The Children & Young People's Cancer Association

child cancer smart

A guideline to assist healthcare professionals in the assessment of children and young people aged 0-18 who may have a bone tumour

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Guideline background, aim and scope

Background

The Childhood Cancer Diagnosis study studied time to diagnosis for children and young people aged 0-18 across the UK. Bone tumours had the longest median time to diagnosis of 12.6 weeks. This highlighted a need to urgently review the clinical guidance available to health care professionals.

The 2015 National Institute for Health and Care Excellence (NICE) published a guideline on 'Suspected cancer: recognition and referral' which covers all ages[1]. There is a real need for paediatric-specific guidance, as adult cancers manifest and present differently. This current guidance is directed at primary care with the 'end- point' being referral onto secondary care. Children and young people with cancer experience diagnostic delay throughout the health service both at primary care and secondary care level and a referral from primary to secondary care can add significant length to the patient's diagnostic journey. Bone tumours are diagnosed by imaging rather than referral and so guidance was required on indications for, and appropriate waiting times to imaging.

Furthermore, the recommendations lack a systematic evidence review and are based solely on expert consensus which notably did not include any paediatric oncologists. As a result, concern from the paediatric oncology community across the UK led to the publication of a supplement to the NICE guideline in 2021 following a Delphi consensus process conducted among the CCLG: The Children & Young People's Cancer Association (CCLG) membership[2]. A full systematic evidence review was not completed at this time due to the urgent need for expert child-specific guidance.

Detailed tumour-specific guidance such as that produced for childhood brain tumours is needed to empower clinicians to make decisions about those who need investigation and accelerate referrals for children and young people with high-suspicion of bone cancer promoting earliest possible diagnosis.

Aim of the guideline

This guideline aims to shorten the time to diagnosis of bone tumours by providing evidence-based guidance for health professionals in primary and secondary care on the following:

1. **The symptoms and signs that may occur in children and young people (CYP) with these tumours.**
2. **Assessment of CYP presenting with these symptoms and signs.**
3. **Indications and waiting times for imaging CYP with these symptoms and signs.**

Clinical health questions

The guideline was devised to address the following questions:

1. What are the symptoms and signs that CYP with bone tumours present with?
2. Given that the initial symptoms and signs of a bone tumour may occur with other less serious childhood conditions, how can healthcare professionals distinguish those CYP who may have a bone tumour from the majority who do not?
3. What is the best way to clinically assess a CYP presenting with these symptoms and/or signs?
4. What symptoms and/or signs in CYP increase the likelihood of a bone tumour to the extent that their presence mandates imaging?
5. What is the best modality for imaging in these CYP?
6. In a CYP who presents with these symptoms and/or signs, what is an appropriate maximum waiting time to imaging?
7. Are there specific presentations of childhood bone tumours that are repeatedly associated with diagnostic difficulty?
8. Are there other barriers to diagnosis in childhood bone tumours and if so, how can these be addressed?

Scope and target population

The guideline is intended to support all healthcare professionals caring for children and young people aged 0-18 years in their clinical practice.

Healthcare professionals should use it to support their decision-making when assessing children who may have a bone tumour. It does not, however, override the responsibility of a healthcare professional to make decisions appropriate to the condition of individual children.

Stakeholder involvement

This guideline was developed under the leadership of the CCLG: The Children & Young People's Cancer Association (CCLG) and The University of Nottingham. Key stakeholders including general paediatricians, GPs, community paediatricians, emergency paediatricians, oncologists, paediatric surgeons, paediatric orthopaedic surgeons and parent representatives with experience of childhood cancer diagnosis who volunteered to participate in the multi-disciplinary workshop and helped revise the statements following feedback from the Delphi panel.

The following organisations are also recognised as key stakeholders. While these organisations were not directly involved in the development of this guideline, they represent key contributors to the understanding, diagnosis, and management of paediatric bone tumours:

- National Institute for Clinical Excellence (NICE)
- Scottish Intercollegiate Guidelines Network (SIGN)
- Royal College of Paediatrics and Child Health (RCPCH)
- Royal College of General Practitioners (RCGP)
- Royal College of Surgeons (RCS)

Funding

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Conflicts of interest

All GDG members, multidisciplinary workshop participants and Delphi consensus group participants declared no conflict of interests. The funders had no role in the guideline development and implementation process.

