

# The Diagnosis of Brain Tumours in Children

An evidence-based guideline to assist healthcare professionals in the assessment of children presenting with symptoms and signs that may be due to a brain tumour

Quick Reference Guide  
endorsed by the RCPCH

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<div style="border: 1px solid pink; padding: 5px; margin: 10px 0;">Statements in a pink box advise on indications for imaging</div> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;">Statements in a black box advise on presentations frequently associated with diagnostic difficulty</div>	
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# 1. Guideline background, aim and scope:

This quick reference guide summarises the recommendations in the “The Diagnosis of Brain Tumours in Children” guidelines. The complete guideline including methodology, evidence base and references can be viewed at and downloaded from [www.rcpch.ac.uk/bpp](http://www.rcpch.ac.uk/bpp).

## **Background**

Approximately 450 children are diagnosed with a brain tumour each year in the UK. Brain tumours are the commonest cause of cancer related death, with an annual mortality of nine per million (80 to 100 children annually in the UK). 60% of survivors are left with life-altering disability. It can be difficult for healthcare professionals to recognise when a child presents with the symptoms and signs of a brain tumour. Childhood brain tumours are relatively rare and have a very varied presentation. The symptoms and signs that precede diagnosis are diverse, fluctuate in severity and differ according to the tumour location and the developmental stage of the child. Many of the initial symptoms and signs of brain tumours are non-specific and mimic other more common and less serious disorders.

Children with brain tumours are frequently unwell for prolonged period before the diagnosis is made. In the UK, the median symptom interval (time between symptom onset and diagnosis) for childhood brain tumours is between 2.5 to 3 months, this is longer than that experienced by children in other countries. A prolonged symptom interval childhood CNS tumours is associated with an increased risk of life-threatening and disabling neurological complications at presentation and a worse cognitive outcome in survivors. It has a detrimental effect on professional relationships with patients and their families, and their subsequent psychological well-being.

The Diagnosis of brain tumours in children guideline was written to support healthcare professionals in the recognition and assessment of children and young people presenting with symptoms and sign that could be due to a brain tumour. It aims to reduce prolonged symptom interval experienced by many UK children diagnosed with a brain tumour.

## **Aim of the guideline**

The guideline advises on the following:

1. The symptoms and signs that may occur in children with brain tumour
2. Assessment of children presenting with these symptoms and signs
3. Indications and waiting times for imaging children with these symptoms and signs

## **Scope**

### Patient inclusion criteria

The guideline is applicable to all children aged 0-18 years who present with symptoms and / or signs that could result from a brain tumour and are being reviewed by a healthcare professional.

### Guideline users

The guideline is intended to support the assessment and investigation by healthcare professionals of children who may have a brain tumour.

The guideline has been developed following careful consideration of the available evidence and has incorporated professional expertise via a Delphi consensus process. Healthcare professionals should use it to support their decision making when assessing children who may have an intracranial tumour. It does not however override the responsibility of a healthcare professional to make decisions appropriate to the condition of individual children.

There are 76 recommendations in total with 21 grade B recommendations. Levels of evidence and grading of recommendations are explained below and are taken from *SIGN*, Scottish Intercollegiate Guideline Network (2000) [19].



## 2. Guideline summary:

### The Diagnosis of Brain Tumours in Children: A Guideline for Healthcare Professionals

**HEADACHES:**

- Consider a brain tumour in any child presenting with a new, persistent\* headache
- Brain tumour headaches occur at any time.
- Children aged younger than 4 years may not be able to complain of a headache—observe behaviour.

**CNS IMAGING REQUIRED WITH:**

- Persistent\* headaches that wake a child from sleep
- Persistent\* headaches that occur on waking
- Persistent\* headaches at any time in a child younger than 4 yrs.
- Confusion or disorientation and a headache

**COMMON HEADACHE PITFALLS:**

- Failure to re-assess a child with migraine or tension headache when the headache character changes

- Persistent = continuous or recurrent headache present for more than 4 weeks

**NAUSEA AND VOMITING:**

- Consider a brain tumour in any child with persistent\* nausea and / or vomiting.
- A child with persistent\* nausea and / or vomiting requires specialist assessment within 2 weeks

**CNS IMAGING REQUIRED WITH:**

- Persistent vomiting on awakening (NB: exclude pregnancy where appropriate)

**COMMON VOMITING PITFALLS:**

- Failing to consider a CNS cause for persistent nausea and vomiting

- Persistent = nausea and / or vomiting present for more than 2 weeks

**VISUAL SYMPTOMS AND SIGNS:**

- Consider a brain tumour in any child presenting with a persisting\* visual abnormality
- Visual assessment requires assessment of:
  - Acuity
  - Eye movements
  - Pupil responses
  - Optic disc appearance
  - Visual fields (>/= 5 yrs)
- Pre-school and uncooperative children should be assessed by hospital eye service within 2 weeks of referral.

