart. **D**

**Pregnancy**

1.11.15 Women with epilepsy need accurate information during pregnancy, and the possibility of status epilepticus and SUDEP should be discussed with all women who plan to stop AED therapy (see Sections 1.8.30–1.8.35). **C**

1.11.16 All pregnant women with epilepsy should be encouraged to notify their pregnancy, or allow their clinician to notify the pregnancy, to the UK Epilepsy and Pregnancy Register (www.epilepsyandpregnancy.co.uk). **GPP**

1.11.17 In all women with epilepsy, seizure freedom during pregnancy should be sought. **GPP**

1.11.18 The clinician should discuss with the woman the relative benefits and risks of adjusting medication to enable her to make an informed decision. Where appropriate, the woman's specialist should be consulted. **GPP**

1.11.19 Women with generalised tonic–clonic seizures should be informed that the fetus may be at relatively higher risk of harm during a seizure, although the absolute risk remains very low, and the level of risk may depend on seizure frequency. **D**

1.11.20 Women should be reassured that there is no evidence that simple partial, complex partial, absence and myoclonic seizures affect the pregnancy or developing fetus adversely unless they fall and sustain an injury. **D**

1.11.21 Women should be reassured that an increase in seizure frequency is generally unlikely in pregnancy or in the first few months after birth. **B**

1.11.22 Generally, women may be reassured that the risk of a tonic–clonic seizure during the labour and the 24 hours after birth is low (1–4%). **C**

1.11.23 Routine monitoring of AED levels in pregnancy is not recommended. If seizures increase, or are likely to increase, monitoring of AED levels may be useful to plan or anticipate the extent of change of dose adjustment needed. **D**

1.11.24 Women with epilepsy should be informed that although they are likely to have healthy pregnancies, their risk of complications during pregnancy and labour is higher than for women without epilepsy. **B**

1.11.25 Care of pregnant women should be shared between the obstetrician and the specialist. **GPP**

1.11.26 Pregnant women who are taking AEDs should be offered a high-resolution ultrasound scan to screen for structural anomalies. This scan should be performed at 18–20 weeks' gestation by an appropriately trained ultrasonographer, but earlier scanning may allow major malformations to be detected sooner. **GPP**

1.11.27 The risk of seizures during labour is low, but it is sufficient to warrant the recommendation that delivery should take place in an obstetric unit with facilities for maternal and neonatal resuscitation and treating maternal seizures. **GPP**

1.11.28 All children born to mothers taking enzyme-inducing AEDs should be given 1 mg of vitamin K parenterally at delivery. **C**

1.11.29 Genetic counselling should be considered if one partner has epilepsy, particularly if the partner has idiopathic epilepsy and a positive family history of epilepsy. **D**

1.11.30 Although there is an increased risk of seizures in children of parents with epilepsy, individuals with epilepsy should be given information that the probability that a child will be affected is generally low. However, this will depend on the family history. **GPP**

1.11.31 Advanced planning, including the development of local protocols for care, should be implemented in obstetric units that deliver babies of women with epilepsy. **GPP**

1.11.32 Joint epilepsy and obstetric clinics may be convenient for mothers and healthcare professionals but there is insufficient evidence to recommend their routine use. **GPP**

1.11.33 It is, however, important that there should be regular follow-up, planning of delivery, and liaison between the specialist or epilepsy team and the obstetrician or midwife. **GPP**

**Breastfeeding**

1.11.34 All women with epilepsy should be encouraged to breastfeed, except in very rare circumstances. Breastfeeding for most women taking AEDs is generally safe and should be encouraged. However, each mother needs to be supported in the choice of feeding method that bests suits her and her family. **GPP**

1.11.35 Prescribers should consult Appendix 5 of the *British National Formulary* when prescribing AEDs for women who are breastfeeding. The decision on whether to continue AED therapy should be made between the woman and the prescriber, and be based on the risks and benefits of breastfeeding against the potential risks of the drug affecting the child. **GPP**

**After the birth**

1.11.36 Parents of new babies or young children should be informed that introducing a few simple safety precautions may significantly reduce the risk of accidents and minimise anxiety. An approaching birth can

be an ideal opportunity to review and consider the best and most helpful measures to start to ensure maximum safety for both mother and baby. **GPP**

1.11.37 Information should be given to all parents about safety precautions to be taken when caring for the baby (see Appendix D[n] of the full guideline). **C**

1.11.38 Parents should be reassured that the risk of injury to the infant caused by maternal seizure is low. **C**

## *1.12 People with learning disabilities (see also Sections 1.11 and 1.13)*

1.12.1 People with learning disabilities should receive the same support and care for their epilepsy as the general population. In addition, those with learning disabilities need the care of the learning disabilities team. **GPP**

1.12.2 Learning disabilities are a common association with epilepsy. The management and treatment of the epilepsy should be undertaken by a specialist, working within a multidisciplinary team. **C**

**Diagnosis (see also Section 1.5)**

1.12.3 It can be difficult to diagnose epilepsy in people with learning disabilities, and so care should be taken to obtain a full clinical history. Confusion may arise between stereotypic or other behaviours and seizure activity. **C**

1.12.4 It is important to have an eye witness account supplemented by corroborative evidence (for example, a video account), where possible. **D**

1.12.5 Clear, unbiased reporting is essential. Witnesses may need education to describe their observations accurately. **GPP**

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[n] Appendix D of the full guideline provides a checklist for the information needs of women with epilepsy, and practical information for mothers with epilepsy.

**Investigations (see also Section 1.6)**

1.12.6 Those with learning disabilities may require particular care and attention to tolerate investigations. **GPP**

1.12.7 Facilities should be available for imaging under anaesthesia, if necessary. **D**

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|---|---|
| | 1.12.8 **C** In the child presenting with epilepsy and learning disability, investigations directed at determining an underlying cause should be undertaken. **GPP** |

**Management**

1.12.9 In making a management plan for an individual with learning disabilities and epilepsy, particular attention should be paid to the possibility of adverse cognitive and behavioural effects of AED therapy. **D**

1.12.10 The recommendations on choice of treatment and the importance of regular monitoring of effectiveness and tolerability are the same for those with learning disabilities as for the general population. **A (NICE)**

1.12.11 Every therapeutic option should be explored in individuals with epilepsy in the presence or absence of learning disabilities. **B**

1.12.12 Healthcare professionals should be aware of the higher risks of mortality for people with learning disabilities and epilepsy and discuss these with individuals, their families and/or carers. **GPP**

1.12.13 All individuals with epilepsy and learning disabilities should have a risk assessment including: **C**

- bathing and showering
- preparing food

- using electrical equipment
- managing prolonged or serial seizures
- the impact of epilepsy in social settings
- SUDEP
- the suitability of independent living, where the rights of the individual are balanced with the role of the carer.

## *1.13 Young people with epilepsy (see also Section 1.11)*

1.13.1 The physical, psychological and social needs of young people with epilepsy should always be considered by healthcare professionals. Attention should be paid to their relationships with family and friends, and at school. **C**

1.13.2 Healthcare professionals should adopt a consulting style that allows the young person with epilepsy to participate as a partner in the consultation. **GPP**

1.13.3 Decisions about medication and lifestyle issues should draw on both the expertise of the healthcare professional and the experiences, beliefs and wishes of the young person with epilepsy as well as their family and/or carers. **GPP**

1.13.4 During adolescence a named clinician should assume responsibility for the ongoing management of the young person with epilepsy and ensure smooth transition of care to adult services, and be aware of the need for continuing multi-agency support. **GPP**

1.13.5 Multidisciplinary services provided jointly by adult and paediatric specialists have a key role in the care of the young person with epilepsy. This can facilitate the transition from paediatric to adult services and aid in the dissemination of information. **D**

1.13.6 Before the transition to adult services is made, diagnosis and management should be reviewed and access to voluntary organisations, such as support groups and epilepsy charities, should be facilitated. **D**

1.13.7 The information given to young people should cover epilepsy in general and its diagnosis and treatment, the impact of seizures and adequate seizure control, treatment options including side effects and risks, and the risks of injury. Other important issues to be covered are the possible consequences of epilepsy on lifestyle and future career opportunities and decisions, driving and insurance issues, social security and welfare benefit issues, sudden death and the importance of adherence to medication regimes. Information on lifestyle issues should cover recreational drugs, alcohol, sexual activity and sleep deprivation (see Section 1.3). **D**