Methods

Guideline development

The guideline was developed in accordance with the AGREE II criteria, following a three-stage process involving evidence review, expert consultation, and consensus building (Figure 1).

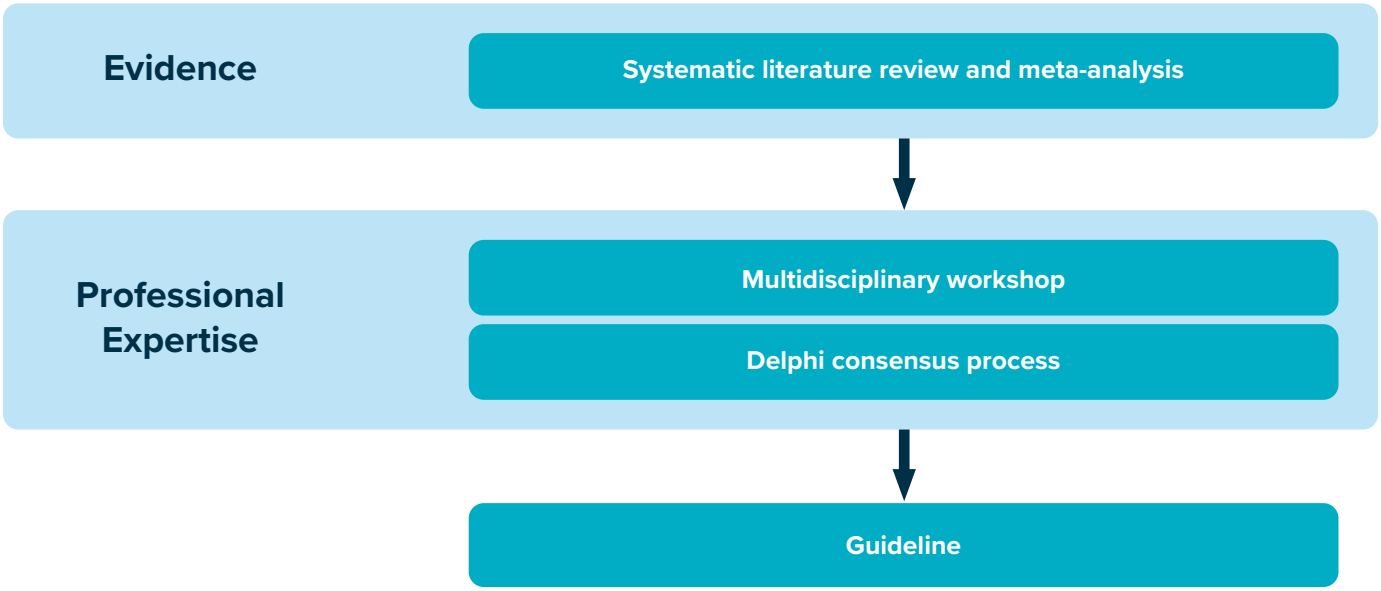

Figure 1. Guideline development methodology

The initial stage comprised a systematic review and meta-analysis to appraise current evidence on childhood bone tumour presentation. In stage two, a multidisciplinary workshop, involving clinicians from primary, secondary and tertiary care, as well as parents of children with cancer, reviewed the evidence and devised statements describing the clinical presentation, assessment, and investigation process. Parents were also given dedicated time to share their views. were also given dedicated time to share their views. were also given dedicated time to share their views.

In stage three, these statements were refined through a modified Delphi process involving clinicians from primary, secondary, and tertiary care across relevant specialties. Membership of the Guideline Development Group (GDG), workshop, and Delphi panel is listed in Appendix 2.

Impact of the COVID-19 pandemic

The systematic review and meta-analysis were originally carried out in 2018[4]. The multi-disciplinary workshop and Delphi consensus survey was subsequently conducted in 2019 and early 2020, with the findings published in 2023[5]. However, the guideline development was delayed due to the COVID-19 pandemic. To ensure the inclusion of up-to-date evidence in this guideline, another search was carried out in 2023. The combined analysis, which provided contemporary information and evidence regarding the presentation has since been published[6].

Systematic review and meta-analysis

Clinical Question: What are the symptoms and signs that children with bone tumours develop?

A systematic review and meta-analysis of the presenting signs and symptoms bone tumours in children and young people under the age of 18 was carried out to provide the evidence base for the development of this guideline. The detailed methodology and full results including sub-analysis by tumour type have been published[6].