**CNS IMAGING REQUIRED WITH:**

- Papilloedema
- Optic atrophy
- New onset nystagmus
- Reduction in acuity not due to refractive error
- Visual field reduction
- Proptosis
- New onset paralytic (non-comitant) squint

**COMMON VISUAL PITFALLS:**

- Failure to fully assess vision in a young or un-cooperative child—REFER IF NECESSARY
- Failure of communication between community optometry and primary and secondary care

- Persistent = visual abnormality present for more than 2 weeks

**REFERRAL FROM PRIMARY CARE:**

- High risk of tumour—same day referral to secondary care
- Lower\* risk—specialist assessment within 2 weeks

**IMAGING:**

- High risk of tumour—urgent CNS imaging
- Lower\* risk—CNS imaging within 4 weeks

\* Lower risk = CNS tumour in differential diagnosis, low index of suspicion

**CONSIDER A BRAIN TUMOUR IN ANY CHILD PRESENTING WITH:**

Headache

Nausea and / or vomiting

Visual symptoms and signs

- reduced visual acuity and / or fields
- abnormal eye movements
- abnormal fundoscopy

Motor symptoms and signs

- abnormal gait
- abnormal coordination
- focal motor weakness

Growth and developmental abnormalities

- growth failure (weight / height)
- delayed, arrested or precocious puberty

Behavioural change

Diabetes insipidus

Seizures (see [www.nice.org.uk/CG020](http://www.nice.org.uk/CG020))

Altered consciousness (see [www.nottingham.ac.uk/ paediatric-guideline](http://www.nottingham.ac.uk/ paediatric-guideline))

**ASSESS THESE CHILDREN WITH:**

History : Associated symptoms

Any predisposing factors

Assessment of:

- Visual system
- Motor system
- Height and weight
- Head circumference (< 2 yrs)
- Pubertal status

**ASSESSMENT PITFALLS:**

- The initial symptoms of a brain tumour frequently mimic those that occur with common childhood conditions
- Symptoms frequently fluctuate—resolution and then recurrence does not exclude a brain tumour
- A normal neurological examination does not exclude a brain tumour
- Language difficulties—use interpreting services if necessary

**MOTOR SYMPTOMS AND SIGNS:**

- Consider a brain tumour in any child presenting with a persisting motor abnormality
- Motor assessment requires observation of:
  - Sitting and crawling in infants
  - Walking and running
  - Handling of small objects
  - Handwriting in school age children
- Brain tumours may cause a deterioration or change in motor skills—this can be subtle e.g. change in hand preference

**CNS IMAGING REQUIRED WITH:**

- Regression in motor skills
- Focal motor weakness
- Abnormal gait and / or co-ordination (unless local cause)
- Bells palsy with no improvement within 4 weeks
- Swallowing difficulties (unless local cause)

**COMMON MOTOR PITFALLS:**

- Attributing the abnormal balance or gait caused by a cerebellar lesion to middle ear disease
- Failure to identify swallowing difficulties and aspiration as the cause of recurrent chest infections

- Persistent = motor abnormality present for more than 2 weeks

**GROWTH AND DEVELOPMENT:**

- Consider a brain tumour in any child presenting with any combination of growth failure, delayed / arrested puberty and polyuria / polydipsia
- Early assessment is required for a child presenting with:
  - Precocious puberty
  - Delayed or arrested puberty
  - Growth failure

**COMMON GROWTH AND DEVELOPMENT PITFALLS:**

- Failure to consider a CNS cause in children with vomiting and weight loss
- Failure to consider diabetes insipidus in children with polyuria and polydipsia

**BEHAVIOUR:**

- Lethargy is the commonest behavioural abnormality that occurs with brain tumours

**COMMON PREDISPOSING FACTORS:**

- Personal or family history of a brain tumour
- Leukaemia, sarcoma or early onset breast cancer
- Prior therapeutic CNS irradiation
- Neurofibromatosis ([www.nfauk.org](http://www.nfauk.org))
- Tuberous sclerosis ([www.tuberous-sclerosis.org](http://www.tuberous-sclerosis.org))
- Other familial genetic syndromes