1.13.8 The diagnosis and management of epilepsy should be reviewed during adolescence. **D**

## *1.14 Older people with epilepsy*

1.14.1 The recommendations on choice of treatment and the importance of regular monitoring of effectiveness and tolerability are the same for older people as for the general population. **A (NICE)**

## *1.15 People from black and minority ethnic groups*

1.15.1 People from black and minority ethnic groups may have different cultural and communication needs and these should be considered during diagnosis and management. The need for interpretation should be considered alongside other means of ensuring that an individual's needs are appropriately met. **D**

1.15.2 An interpreter should have both cultural and medical knowledge. Interpreters from the family are generally not suitable because of issues such as confidentiality, privacy, personal dignity, and accuracy of translation. **D**

1.15.3 Information, including information about employment rights and driving, should be available in an appropriate format or through other appropriate means for people who do not speak or read English. **D**

## *1.16 Review*

1.16.1 Adults and children with epilepsy should have a regular structured review and be registered with a general medical practice. **D**

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|---|---|
| 1.16.2A Adults should have a regular structured review with their GP, but depending on the individual's wishes, circumstances and epilepsy, the review may be carried out by the specialist. **D** | 1.16.2C Children should have a regular structured review with a specialist. **D** |
| 1.16.3A For adults, the maximum interval between reviews should be 1 year but the frequency of review will be determined by the individual's epilepsy and their wishes. **D** | 1.16 3C For children, the maximum interval between reviews should be 1 year, but the frequency of reviews should be determined by the individual's epilepsy and their wishes and those of the family and/or carers. The interval between reviews should be agreed between the individual, their family and/or carers as appropriate, and the specialist, but is likely to be between 3 and 12 months. **GPP** |
| 1.16.4A Adults should have regular reviews. In addition, access to either secondary or tertiary care | |

| | |
|---|---|
| should be available to ensure appropriate diagnosis, investigation and treatment if the individual or clinician view the epilepsy as inadequately controlled. **D** | |
| 1.16.5A Adults with well-controlled epilepsy may have specific medical or lifestyle issues (for example, pregnancy or drug cessation) that may need the advice of a specialist. **D** | |

1.16.6 If the structured review is to be conducted by the specialist, this may be best provided in the context of a specialist clinic. **D**

1.16.7 Treatment should be reviewed at regular intervals to ensure that individuals with epilepsy are not maintained for long periods on treatment that is ineffective or poorly tolerated and that concordance with prescribed medication is maintained. **A (NICE)**

1.16.8 Annual review should include an enquiry about side effects and a discussion of the treatment plan to ensure concordance and adherence to medication. **GPP**

1.16.9 At the review, individuals should have access to: written and visual information; counselling services; information about voluntary organisations; epilepsy specialist nurses; timely and appropriate investigations; referral to tertiary services including surgery, where appropriate. **D**

# 2 Notes on the scope of the guidance

All NICE guidelines are developed in accordance with a scope document that defines what the guideline will and will not cover. The scope of this guideline was established at the start of the development of this guideline, following a period of consultation; it is available from www.nice.org.uk/article.asp?a=29300

The guideline addresses the diagnosis, treatment and management of epilepsy in children, adolescents, adults and older people. It does not cover the diagnosis, treatment or management of epilepsy in neonates or the diagnosis or management of febrile convulsions.

The guideline makes recommendations concerning the care provided by healthcare professionals who have direct contact with, or make decisions concerning, the care of people with epilepsy. It deals with care in primary, secondary and tertiary centres, and integrated care for epilepsy may span all these sectors. The delivery of tertiary procedures, such as surgical techniques, is not included. The guideline will also be relevant to, but does not cover the practice of, those working in the occupational health services, social services, educational services or the voluntary sector.

# 3 Implementation in the NHS

## *3.1 In general*

Local health communities should review their existing practice for epilepsy. The review should consider the resources required to implement the recommendations set out in Section 1, the people and processes involved and the timeline over which full implementation is envisaged. It is in the interests of people with epilepsy that the implementation timeline is as rapid as possible.

Relevant local clinical guidelines, care pathways and protocols should be reviewed in the light of this guidance and revised accordingly.

This guideline should be used in conjunction with the National Service Frameworks for children, older people, and for long-term neurological conditions.

### *3.2 Audit*

Suggested audit criteria are listed in Appendix D. These can be used as the basis for local clinical audit, at the discretion of those in practice.

## 4 Research recommendations

The following research recommendations have been identified for this NICE guideline by the GDG and the National Collaborating Centre for Primary Care (see Section 5).

- Large, population-based studies are needed to assess current rates of misdiagnosis in both adults and children with epilepsy.
- Diagnostic studies are needed to establish the utility, sensitivity and specificity of structured questionnaires compared with a defined 'gold standard' to help medical practitioners differentiate between the common causes of attack disorders in adults and children.
- Economic evaluations are needed on the cost-effectiveness of investigations for the diagnosis of epilepsy in both adults and children. Economic evaluations that consider the incremental cost effectiveness of performing a specific number of EEGs, or the cost effectiveness of video EEG compared with EEG or MRI, are needed to inform practice.
- Economic evaluations are needed into the cost effectiveness of training programmes for healthcare professionals (general practitioners, nurses and specialists) involved in the diagnosis of epilepsy.
- Diagnostic studies are needed to establish the utility, sensitivity and specificity of 24-hour ambulatory EEG, compared with standard and sleep/induced/deprived EEG in the diagnosis of suspected epilepsy and epilepsy syndromes.

- Large, population-based cohort studies are needed to further investigate the prognosis of epilepsy in children, with a specific emphasis on the proportion of children who become refractory to drug therapy and become candidates for surgery.
- The use of steroids in the treatment of non-convulsive status epilepticus should be evaluated in adequately powered RCTs that report all relevant clinical outcomes.
- RCTs are needed to establish the relative effectiveness of epilepsy clinics, in particular for special groups, when compared with usual care.
- The use of epilepsy specialist nurses in primary and secondary care and GPs with a special interest in epilepsy should be evaluated in adequately powered RCTs that report all relevant clinical outcomes for individuals with epilepsy.
- Qualitative studies are needed to explore both the process and outcome of risk communication in the consultation between healthcare practitioners and the individual with epilepsy and their carers. These should include the perspectives of all relevant parties.
- Qualitative studies are needed to determine the experiences of individuals from black and minority ethnic groups with epilepsy in relation to their health needs and beliefs and the role of healthcare professionals in providing culturally sensitive care.
- Qualitative and quantitative studies are needed to determine the experience of individuals with learning disabilities and, in particular, to compare outcomes for people with epilepsy and learning disabilities managed by different groups of clinicians.
- Qualitative studies are needed about the information needs of individuals with epilepsy with respect to SUDEP. The research should focus on different groups of individuals, particularly children and their families.

- A large RCT of longer-term clinical outcomes and cost-effectiveness of standard and new antiepileptic drugs (SANAD) has been sponsored by the NHS R&D Health Technology Appraisal Programme. The study will compare monotherapy with clinicians' first-choice standard drug with appropriate comparators from the newer AEDs.

# 5 Other versions of this guideline

## *Full guideline*

The National Institute for Clinical Excellence commissioned the development of this guidance from the National Collaborating Centre for Primary Care. The Centre established a Guideline Development Group, which reviewed the evidence and developed the recommendations. The full guideline, 'The diagnosis and management of the epilepsies in adults and children in primary and secondary care', is published by the National Collaborating Centre for Primary Care; it is available on its website (www.rcgp.org.uk), the NICE website (www.nice.org.uk) and on the website of the National Electronic Library for Health (www.nelh.nhs.uk).

The members of the Guideline Development Group are listed in Appendix B. Information about the independent Guideline Review Panel is given in Appendix C.

'The Guideline Development Process − An Overview for Stakeholders, the Public and the NHS' has more information about the Institute's guideline development process. It is available from the Institute's website and copies can also be ordered by telephoning 0870 1555 455 (quote reference N0472).

## *Information for the public*

A version of this guideline for people with epilepsy, their families and/or carers, and for the public is available from the NICE website (www.nice.org.uk/CG020) or from the NHS Response Line (0870 1555 455; quote reference number N0741 for an English version and N0742 for an English and Welsh version). This is a good starting point for explaining to patients the kind of care they can expect.