Multidisciplinary workshop

Following the systematic review and meta-analysis, professional expertise was incorporated into guideline development to determine the specificity of signs and symptoms associated with childhood bone tumours and to advise on appropriate referral pathways, imaging indications and acceptable waiting times.

The panel reviewed the data from the meta-analysis and initially discussed the symptom list for bone tumours, splitting each list into core symptoms and associated symptoms.

For each of the symptoms, the group was asked to devise statements on the following:

- How would the signs and symptoms present to a healthcare professional?
- How should a healthcare professional assess a child presenting with this sign or symptom?
- How should a healthcare professional determine whether the presenting signs and symptoms could be due to a bone tumour, i.e. their specificity?
- What factors influence the specificity of a sign and symptom?
- What are appropriate thresholds for referral and selection for imaging for a child presenting with this sign or symptom?
- What would they regard as best practice for referral and imaging of a child presenting with this sign and symptom?

All discussions were translated into a series of statements by the Guideline Development Group (GDG) at the end of the workshop and sent back to the workshop participants to ensure they reflected the discussion.

Delphi consensus process

Statements for the first round of the Delphi consensus process were derived from the statements developed by the multidisciplinary workshop and from the evidence base provided by the systematic review. The detailed methodology and results have been published[5].

Invitations to join the Delphi panel were sent to health specialists fulfilling one or more of the following criteria (Delphi panel composition see Appendix 2):

- CCLG: The Children & Young People's Cancer Association (CCLG) member from one of the following disciplines: paediatric surgery, paediatric radiology, paediatric oncology, paediatric orthopaedic surgery.
- A range of general practitioners, paediatric emergency physicians and paediatricians across the UK.

Strength of evidence and recommendation

The levels of evidence and grades of recommendations (Appendix 5) are based on the SIGN 50: A Guideline Developer's Handbook[3]. Recommended best practice are based on the clinical experience of the Guideline Development Group (GDG).

The evidence

Systematic review and meta-analysis

The initial search of MEDLINE and EMBASE identified 25,131 titles published between January 2008 and May 2023. After title and abstract screening, 432 were selected for full-text review and 16 studies included in the final analysis [7-22]. These studies provided data on 1452 patients, including 932 with Ewing's sarcoma and 492 with osteosarcoma, across 12 countries).

The quality was comprehensively evaluated and summarised. A total of 38 symptoms/signs were recorded and those with pooled proportions 2% or more of the studied population are reported in Figure 2.