The University of Nottingham

This guideline was developed by The Children's Brain Tumour Research Centre, University of Nottingham. Funding was provided by the Big Lottery Fund in conjunction with The Samantha Dickson Brain Tumour Trust

## 3. Best practice:

### Consultation

- **Parents and their carers should be asked explicitly about their concerns in any consultation.**  
*Strength of evidence* 4  
*Recommendation grade* D
- **If a parent / carer expresses concerns about a brain tumour this should be reviewed carefully. If a brain tumour is unlikely the reasons why should be explained and arrangements made for review within 4 weeks.**  
*Strength of evidence* 4  
*Recommendation grade* D
- **If the patient, parent / carer and healthcare professional are not fluent in a common language an interpreter must be used for the consultation ([www.languageline.co.uk](http://www.languageline.co.uk)).**  
*Strength of evidence* 4  
*Recommendation grade* D
- **Low parental educational level, social deprivation and lack of familiarity with the UK healthcare system may be associated with diagnostic delay. A lower threshold for investigation and referral may be appropriate in these situations.**  
*Strength of evidence* 4  
*Recommendation grade* D

### Referral

- **A primary healthcare professional who has a high index of suspicion regarding a possible brain tumour should discuss their concerns with a secondary health care professional the same day.**  
*Strength of evidence* 4  
*Recommendation grade* D
- **A child referred from primary care in which the differential diagnosis includes a possible space occupying lesion should be seen within two weeks.**  
*Strength of evidence* 4  
*Recommendation grade* D

### Imaging

- **A child in whom CNS imaging is required to exclude a brain tumour (potential diagnosis but low index of suspicion) should be imaged within 4 weeks.**

*Strength of evidence* 4  
*Recommendation grade* D

- **MRI is the imaging modality of choice for a child who may have a brain tumour.**

*Strength of evidence* 2++  
*Recommendation grade* B

- **If MRI is not available a contrast enhanced CT should be performed.**

*Strength of evidence* 2++  
*Recommendation grade* B

- **Imaging results should be interpreted by a professional with expertise and training in central nervous system MR and CT imaging in children.**

*Strength of evidence* 4  
*Recommendation grade* D

- **The need to sedate or anaesthetise a child for imaging should not delay imaging by more than 1 week.**

*Strength of evidence* 4  
*Recommendation grade* D

## **Feedback**

- **Patients and their families should receive the provisional results of CNS imaging within 1 week of the investigation.**

*Strength of evidence* 4  
*Recommendation grade* D

## 4. Predisposing factors:

- The following are all associated with an increased risk of childhood brain tumours. Their presence may lower the threshold for referral and investigation:
  - **Personal or family history of a brain tumour, leukaemia, sarcoma, and early onset breast cancer**  
*Strength of evidence* 2++  
*Recommendation grade* B
  - **Prior therapeutic CNS irradiation**  
*Strength of evidence* 2++  
*Recommendation grade* B
  - **Neurofibromatosis 1 and 2**  
*Strength of evidence* 2++  
*Recommendation grade* B
  - **Tuberous sclerosis 1 and 2**  
*Strength of evidence* 2++  
*Recommendation grade* B
  - **Other familial genetic syndromes**  
*Strength of evidence* 2++  
*Recommendation grade* B

## 5. Presentation and assessment of a child with a potential brain tumour:

### Presenting symptoms and signs

The following symptoms and signs are all associated with childhood brain tumours. Their presence should alert the clinician to this possibility.

- **Headache**  
*Strength of evidence*      2++  
*Recommendation grade*    B
- **Nausea and / or vomiting**  
*Strength of evidence*      2++  
*Recommendation grade*    B
- **Visual symptoms and signs including**
  - Reduced visual acuity
  - Reduced visual fields
  - Abnormal eye movements
  - Abnormal fundoscopy*Strength of evidence*      2++  
*Recommendation grade*    B
- **Motor symptoms and signs including**
  - Abnormal gait
  - Abnormal co-ordination
  - Focal motor abnormalities*Strength of evidence*      2++  
*Recommendation grade*    B
- **Growth and developmental abnormalities including**
  - Growth failure
  - Delayed, arrested or precocious puberty*Strength of evidence*      2++  
*Recommendation grade*    B
- **Behavioural change**  
*Strength of evidence*      2++  
*Recommendation grade*    B
- **Diabetes insipidus**  
*Strength of evidence*      2++  
*Recommendation grade*    B
- **Seizures** - Not covered in this guideline (see [www.nice.org.uk/CG020](http://www.nice.org.uk/CG020))