### *Quick reference guides*

Two quick reference guides for healthcare professionals are available from the NICE website (www.nice.org.uk/CG020): one guide covers the diagnosis and management of the epilepsies in adults; the other covers the diagnosis and management of the epilepsies in children. These guides are also available from the NHS Response Line (0870 1555 455; quote reference numbers N0739 and N0740, respectively).

## 6 Related NICE guidance

National Institute for Clinical Excellence (2004) Newer drugs for epilepsy in Adults. *NICE Technology Appraisal Guidance* no 76. London: National Institute for Clinical Excellence. Available from: www.nice.org.uk/TA076

National Institute for Clinical Excellence (2004) Newer drugs for epilepsy in children. *NICE Technology Appraisal Guidance* no 79. London: National Institute for Clinical Excellence. Available from: www.nice.org.uk/TA079

## 7 Review date

The process of reviewing the evidence is expected to begin 4 years after the date of issue of this guideline. Reviewing may begin earlier than 4 years if significant evidence that affects the guideline recommendations is identified sooner. The updated guideline will be available within 2 years of the start of the review process.

# Appendix A: Grading scheme

The grading scheme and hierarchy of evidence used in this guideline (see Table) are adapted from Eccles and Mason (2001).

| Recommendation grade | Evidence |
|---|---|
| A | Directly based on category I evidence |
| B | Directly based on:<br>• category II evidence, **or**<br>• extrapolated recommendation from category I evidence |
| C | Directly based on:<br>• category III evidence, **or**<br>• extrapolated recommendation from category I or II evidence |
| D | Directly based on:<br>• category IV evidence, **or**<br>• extrapolated recommendation from category I, II, or III evidence |
| A (NICE) | Recommendation taken from NICE Guideline or Technology Appraisal |
| GPP | Good practice point based on the clinical experience of the GDG |

| Evidence category | Source |
|---|---|
| I: | Evidence from:<br>• meta-analysis of randomised controlled trials, **or**<br>• at least one randomised controlled trial |
| II: | Evidence from:<br>• at least one controlled study without randomisation, **or**<br>• at least one other type of quasi-experimental study |
| III: | Evidence from non-experimental descriptive studies, such as comparative studies, correlation studies and case–control studies |
| IV: | Evidence from expert committee reports or opinions and/or clinical experience of respected authorities |

Adapted from Eccles M, Mason J (2001) How to develop cost-conscious guidelines. *Health Technology Assessment* 5: 16

# Appendix B: The Guideline Development Group

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General Practitioner, York

## *Guideline Development Group co-opted experts*

For this guideline, the GDG was assisted by a number of co-opted experts, who were chosen because of their knowledge in a particular area.

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# Appendix C: The Guideline Review Panel

The Guideline Review Panel is an independent panel that oversees the development of the guideline and takes responsibility for monitoring its quality. The Panel includes experts on guideline methodology, healthcare professionals and people with experience of the issues affecting patients and carers. The members of the Guideline Review Panel were as follows.

Professor Mike Drummond (Chair), Director, Centre for Health Economics, University of York

Mr Barry Stables, Patient/Lay Representative

Dr Imogen Stephens, Joint Director of Public Health, Western Sussex Primary Care Trust

Dr Kevork Hopayian, General Practitioner, Suffolk

Dr Robert Walker, Clinical Director, West Cumbria Primary Care Trust

# Appendix D: Technical detail on the criteria for audit

| Key priority | Criterion | Definitions and other comments |
|---|---|---|
| All individuals with a recent onset suspected seizure should be seen urgently[o] by a specialist. This is to ensure precise and early diagnosis and initiation of therapy as appropriate to their needs. | The records show that all individuals presenting with suspected recent onset seizures should be seen within 2 weeks of referral. | Although there should be no exceptions, the rate is likely to be higher in localities where epilepsy services are already well developed. |
| | The records show the named specialist who established the diagnosis of epilepsy. | |
| | The records show whether or not AED therapy was prescribed. If AEDs were prescribed, details of the prescription, including drug, dose and date of initiation should be included. | Prescribing data in primary care should be reasonably accurate and easy to extract due to the electronic prescribing systems used, but recording in secondary/tertiary care may be less complete and require some record review. |
| | The records show that if AED therapy was prescribed, that the decision to initiate treatment was made in consultation with the individual and family and/or carers. | May need some element of record review. |
| | The records show that if individuals decided not to commence the AED therapy offered, this decision was recorded. | This data may be available through some computer information systems, but if not, record review may be required. |
| The seizure type(s) and epilepsy syndrome, aetiology, and co-morbidity should be determined. | The records show that all individuals have had their seizures and/or epilepsy syndrome classified using a multi-axial classification scheme. | This may need some element of record review. In addition, classification may have been made using an older or alternative scheme. This should be highlighted and addressed in the annual review. |
| The AED treatment strategy should be individualised according to the seizure type, epilepsy syndrome, co-medication, and co-morbidity, the individual's lifestyle, and the preferences of the individual, their family and/or carers as appropriate. | The records show that if combination AED therapy is prescribed, an adequate trial of monotherapy was tried. | May need to judge whether the length of trial and drug dosage prescribed were adequate. |
| All individuals with epilepsy should have a comprehensive care plan that is agreed between the individuals and, their family and/or carers as appropriate, and primary and secondary care providers. | The records show that all individuals with a diagnosis of epilepsy have an agreed care plan. | In a more sophisticated audit, additional criteria on the content of the care plan could be added. |

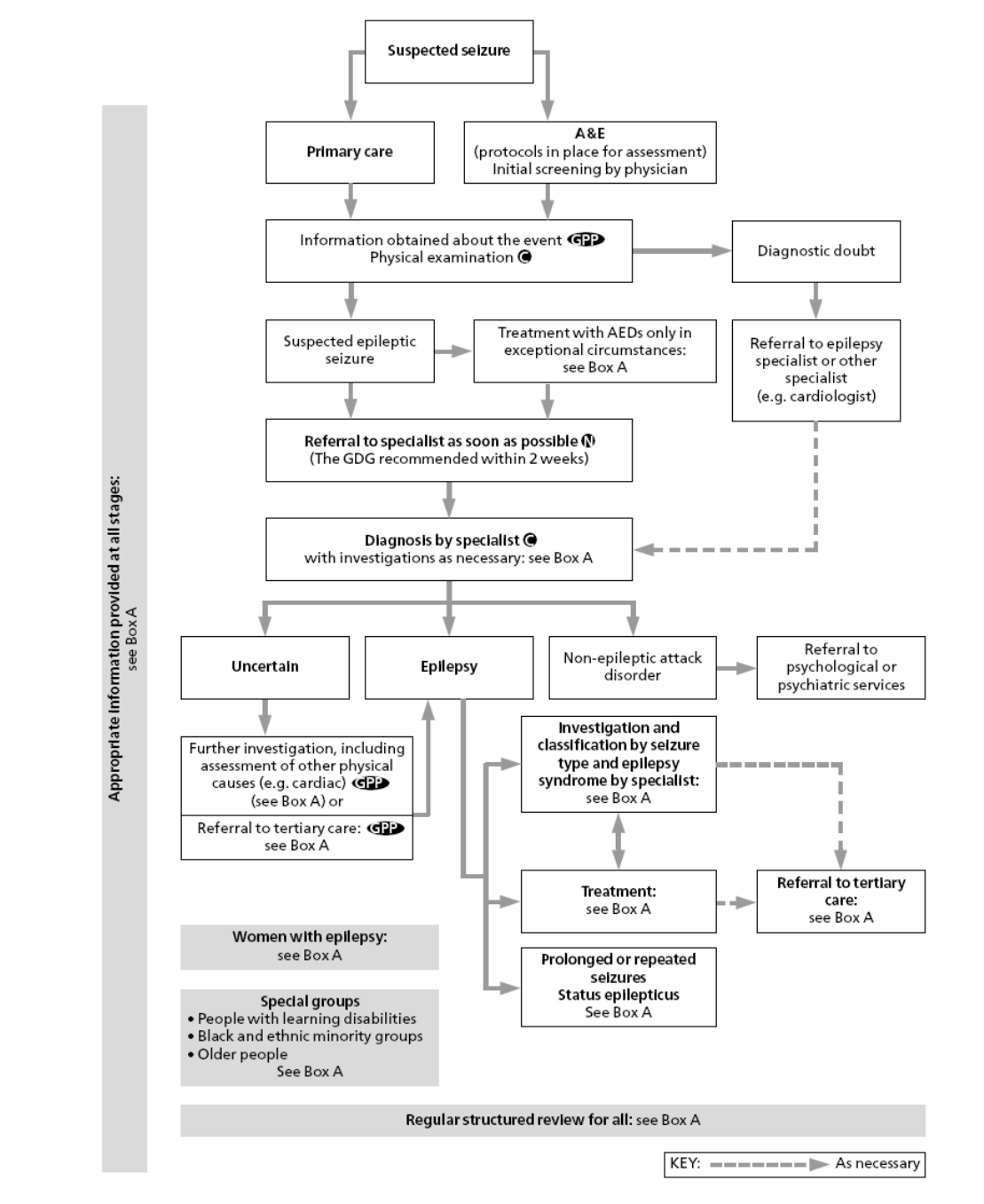
[o] The Guideline Development Group considered that 'urgently' meant being seen within 2 weeks.