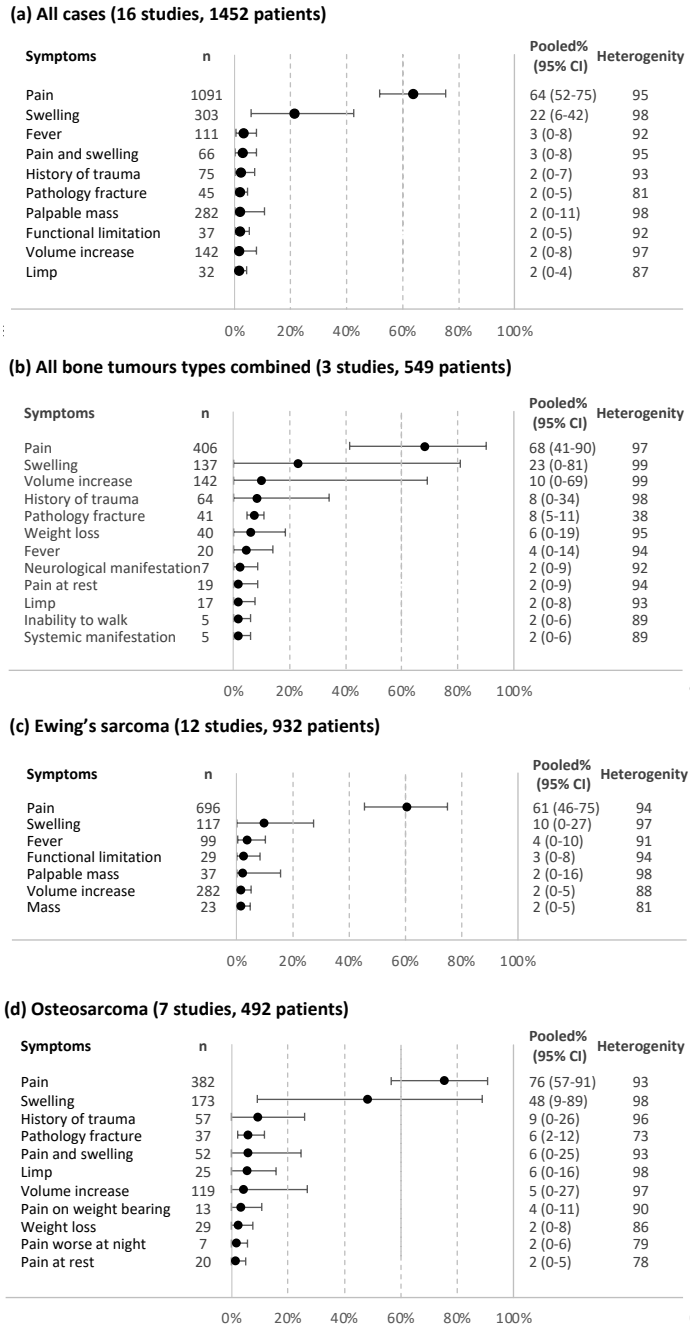

Figure 2. Pooled proportions for the most common pre-diagnostic signs and symptoms for bone tumour.
(a) all cases from 16 eligible studies, (b) studies reported all bone tumour types (c) Ewing's sarcoma (d) Osteosarcoma.

Core and associated symptoms

Following a review of the evidence and discussions by the multidisciplinary workshop and the Guideline Development Group (GDG) members, the following core and associated symptoms were included in the clinical guideline:

Core symptoms

- **Bone pain**
- **Swelling**
- **Bone mass/Lump**
- **Restricted movement/limp**

Associated symptoms

- **Persistent back pain especially with associated bladder/bowel/ erectile dysfunction**
- **Fever**
- **Weight loss**

Delphi consensus

The Delphi consensus process comprised of 36 statements describing best practice (referral, imaging, predisposing factors), the presenting features of childhood bone tumours (general, bone pain, swelling, mass/lump, restricted movement/limp), factors that could be used to discriminate these tumours from other less serious conditions and possible referral pathways for children with symptoms or signs suggestive of bone tumours.

The initial round achieved a consensus in 95% of the statements sent out for review and all statements reached consensus within two rounds; no statement was rejected. The full Delphi consensus process methodology and results for best practice and bone tumour statements have been published[5].

Table 1. Best practice statements and percentages consensus

General	1. Explicitly ask young people, parents and carers about their concerns regarding what the cause of symptoms are in any consultation.	99.0%
	2. If a parent/carer expresses concerns about a bone tumour this should be reviewed carefully. If a tumour is unlikely, explain why and give appropriate safety netting advice.	72.0%
	3. Any healthcare professional deciding to review a patient to diagnose or exclude cancer should ensure that the timing of the review does not exceed the national 4-week limit to access a diagnostic test and obtain the result.	89.8%
	4. Offer a telephone or in person interpreter if the patient, parent / carer or healthcare professional are not fluent in English or Welsh.	95.9%
	5. Be aware that low parental educational level, social deprivation and lack of familiarity with the UK healthcare system may be associated with diagnostic delay. Consider a multi-disciplinary approach for these families (for example health visitor liaison) and provide clear written safety netting for when to seek further medical advice.	90.7%
	6. Be aware that the presence of complex neuro-disabilities or other communication difficulties (eg, Autistic Spectrum Disorder) may also be associated with diagnostic delay. Care should be taken to elicit concerns from parents or carers that know them best.	98.0%
Referral	7. In primary care, discuss concerns with your local consultant paediatrician hotline or the paediatric consultant on call the same day if there is a high index of suspicion regarding a possible bone or abdominal tumour in a CYP.	90.1%

Referral	8. Discuss concerns over the telephone with the consultant paediatrician hotline or local equivalent service before referring a CYP from primary care in which differential diagnosis includes a possible tumour to ensure the CYP is seen within the most suitable timeframe (ideally within 2 weeks).	89.6%
Imaging	9. Request a plain x-ray in anteroposterior (AP) and lateral view as the initial investigation for a CYP who has a suspected bone tumour. This should not delay referral from primary care.	76.2%
Predisposing Factors	10. Be aware that some predisposing factors are associated with an increased risk of childhood bone tumours. Verify the presence of predisposing factors with parents/patients as they may lower the threshold for referral and investigation.	79.4%