- **Altered consciousness** - Not covered in this guideline (see [www.nottingham.ac.uk/paediatric-guideline](http://www.nottingham.ac.uk/paediatric-guideline))

**Symptoms and signs in childhood brain tumours may occur singularly or in combination.**

*Strength of evidence*      2+  
*Recommendation grade*    C

## **History**

- **Take detailed history and enquire specifically about:**
  - **Associated symptoms** (see pages 8-9)
  - **Predisposing factors** (see page 7)

*Strength of evidence*      4  
*Recommendation grade*    D

## **Assessment**

- **Assess:**
  - **Visual system** (see page 13)
  - **Motor system** (see page 15)
  - **Height and weight**
  - **Head circumference if under 2 years**
  - **Pubertal status**

*Strength of evidence*      2+  
*Recommendation grade*    C
- **The initial symptoms of a brain tumour frequently mimic those that occur with many common childhood conditions**

*Strength of evidence*      2+  
*Recommendation grade*    C
- **Symptoms frequently fluctuate in severity – resolution and then recurrence does not exclude a brain tumour**

*Strength of evidence*      4  
*Recommendation grade*    D
- **Presentation depends upon the age of the child**

*Strength of evidence*      2++  
*Recommendation grade*    B
- **A normal neurological examination does not exclude a brain tumour**

*Strength of evidence*      2+  
*Recommendation grade*    C

**Summary of presentation and assessment of a child with a potential brain tumour:**

Presenting symptoms and signs (may occur singularly or in combination)	History	Assess
<p><b>Headache</b></p> <p><b>Nausea and / or vomiting</b></p> <p><b>Visual symptoms and signs</b>                      Reduced visual acuity                      Reduced visual fields                      Abnormal eye movements                      Abnormal fundoscopy</p> <p><b>Motor symptoms and signs</b>                      Abnormal gait                      Abnormal co-ordination                      Focal motor abnormalities</p> <p><b>Growth and developmental abnormalities</b>                      Growth failure                      Delayed, arrested or precocious puberty</p> <p><b>Behavioural change</b></p> <p><b>Diabetes insipidus</b></p> <p><b>Seizures</b></p> <p><b>Altered consciousness</b></p>	<p><b>Take detailed history</b></p> <p><b>Enquire specifically about:</b>                      Associated symptoms (as listed in first column)                      Predisposing factors (see page 7)</p>	<p><b>Visual system (see page 13)</b></p> <p><b>Motor system (see page 15)</b></p> <p><b>Height and weight</b></p> <p><b>Head circumference if under 2 years</b></p> <p><b>Pubertal status</b></p>
<p>Not covered in this guideline (see <a href="http://www.nice.org.uk/CG020">www.nice.org.uk/CG020</a>)</p>		<p>Not covered in this guideline (see <a href="http://www.nice.org.uk/CG020">www.nice.org.uk/CG020</a>)</p>
<p>Not covered in this guideline (see <a href="http://www.nice.org.uk/CG020">www.nice.org.uk/CG020</a>)</p>		<p>Not covered in this guideline (see <a href="http://www.nice.org.uk/CG020">www.nice.org.uk/CG020</a>)</p>

**NOTE:**

- **The initial symptoms of a brain tumour frequently mimic those that occur with many common childhood conditions**  
*Strength of evidence 2+; Recommendation grade C*
- **Symptoms frequently fluctuate in severity – resolution and recurrence does not exclude a brain tumour**  
*Strength of evidence 4; Recommendation grade D*
- **Presentation depends upon the developmental age of the child**  
*Strength of evidence 2++; Recommendation grade B*
- **A normal neurological examination does not exclude a brain tumour**  
*Strength of evidence 2+; Recommendation grade C*

## 6. Signs and Symptoms of a child with a potential brain tumour

### Headache:

- **Consider a brain tumour in any child presenting with a new persistent headache. (A continuous or recurrent headache lasting for more than 4 weeks should be regarded as persistent)**

*Strength of evidence* 2++

*Recommendation grade* B

- **Brain tumour headaches can occur at any time of the day or night**

*Strength of evidence* 2+

*Recommendation grade* C

- **Children aged younger than 4 years, or those with communication difficulties, are frequently unable to describe headache; their behaviour e.g. withdrawal, holding head may indicate a headache.**