| Key priority | Criterion | Definitions and other comments |
|---|---|---|
| All individuals with epilepsy should have a regular structured review. In children, this review should be carried out at least yearly (but may be between 3 and 12 months by arrangement) by a specialist. In adults, this review should be carried out at least yearly by either a generalist or specialist, depending on how well the epilepsy is controlled and/or the presence of specific lifestyle issues. | The records show that all individuals with epilepsy have had a review in the previous 12 months. | Some individuals may have their care reviewed more frequently than 12 months.<br>In a more sophisticated audit, additional criteria on the content of the review could be added.<br>For individuals aged 16 and over and who are on drug treatment, this is covered by Epilepsy 1 & 3 (review of medication) in the Quality Indicators for Epilepsy in the New GMS Contract (which sets maximum threshold of standard as 90%). |
| | The records show that seizure frequency has been documented in the past 12 months for all individuals with a diagnosis of epilepsy. | For individuals aged 16 and over and who are on drug treatment, this is covered by Epilepsy 2 in the Quality Indicators for Epilepsy in the New GMS Contract (which sets maximum threshold of standard as 90%). |
| | The records show a defined percentage of individuals with epilepsy have been seizure-free for the past 12 months. | The agreed standard may differ in different settings. For individuals aged 16 and over and who are on drug treatment, this is covered by Epilepsy 4 in the Quality Indicators for Epilepsy in the New GMS Contract (which sets the maximum threshold of standard as 70%). |
| At the review, individuals should have access to: written and visual information; counselling services; information about voluntary organisations; epilepsy specialist nurses; timely and appropriate investigations; referral to tertiary services, including surgery where if appropriate. | The records show that the information needs of the individual were discussed at the review. | In a more sophisticated audit, the extent to which the information needs of the individual were met could be assessed. |
| Women with epilepsy and their partners, as appropriate, must be given accurate information and counselling about contraception, conception, pregnancy, caring for children, and breastfeeding, and menopause. | The records show that treatment choices have been discussed with all women and girls of childbearing potential. | |
| | The records show that contraceptive choices have been discussed with all women and girls of childbearing potential taking AED therapy. | |
| If seizures are not controlled and/or there is diagnostic uncertainty or treatment failure, individuals should be referred to tertiary services soon for further assessment. | The records show that if individuals were referred to tertiary services, they were seen within 4 weeks. | |
| | The records show that if individuals were referred to tertiary services, referral was appropriate. | Record review will be necessary to determine the indications for referral, and therefore the appropriateness of referral. |

| Key priority | Criterion | Definitions and other comments |
|---|---|---|
| | The records show that all individuals who have indications for referral to tertiary services were referred. | Record review may be necessary to ascertain all cases where referral was indicated. |

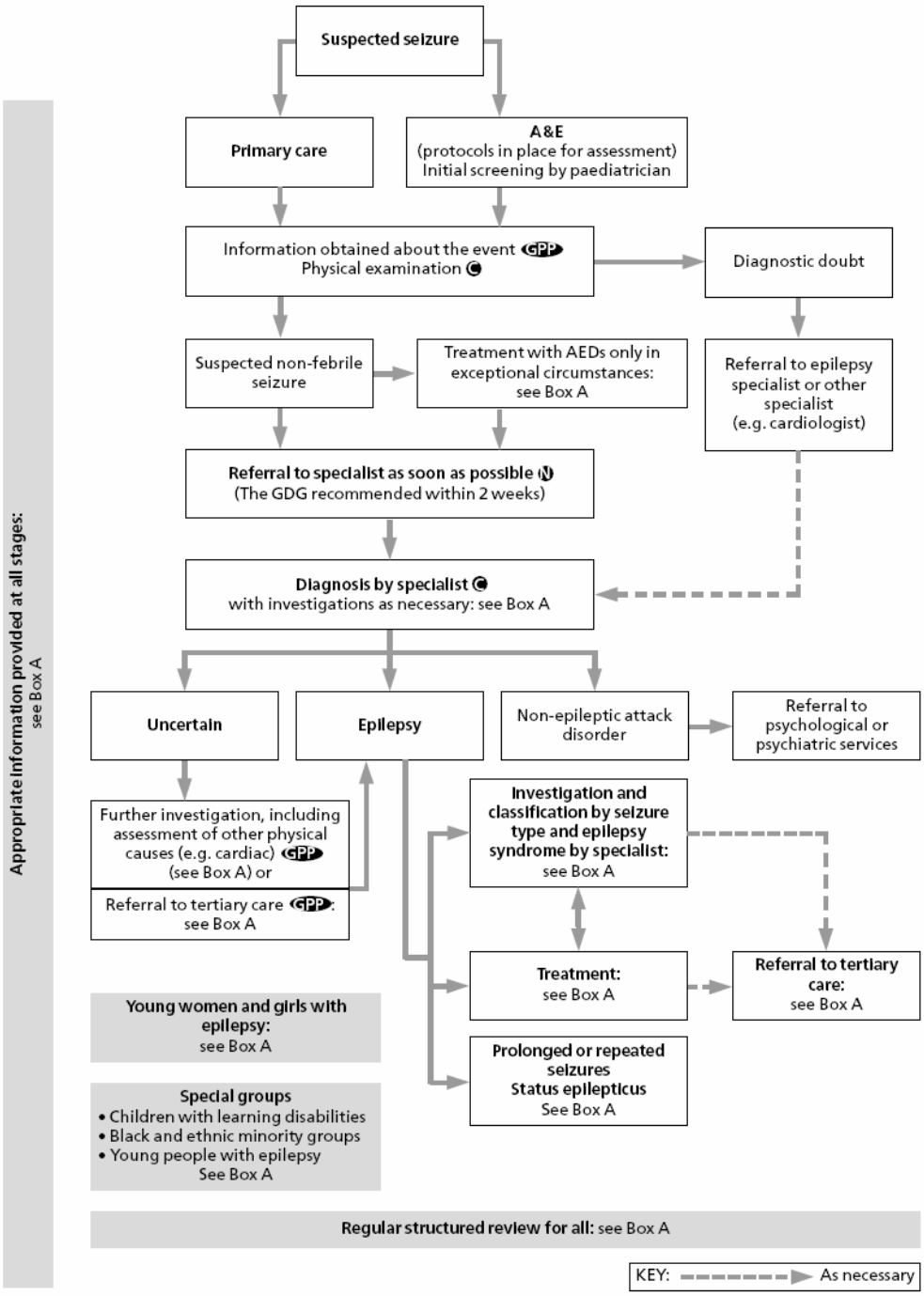
# Appendix E: Outline care algorithms

## *Adults*




Box A: see page 59

## *Children*



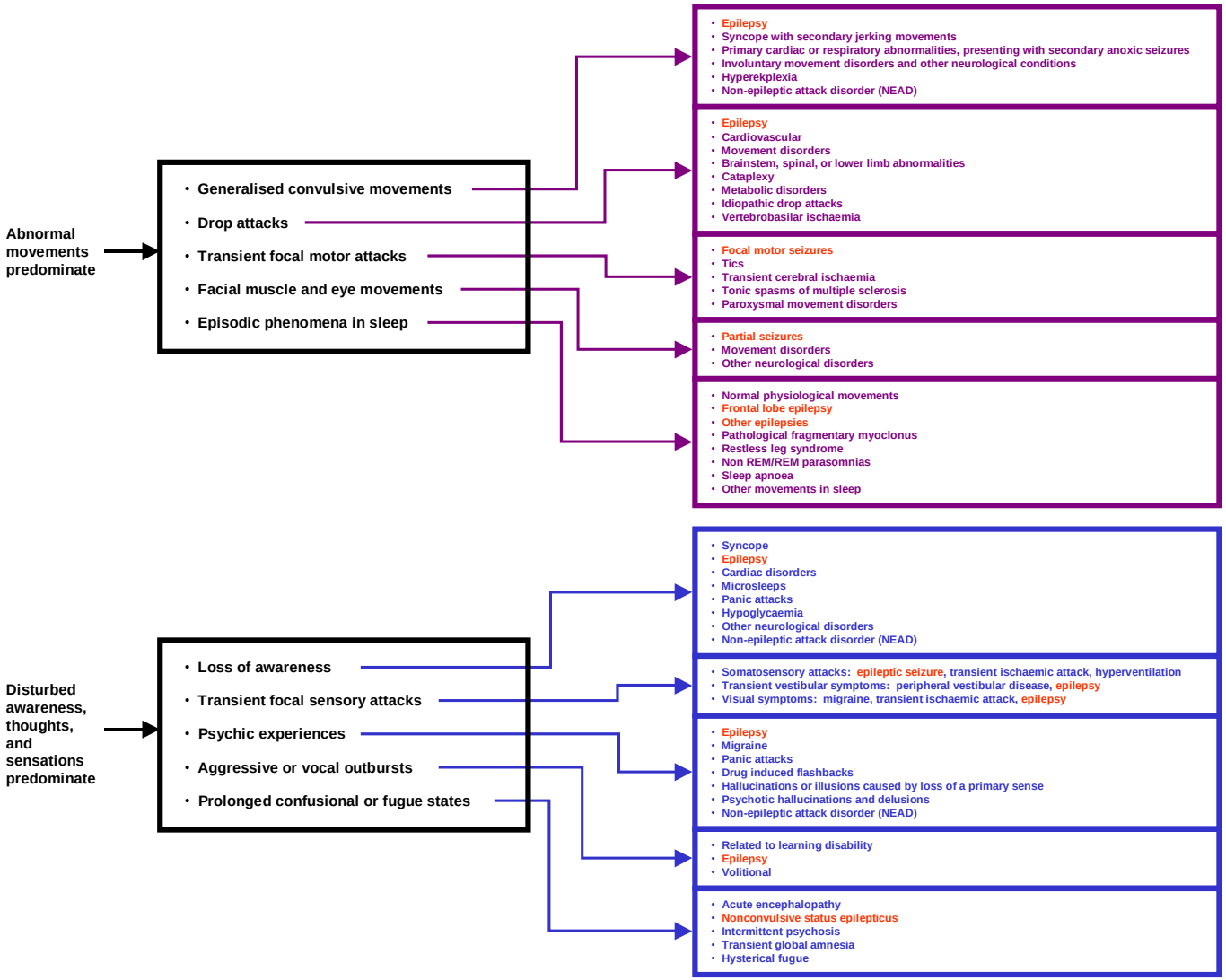

Box A: see page 59

**Box A Cross-references for algorithms**

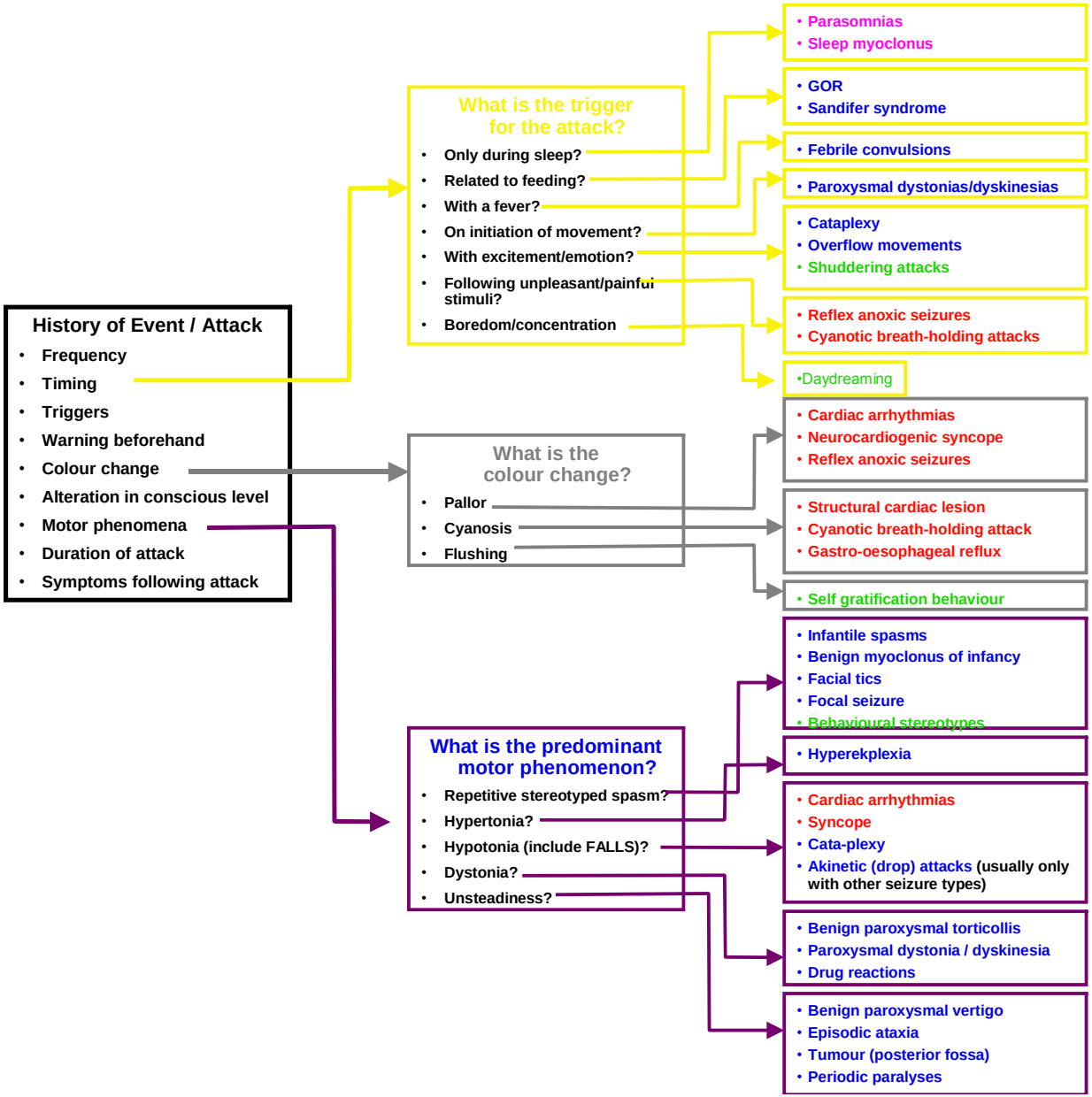
| | Page |
|---|---|
| Treatment with AEDs only in exceptional circumstances | 21 |
| Diagnosis and investigations | 13, 14 |
| Further investigation | 13, 14 |
| Investigation and classification by seizure type and epilepsy syndrome | 18 |
| Referral to tertiary care | 25 |
| Treatment | 18 |
| Prolonged or repeated seizures; status epilepticus | 29, 30 |
| Women or girls with epilepsy | 31 |
| Special groups | 37 |
| Regular structured review | 41 |
| Appropriate information | 9 |