*Strength of evidence* 4

*Recommendation grade* D

- **In a child with a known migraine or tension headache a change in the nature of the headache requires reassessment and review of the diagnosis.**

*Strength of evidence* 3

*Recommendation grade* D

- **Delayed diagnosis has been associated with failure to reassess a child with migraine or tension headache when the headache character changes.**

*Strength of evidence* 3

*Recommendation grade* D

### CNS IMAGING (within a maximum of 4 weeks) REQUIRED FOR:

- **Persistent headaches that wake a child from sleep**

*Strength of evidence* 4

*Recommendation grade* D

- **Persistent headaches that occur on waking**

*Strength of evidence* 4

*Recommendation grade* D

- **A persistent headache occurring at any time in a child younger than 4 years**

*Strength of evidence* 4

*Recommendation grade* D

- **Confusion or disorientation occurring with a headache**

*Strength of evidence* 4

*Recommendation grade* D



## Nausea and vomiting

- **Early specialist referral for consideration of underlying causes including CNS causes is required for a child with persistent nausea and / or vomiting. (Nausea and / or vomiting that lasts for more than two weeks should be regarded as persistent)**

*Strength of evidence* 2++

*Recommendation grade* B

- **CNS imaging (within a maximum of four weeks) is required for persistent vomiting on awakening (either in the morning or from a day time sleep). N.B. exclude pregnancy where appropriate.**

*Strength of evidence* 4

*Recommendation grade* D

### **Delayed diagnosis has been associated with:**

- **Attributing persistent nausea and vomiting to an infective cause (in the absence of corroborative findings e.g. contact with similar illness, pyrexia, diarrhoea).**

*Strength of evidence* 3

*Recommendation grade* D

### **CNS IMAGING (within a maximum of 4 weeks) REQUIRED FOR:**

- **Persistent vomiting on awakening (either in the morning or from a day time sleep) NB: exclude pregnancy where appropriate.**

*Strength of evidence* 4

*Recommendation grade* D

## Visual symptoms and signs

- **Consider a brain tumour in any child presenting with a persisting visual abnormality. (Any visual abnormality lasting longer than 2 weeks should be regarded as persistent)**

*Strength of evidence* 2++  
*Recommendation grade* B

- **Visual assessment must include assessment of:**

### **Pupil responses**

*Strength of evidence* 2+  
*Recommendation grade* C

### **Acuity**

*Strength of evidence* 2++  
*Recommendation grade* B

### **Visual fields in school age children**

*Strength of evidence* 2++  
*Recommendation grade* B

### **Eye movements**

*Strength of evidence* 2++  
*Recommendation grade* B

### **Optic disc appearance**

*Strength of evidence* 2++  
*Recommendation grade* B

- **If the assessing healthcare professional is unable to perform a complete visual assessment the child should be referred for assessment.**

*Strength of evidence* 4  
*Recommendation grade* D

- **Children referred for visual assessment with symptoms or signs suggestive of a brain tumour should be seen within two weeks of referral.**

*Strength of evidence* 4  
*Recommendation grade* D

- **Community optometry should refer any child with abnormal eye findings suggestive of a possible brain tumour directly to secondary care.**

*Strength of evidence* 4  
*Recommendation grade* D

- **Consideration should be given to the appropriate place of assessment. If appropriate community optometry expertise is not available, pre-**

**school and uncooperative children should be assessed by the hospital eye service.**

*Strength of evidence* 4

*Recommendation grade* D

- **A child with a new onset non-paralytic (concomitant) squint should have early ophthalmological assessment for consideration of underlying causes (including CNS causes).**

*Strength of evidence* 4

*Recommendation grade* D

**Delayed diagnosis has been associated with:**

- **Failure to fully assess vision in a young or uncooperative child**

*Strength of evidence* 4

*Recommendation grade* D

- **Failure of communication between community optometry and primary and secondary care**