# Appendix F: Differential diagnosis of epilepsy in adults and children

## *Differential diagnosis of epilepsy in adults*


Abnormal movements predominate
• Generalised convulsive movements
• Drop attacks
• Transient focal motor attacks
• Facial muscle and eye movements
• Episodic phenomena in sleep
• Epilepsy
• Syncope with secondary jerking movements
• Primary cardiac or respiratory abnormalities, presenting with secondary anoxic seizures
• Involuntary movement disorders and other neurological conditions
• Hyperekplexia
• Non-epileptic attack disorder (NEAD)
• Epilepsy
• Cardiovascular
• Movement disorders
• Brainstem, spinal, or lower limb abnormalities
• Cataplexy
• Metabolic disorders
• Idiopathic drop attacks
• Vertebrobasilar ischaemia
• Focal motor seizures
• Tics
• Transient cerebral ischaemia
• Tonic spasms of multiple sclerosis
• Paroxysmal movement disorders
• Partial seizures
• Movement disorders
• Other neurological disorders
• Normal physiological movements
• Frontal lobe epilepsy
• Other epilepsies
• Pathological fragmentary myoclonus
• Restless leg syndrome
• Non REM/REM parasomnias
• Sleep apnoea
• Other movements in sleep
Disturbed awareness, thoughts, and sensations predominate
• Loss of awareness
• Transient focal sensory attacks
• Psychic experiences
• Aggressive or vocal outbursts
• Prolonged confusional or fugue states
• Syncope
• Epilepsy
• Cardiac disorders
• Microsleeps
• Panic attacks
• Hypoglycaemia
• Other neurological disorders
• Non-epileptic attack disorder (NEAD)
• Somatosensory attacks: epileptic seizure, transient ischaemic attack, hyperventilation
• Transient vestibular symptoms: peripheral vestibular disease, epilepsy
• Visual symptoms: migraine, transient ischaemic attack, epilepsy
• Epilepsy
• Migraine
• Panic attacks
• Drug induced flashbacks
• Hallucinations or illusions caused by loss of a primary sense
• Psychotic hallucinations and delusions
• Non-epileptic attack disorder (NEAD)
• Related to learning disability
• Epilepsy
• Volitional
• Acute encephalopathy
• Nonconvulsive status epilepticus
• Intermittent psychosis
• Transient global amnesia
• Hysterical fugue

***Differential diagnosis of epilepsy in children***




**INFANT**

- Cardiac arrhytthmias
- Hyperexplexia
- Structural cardiac lesion
- Benign myoclonus of infancy
- Paroxysmal dystonia
- Sandifers syndrome/GOR
- Benign paroxysmal torticollis
- Alternating hemiplegia
- (Infantile spasms)
- Self gratification behaviour
- Shuddering attacks
- Benign sleep myoclonus

**TODDLER**

- Cardiac arrhytthmias
- Reflex anoxic seizures
- Cyanotic breath-holding attacks
- Hyperekplexia
- Myoclonus
- Paroxysmal dyskinesias
- Sandifer syndrome
- Benign paroxysmal vertigo/torticollis
- Migraine
- Cataplexy
- Akinetic (drop) attacks
- (Febrile convulsions)
- Overflow movements
- Self gratification behaviour
- Stereotypies/ritualistic behaviour (eg. Children with learning difficulties)
- Head banging
- Confusional arousal
- Night terrors

**OLDER CHILD**

- Cardiac arrhytthmias
- Neurocardiogenic syncope
- Reflex anoxic seizures
- Neurocardiogenic syncope
- Hyperexplexia
- Myoclonus
- TICs
- Paroxysmal dyskinesias
- Benign paroxysmal vertigo/torticollis
- Migraine
- Eye movement disorders
- Episodic ataxia
- Cataplexy
- Akinetic (drop) attacks
- Day dreams
- Hyperventilation panic/anxiety attacks
- Non epileptic attack disorder
- Pseudo-syncope or psychogenic syncope
- Stereotypes/ritualistic behaviour (eg. Children with learning difficulties)
- Confusional arousal
- REM sleep disorders
- Night terrors

# Appendix G: Pharmacological treatment

The tables that follow provide a summary reference guide to pharmacological treatment. They were prepared from data available in July 2004. Prescribers should refer to the *British National Formulary* and Summary of Product Characteristics for full and up-to-date details of licensing (also see Table 3).

The following tables should be used alongside the Technology Appraisal guidance published on the use of newer AEDs in adults and children with epilepsy (see Section 6, page 47).

All drugs are listed in alphabetical order.

## Table 1 Drug options by seizure type

| Seizure type | First-line drugs | Second-line drugs | Other drugs that may be considered | Drugs to be avoided (may worsen seizures) |
|---|---|---|---|---|
| Generalised tonic–clonic | Carbamazepine[a]<br>Lamotrigine[b]<br>Sodium valproate<br>Topiramate[a,b] | Clobazam<br>Levetiracetam<br>Oxcarbazepine[a] | Acetazolamide<br>Clonazepam<br>Phenobarbital[a]<br>Phenytoin[a]<br>Primidone[a,c] | Tiagabine<br>Vigabatrin |
| Absence | Ethosuximide<br>Lamotrigine[b]<br>Sodium valproate | Clobazam<br>Clonazepam<br>Topiramate[a] | | Carbamazepine[a]<br>Gabapentin<br>Oxcarbazepine[a]<br>Tiagabine<br>Vigabatrin |
| Myoclonic | Sodium valproate<br>(Topiramate[a,d]) | Clobazam<br>Clonazepam<br>Lamotrigine<br>Levetiracetam<br>Piracetam<br>Topiramate[a] | | Carbamazepine[a]<br>Gabapentin<br>Oxcarbazepine[a]<br>Tiagabine<br>Vigabatrin |
| Tonic | Lamotrigine[b]<br>Sodium valproate | Clobazam<br>Clonazepam<br>Levetiracetam<br>Topiramate[a] | Acetazolamide<br>Phenobarbital[a]<br>Phenytoin[a]<br>Primidone[a,c] | Carbamazepine[a]<br>Oxcarbazepine[a] |
| Atonic | Lamotrigine[b]<br>Sodium valproate | Clobazam<br>Clonazepam<br>Levetiracetam<br>Topiramate[a] | Acetazolamide<br>Phenobarbital[a]<br>Primidone[a,c] | Carbamazepine[a]<br>Oxcarbazepine[a]<br>Phenytoin[a] |
| Focal with/without secondary generalisation | Carbamazepine[a]<br>Lamotrigine[b]<br>Oxcarbazepine[a,b]<br>Sodium valproate<br>Topiramate[a,b] | Clobazam<br>Gabapentin<br>Levetiracetam<br>Phenytoin[a]<br>Tiagabine | Acetazolamide<br>Clonazepam<br>Phenobarbital[a]<br>Primidone[a,c] | |

[a] Hepatic enzyme-inducing AED.
[b] Should be used as a first choice under circumstances as outlined in the NICE technology appraisal of newer AEDs– see page 47.
[c] Should rarely be initiated – if a barbiturate is required, phenobarbital is preferred.
[d] In children, for severe myoclonic epilepsy of infancy (see Table 2).

Table 3 summarises licensing status in July 2004. For current details on licensing, see the Summary of Product Characteristics for each drug and/or the *British National Formulary*.

## Table 2 Drug options by epilepsy syndrome

| Epilepsy syndrome | First-line drugs | Second-line drugs | Other drugs | Drugs to be avoided (may worsen seizures) |
|---|---|---|---|---|
| Childhood absence epilepsy | Ethosuximide<br>Lamotrigine[b]<br>Sodium valproate | Levetiracetam<br>Topiramate[a] | | Carbamazepine[a]<br>Oxcarbazepine[a]<br>Phenytoin<br>Tiagabine<br>Vigabatrin |
| Juvenile absence epilepsy | Lamotrigine[b]<br>Sodium valproate | Levetiracetam<br>Topiramate[a] | | Carbamazepine[a]<br>Oxcarbazepine[a]<br>Phenytoin[a]<br>Tiagabine<br>Vigabatrin |
| Juvenile myoclonic epilepsy | Lamotrigine[b]<br>Sodium valproate | Clobazam<br>Clonazepam<br>Levetiracetam<br>Topiramate[a] | Acetazolamide | Carbamazepine[a]<br>Oxcarbazepine[a]<br>Phenytoin[a]<br>Tiagabine<br>Vigabatrin |
| Generalised tonic–clonic seizures only | Carbamazepine[a]<br>Lamotrigine[b]<br>Sodium valproate<br>Topiramate[a,b] | Levetiracetam | Acetazolamide<br>Clobazam<br>Clonazepam<br>Oxcarbazepine[a]<br>Phenobarbital[a]<br>Phenytoin[a]<br>Primidone[a,c] | Tiagabine<br>Vigabatrin |
| Focal epilepsies: cryptogenic, symptomatic | Carbamazepine[a]<br>Lamotrigine[b]<br>Oxcarbazepine[a,b]<br>Sodium valproate<br>Topiramate[a,b] | Clobazam<br>Gabapentin<br>Levetiracetam<br>Phenytoin[a]<br>Tiagabine | Acetazolamide<br>Clonazepam<br>Phenobarbital[a]<br>Primidone[a,c] | |
| Infantile spasms | Steroids[c]<br>Vigabatrin[b] | Clobazam<br>Clonazepam<br>Sodium valproate<br>Topiramate[a] | Nitrazepam | Carbamazepine[a]<br>Oxcarbazepine[a] |
| Benign epilepsy with centrotemporal spikes | Carbamazepine[a]<br>Lamotrigine[b]<br>Oxcarbazepine[a,b]<br>Sodium valproate | Levetiracetam<br>Topiramate[a] | Sulthiame[e] | |
| Benign epilepsy with occipital paroxysms | Carbamazepine[a]<br>Lamotrigine[b]<br>Oxcarbazepine[a,b]<br>Sodium valproate | Levetiracetam<br>Topiramate[a] | | |
| Severe myoclonic epilepsy of infancy | Clobazam<br>Clonazepam<br>Sodium valproate<br>Topiramate[a,b] | Levetiracetam<br>Stiripentol[e] | Phenobarbital[a] | Carbamazepine[a]<br>Lamotrigine<br>Oxcarbazepine[a]<br>Vigabatrin |
| Continuous spike wave of slow sleep | Clobazam<br>Clonazepam<br>Ethosuximide<br>Lamotrigine[b]<br>Sodium valproate<br>Steroids[d] | Levetiracetam<br>Topiramate[a] | | Carbamazepine[a]<br>Oxcarbazepine[a]<br>Vigabatrin |
| Lennox–Gastaut syndrome | Lamotrigine[b]<br>Sodium valproate<br>Topiramate[a,b] | Clobazam<br>Clonazepam<br>Ethosuximide<br>Levetiracetam | Felbamate[e] | Carbamazepine[a]<br>Oxcarbazepine[a] |
| Landau–Kleffner syndrome | Lamotrigine[b]<br>Sodium valproate<br>Steroids[d] | Levetiracetam<br>Topiramate[a] | Sulthiame[e] | Carbamazepine[a]<br>Oxcarbazepine[a] |
| Myoclonic astatic epilepsy | Clobazam<br>Clonazepam<br>Sodium valproate<br>Topiramate[a,b] | Lamotrigine<br>Levetiracetam | | Carbamazepine[a]<br>Oxcarbazepine[a] |

[a] Hepatic enzyme-inducing AED.
[b] Should be used as a first choice under circumstances as outlined in the NICE technology appraisal of newer AEDs – see page 47.
[c] Should rarely be initiated – if a barbiturate is required, phenobarbital is preferred.

[d] Steroids: prednisolone or ACTH (adrenocorticotrophic hormone).
[e] Not licensed in the UK, but available by importation.
Table 3 summarises licensing status in July 2004. For current details on licensing, see the Summary of Product Characteristics for each drug and/or the *British National Formulary*.

## Table 3 Licensing of AEDs[a]

| Drug | Details of licensing | Age below which use is unlicensed | |
|---|---|---|---|
| | | Monotherapy | Adjunctive treatment |
| Acetazolamide | Indicated for use in conjunction with other AEDs, including for tonic–clonic and partial seizures. | Unlicensed | No age limit specified |
| Carbamazepine[b] | Indicated for use in generalised tonic–clonic and partial seizures. | No age limit specified | No age limit specified |
| Clobazam | Indicated for adjunctive therapy in epilepsy. | Unlicensed | < 3 years but can be used in children aged 6 months to 3 years in exceptional cases |
| Clonazepam | Indicated for all forms of epilepsy and seizures. Especially absence seizures including atypical absence; primary or secondarily generalised tonic–clonic, tonic or clonic seizures; partial seizures with elementary or complex symptomatology; various forms of myoclonic seizures, myoclonus and associated abnormal movements. | No age limit specified | No age limit specified |
| Ethosuximide | Indicated primarily in absence seizures. May be used in combination with other AEDs when generalised tonic–clonic seizures and other forms of epilepsy co-exist with absence seizures. | No age limit specified | No age limit specified |
| Felbamate | No details | | |
| Gabapentin | Indicated as add-on therapy for partial seizures and partial seizures with secondary generalisation in patients who have not achieved satisfactory control with or who are intolerant of standard anticonvulsants used alone or in combination. | Unlicensed | < 6 years |
| Lamotrigine | Indicated for simple partial seizures, complex partial seizures, secondarily generalised tonic–clonic seizures, and primary generalised tonic–clonic seizures.<br>Also indicated for the treatment of seizures associated with Lennox–Gastaut syndrome. | < 12 years | < 2 years |
| Levetiracetam | Indicated as adjunctive therapy in the treatment of partial-onset seizures with or without secondary generalisation in patients with epilepsy. | Unlicensed | < 16 years |
| Oxcarbazepine[b] | Indicated for the treatment of partial seizures with or without secondarily generalised tonic–clonic seizures. Indicated for use as monotherapy or adjunctive therapy in adults and in children of 6 years of age and above. | < 6 years | < 6 years |
| Phenobarbital[b] | Indicated for all forms of epilepsy, except absence seizures. | No age limit specified | No age limit specified |
| Phenytoin[b] | Indicated for tonic–clonic seizures, partial seizures, or a combination. | No age limit specified | No age limit specified |
| Piracetam | Indicated for patients with myoclonus of cortical origin, irrespective of aetiology, and should be used in combination with other anti-myoclonic therapies. | Unlicensed | < 16 years |
| Primidone[b] | Indicated for generalised tonic–clonic seizures and psychomotor epilepsy. Also can be used in partial or Jacksonian seizures, myoclonic jerks and akinetic attacks. | No age limit specified | No age limit specified |
| Sodium valproate | Indicated for generalised, partial or other epilepsy. | No age limit specified | No age limit specified |
| Sulthiame | No details | | |
| Tiagabine | Indicated as add-on therapy for partial seizures with or without secondary generalisation where control is not achieved by optimal doses of at least one other AED. | Unlicensed | < 12 years |

| | | | |
|---|---|---|---|
| Topiramate[b] | Indicated for partial seizures with or without secondarily generalised seizures, seizures associated with Lennox–Gastaut syndrome and primary generalised tonic–clonic seizures. | < 6 years | < 2 years |
| Vigabatrin | Treatment in combination with other AEDs for patients with resistant partial epilepsy with or without secondary generalisation; that is, where all other appropriate drug combinations have proved inadequate or have not been tolerated.<br>Also for monotherapy in the treatment of infantile spasms. | No age limit specified | No age limit specified |

[a] Information from the Summary of Product Characteristics for each drug and/or the *British National Formulary*. The *British National Formulary* was accessed for the purposes of this guideline in July 2004. Please refer to the *British National Formulary* and Summary of Product Characteristics for current information on these drugs.

[b] Hepatic enzyme-inducing AED.

## Table 4 Side effects of drug treatment in adults that may be clinically significant GPP

The following selected list of side effects that may be clinically significant was developed from the Summary of Product Characteristics and the *British National Formulary* on behalf of the GDG by Professor JS Duncan and Professor JWAS Sander of University College London.

The list was developed to help the practising clinician; it should not be considered exhaustive. For full details of side effects, the prescriber should refer to the *British National Formulary* and the Summary of Product Characteristics for each drug.