*Strength of evidence* 4

*Recommendation grade* D

**CNS IMAGING (within a maximum of 4 weeks) REQUIRED FOR:**

- **Papilloedema**

*Strength of evidence* 4

*Recommendation grade* D

- **Optic atrophy**

*Strength of evidence* 4

*Recommendation grade* D

- **New onset nystagmus**

*Strength of evidence* 4

*Recommendation grade* D

- **Reduction in visual acuity not attributable to an ocular cause**

*Strength of evidence* 4

*Recommendation grade* D

- **Visual field reduction not attributable to an ocular cause**

*Strength of evidence* 4

*Recommendation grade* D

- **Proptosis**

*Strength of evidence* 4

*Recommendation grade* D

- **New onset paralytic (non-concomitant) squint**

*Strength of evidence* 4

*Recommendation grade* D

## Motor symptoms and signs

- **Consider a brain tumour in any child presenting with a persisting motor abnormality. Any motor abnormality lasting longer than two weeks should be regarded as persistent.**

*Strength of evidence* 2++

*Recommendation grade* B

- **Brain tumours may cause a deterioration or change in motor skills; this may be subtle e.g. change in hand or foot preference, loss of learned skills (computer games).**

*Strength of evidence* 3

*Recommendation grade* D

- **Motor system assessment must include observation of:**

### **Sitting and crawling in infants**

*Strength of evidence* 4

*Recommendation grade* D

### **Walking and running**

*Strength of evidence* 4

*Recommendation grade* D

### **Coordination e.g. heel to toe walking**

*Strength of evidence* 4

*Recommendation grade* D

### **Handling of small objects**

*Strength of evidence* 4

*Recommendation grade* D

### **Handwriting in school age children**

*Strength of evidence* 4

*Recommendation grade* D

### **Delayed diagnosis has been associated with:**

- **Attributing abnormal balance or gait to middle ear disease in the absence of corroborative findings**

*Strength of evidence* 3

*Recommendation grade* D

- **Failure to identify swallowing difficulties as the cause of recurrent chest infections or “chestiness”**

*Strength of evidence* 3

*Recommendation grade* D

**CNS IMAGING (within a maximum of 4 weeks) REQUIRED FOR:**

- **A regression in motor skills**  
*Strength of evidence* 4  
*Recommendation grade* D
  
- **Focal motor weakness**  
*Strength of evidence* 4  
*Recommendation grade* D
  
- **Abnormal gait and / or coordination (unless local cause)**  
*Strength of evidence* 4  
*Recommendation grade* D
  
- **Bell's palsy (isolated lower motor facial palsy) with no improvement within 4 weeks**  
*Strength of evidence* 4  
*Recommendation grade* D
  
- **Swallowing difficulties (unless local cause)**  
*Strength of evidence* 4  
*Recommendation grade* D
  
- **Persistent head tilt (unless local cause)**  
*Strength of evidence* 4  
*Recommendation grade* D

## Growth and development

- **Consider a brain tumour in any child presenting with any two of the following:**
  - Growth failure**
  - Delayed or arrested puberty**
  - Polyuria and polydipsia**
  - Strength of evidence* 2++
  - Recommendation grade* B
- **Early referral (from primary care) is required for a child presenting with:**
  - Precocious puberty**
  - Delayed or arrested puberty**
  - Growth failure**
  - Strength of evidence* 4
  - Recommendation grade* D
- **Early specialist referral for consideration of underlying causes including CNS causes is required for a child presenting with precocious puberty.**
  - Strength of evidence* 4
  - Recommendation grade* D
- **Diabetes insipidus must be considered in a child presenting with polyuria and / or secondary nocturnal enuresis.**
  - Strength of evidence* 4
  - Recommendation grade* D

### **Delayed diagnosis has been associated with:**

- **Attributing impaired growth with vomiting to gastrointestinal disease in the absence of corroborative findings.**
  - Strength of evidence* 3
  - Recommendation grade* D
- **Failure to consider diabetes insipidus in children with polyuria and polydipsia**
  - Strength of evidence* 3
  - Recommendation grade* D

## **Behaviour**

- **Lethargy is the commonest behavioural abnormality that occurs with brain tumours**

*Strength of evidence* 2++

*Recommendation grade* B

- **Environmental context is important when assessing lethargy: a child who is lethargic in situations in which they are normally active requires further assessment.**

*Strength of evidence* 4

*Recommendation grade* D

## 7. Further Information

Levels of evidence and grading of recommendations are taken from *SIGN*, Scottish Intercollegiate Guideline Network (2000).

- The complete guideline including methodology, evidence base and references can be viewed at and downloaded from [www.rcpch.ac.uk/bpp](http://www.rcpch.ac.uk/bpp)
- The initial guideline was published in June 2008, the current version (version 3) was published in March 2011. The guideline is due for review in June 2013.

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