| Drug | Significant side effects include: |
|---|---|
| Acetazolamide | Some loss of appetite, depression, 'tingling' feeling in the extremities, polyuria, thirst, headache, dizziness, fatigue, irritability, and occasional instances of drowsiness. |
| Carbamazepine[a] | Allergic skin reactions, including urticaria, which may be severe. Accommodation disorders, for example blurred vision, diplopia, ataxia and nausea. Particularly at the start of treatment, or if the initial dose is too high, certain types of adverse reaction occur very commonly or commonly. |
| Clobazam | Drowsiness has been reported. Tolerance may develop, especially during prolonged use. |
| Clonazepam | Somnolence and fatigue have been observed: such effects are usually transitory and disappear spontaneously as treatment continues or with dosage reduction. With certain forms of epilepsy, an increase in the frequency of seizures during long-term treatment is possible. |
| Ethosuximide | Mild side effects, which are usually transient, may occur initially. These include headache, nausea and drowsiness. Other adverse reactions reported include weight loss and irritability. |
| Gabapentin | The most common possible side effects are somnolence and dizziness. A common side effect is fatigue. Headache has also been reported. |
| Lamotrigine | Skin rash, which generally appears within 8 weeks of starting treatment and resolves on withdrawal. Adverse experiences reported include drowsiness, diplopia, dizziness, headache, insomnia, tiredness, fever (associated with a rash as part of a hypersensitivity syndrome) and agitation, confusion and hallucinations. |
| Levetiracetam | Most common reported undesirable effects include dizziness and somnolence. Other undesirable effects include irritability, insomnia, ataxia, tremor, headache and nausea. |
| Oxcarbazepine[a] | Very common undesirable effects include diplopia, headache and nausea. Common undesirable effects include skin rash, ataxia and confusion. |
| Phenobarbital[a] | Drowsiness, lethargy and mental depression. |
| Phenytoin[a] | Hypersensitivity reactions including skin rash. Common undesirable effects include drowsiness, ataxia and slurred speech and these are usually dose related. Coarsening of facial features, gingival hyperplasia and hirsutism may occur rarely. Some haemopoetic complications have been reported including some anaemias (these usually respond to folic acid). Motor twitchings, dyskinesias (rare), tremor (rare), and mental confusion have all been observed. |
| Piracetam | Reported effects (incidence of between 1% and 3%) include weight increase, insomnia, somnolence, nervousness, depression and (incidence less than 1%) diarrhoea and rash. |
| Primidone[a] | Most common side effects include drowsiness and listlessness but these generally occur only at the beginning of treatment. Other effects have been reported but are usually transient. On occasions, an idiosyncratic reaction may occur which involves these symptoms in an acute and severe form necessitating withdrawal. |
| Sodium valproate | Sedation and tremor have been reported occasionally. Transient hair loss, which may sometimes be dose related, has often been reported. Regrowth normally begins within 6 months. Increase in weight may also occur. Severe liver damage has been very rarely reported. Encephalopathy and pancreatitis may occur rarely. Also, hyperammonaemia without change in liver function tests may occur frequently and is usually transient. Blood |

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| | dyscrasias, may occur frequently and the blood picture return to normal when the drug is discontinued. Sodium valproate has been associated with amenorrhoea and irregular periods. Any menstrual problems should be reported to the GP and neurologist. Sodium valproate is associated with a higher risk of fetal malformations if taken in pregnancy. |
| Tiagabine | Dizziness, tiredness, nervousness (non-specific), tremor, concentration difficulties and depressed mood. |
| Topiramate | Headache, somnolence, dizziness, paraesthesia and weight decrease. Increased risk of nephrolithiasis. Difficulty with memory and concentration/attention has been reported. Cases of eye reactions – secondary acute angle closure glaucoma presenting as painful red eye or acute myopia – have rarely been associated with topiramate occurring within 1 month of starting treatment. |
| Vigabatrin | Somnolence is very common, whilst nausea, agitation, aggression, irritability and depression are common. Psychosis has been reported as uncommon. Visual field defects have been reported in one in three people taking vigabatrin with onset usually after months to years of treatment. Any person who has concerns about this should talk to their GP and neurologist. Visual field tests should be done every 6 months in patients on vigabatrin. |

[a] Hepatic-enzyme-inducing drug

## Table 5 Side effects of drug treatment in children and young people that may be clinically significant GPP

The following selected list of side effects that may be clinically significant was developed from the Summary of Product Characteristics, the *British National Formulary* and the formulary of the Royal College of Paediatrics and Child Health on behalf of the GDG by Dr Helen Cross of the Institute of Child Health and Professor JS Duncan of University College London.

The list was developed to help the practicing clinician; it should not be considered exhaustive. For full details of side effects, the prescriber should refer to the *British National Formulary* and the Summary of Product Characteristics for each drug.

| Drug | Significant side effects include |
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| Acetazolamide | Some loss of appetite, depression, 'tingling' feeling in the extremities, polyuria, thirst, headache, dizziness, fatigue, irritability, and occasional instances of drowsiness. |
| Carbamazepine[a] | Allergic skin reactions, including urticaria, which may be severe. Accommodation disorders, for example blurred vision, diplopia, ataxia and nausea. Particularly at the start of treatment, or if the initial dose is too high, certain types of adverse reaction occur very commonly or commonly. |
| Clobazam | Drowsiness has been reported. Tolerance may develop, especially during prolonged use. |
| Clonazepam | Somnolence and fatigue have been observed: such effects are usually transitory and disappear spontaneously as treatment continues or with dosage reduction. With certain forms of epilepsy, an increase in the frequency of seizures during long-term treatment is possible. |
| Ethosuximide | Nausea, headache and drowsiness. |
| Gabapentin | Somnolence, fatigue, hyperkinesia and dizziness are reported (incidence of 2% or more). Also more commonly emotional lability occurs (>10%). |
| Lamotrigine | Skin rash, which generally appears within 8 weeks of starting treatment and resolves on withdrawal. Adverse experiences reported include drowsiness, diplopia, dizziness, headache, insomnia, tiredness, fever (associated with a rash as part of a hypersensitivity syndrome) and agitation, confusion and hallucinations. |
| Levetiracetam | Most common reported undesirable effects include dizziness and somnolence. Other undesirable effects include irritability, insomnia, emotional lability, ataxia, tremor, headache and nausea. |
| Oxcarbazepine[a] | Very common undesirable effects include diplopia, headache and nausea. Common undesirable effects include skin rash, ataxia and confusion. |
| Phenobarbital[a] | Drowsiness, lethargy and mental depression. In addition, allergic skin reactions and hyperkinesia. |
| Phenytoin[a] | Hypersensitivity reactions including skin rash. Common undesirable effects include drowsiness, ataxia and slurred speech and these are usually dose related. Coarsening of facial features, gingival hyperplasia and hirsutism may occur rarely. Some haemopoetic complications have been reported including some anaemias (these usually respond to folic acid). Motor twitchings, dyskinesias (rare), tremor (rare), and mental confusion have all been observed. |
| Primidone[a] | Most common side effects include drowsiness and listlessness but these generally occur only at the beginning of treatment. Other effects have been reported but are usually transient. On occasions, an idiosyncratic reaction may occur which involves these symptoms in an acute and severe form necessitating withdrawal. Psychotic reactions have been reported rarely. |
| Sodium valproate | Sedation and tremor have been reported occasionally. Transient hair loss, which may sometimes be dose related, has often been reported. Regrowth normally begins within 6 months. Increase in weight may also occur. Gastric disorders frequently occur at the start of treatment. Occasionally, hyperactivity, aggression and behavioural deterioration have been reported. Severe liver damage has been very rarely reported. Those most at risk are aged under 3 years but this is most probably related to undiagnosed metabolic disease, so special consideration should be given to children in this age group, where the diagnosis is unclear and where children are on polytherapy. Increases in the levels of liver<br>enzymes are common, particularly at the beginning of therapy; they are also transient.<br>Encephalopathy and pancreatitis may occur rarely. Also, hyperammonaemia without change in liver function tests may occur frequently and is usually transient. Also blood dyscrasias may occur |

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| | frequently and the blood picture return to normal when the drug is discontinued.<br>Sodium valproate has been associated with amenorrhoea and irregular periods. Any menstrual problems should be reported to the GP and neurologist. Sodium valproate is associated with a higher risk of fetal malformations if taken in pregnancy. |
| Tiagabine | Dizziness, tiredness, nervousness (non-specific), tremor, concentration difficulties and depressed mood. |
| Topiramate | Headache, somnolence, dizziness, paraesthesia and weight decrease. Increased risk of nephrolithiasis. Difficulty with memory and concentration/attention has been reported. Cases of eye reactions – secondary acute angle closure glaucoma presenting as painful red eye or acute myopia – have rarely been associated with topiramate occurring within 1 month of starting treatment. |
| Vigabatrin | Somnolence and excitation and agitation are very common, whilst nausea, agitation, aggression, irritability and depression are common. Psychosis has been reported as uncommon. Visual field defects have been reported in one in three people taking vigabatrin with onset usually after months to years of treatment. Any person or carer who has concerns about this should talk to their neurologist. Visual field tests should be done every 6 months while on vigabatrin. Perimetry is seldom possible in children less than 9 years of developmental age, so the risks of treatment must be very carefully weighed against possible benefit in children. Currently, there is no established method to diagnose or exclude visual field defects in children in whom a standardised perimetry cannot be performed. |

[a] Hepatic-enzyme-inducing drug