***CYP, children and young people.**

Table 2. Bone tumour statements and percentages consensus

General	11. Take a detailed history, including the presence or absence of the other symptoms on the list above, history of injury, predisposing factors and a family history for CYP presenting with symptoms suggestive of a bone tumour.	99.0%
	12. Be aware that bone tumours can present with systemic symptoms such as fever, malaise and weight loss. Ask about these associated symptoms when seeing patients with other symptoms suggestive of a bone tumour.	96.8%
	13. Be aware that bone tumours causing spinal cord compression can affect bladder, bowel dysfunction. Ask for the presence of urinary or faecal incontinence (and erectile dysfunction in adolescent males) when taking a history, especially if the presenting complaint is back pain.	94.8%
	14. If there is an associated injury, take a detailed history of the injury including the mechanism of injury and timings of the onset of symptoms after the injury occurred.	95.9%
	15. Examine the limb or joint in question, the joint above and below, and perform a neurological and musculoskeletal examination (e.g., paediatric Gait, Arms, Legs and Spine assessment, pGALS) in a CYP with signs/ symptoms suggestive of a bone tumour.	90.7%
	16. Be aware that weight loss can be a sign of a bone tumour. Measure weight and compare to any previous measurements in CYP with signs or symptoms suggestive of a bone or abdominal tumour. Plot these measurements on age-appropriate growth charts if available to you to monitor change when reviewing symptoms.	88.3%
	17. Be aware that an initial normal x-ray does not exclude a bone tumour. If symptoms or clinical suspicion persists, a referral to secondary care is warranted. In secondary care, a discussion with a radiologist about the most appropriate repeat imaging is advised.	88.6%
	18. Be aware that pelvic bone tumours may not initially show on an x-ray. If the persistent symptom is pelvic pain and the x-ray has been reported as normal, referral to secondary care is warranted. In secondary care, discuss with a paediatric radiologist for further advice on imaging.	85.6%

Bone pain	19. Ask about the presence of the other symptoms of a bone tumour (swelling, palpable lump, restricted movement/limp, fever, weight loss, back pain and bowel/bladder/erectile dysfunction) in a CYP presenting with persistent bone pain (occurring on most days for a 2-week period).	99.0%
	20. Be aware that children aged younger than 4 years, or those with communication difficulties, are frequently unable to describe pain; their behaviour e.g., withdrawal, holding their leg, not weight bearing may indicate bone pain. Look for these signs on examination.	98.0%
	21. Be aware that an initial normal x-ray does not exclude a bone tumour. If symptoms or clinical suspicion persists, consider discussion with a paediatric radiologist and repeat x-ray or further imaging.	85.6%
	22. Request x-ray imaging for persistent bone pain (occurring on most days for a 2-week period). In primary care, request of imaging should not delay referral to secondary care.	83.5%
	23. Request x-ray imaging for localised bone pain that is waking a child or young person at night.	85.5%
	24. Request x-ray imaging for unexplained bone pain (i.e., without any preceding injury).	81.5%
	25. Be aware that x-ray imaging is not always the most suitable imaging modality for persistent bony back pain. Discuss with a paediatric radiologist to decide upon the most suitable imaging of choice.	87.6%
Swelling	26. Ask about the presence of the other symptoms of a bone tumour (bone pain, palpable lump, restricted movement/limp, fever, weight loss, back pain and bowel/bladder/erectile dysfunction) in a CYP presenting with persistent swelling (occurring on most days for a 2-week period).	96.9%
	27. Be aware that delayed diagnosis has been associated with attributing a red warm swelling to infection despite no improvement with antibiotics. Arrange to see the CYP at the end of the course of antibiotics to assess response. If there has been no response, consider discussion with secondary care for advice or referral.	87.7%
	28. Request x-ray imaging for persistent swelling (present for 2 weeks or more) rapidly increasing in size.	75.2%
	29. Request x-ray imaging for persistent swelling (present for 2 weeks or more) not resolving despite treatment with regular anti-inflammatories OR antibiotics.	78.3%
Bone mass/ Lump	30. A bony mass or lump which is increasing in size can be a sign of an underlying bone tumour and requires referral to secondary care.	95.9%
	31. Ask and examine for the other signs and symptoms suggestive of a bone tumour (bone pain, swelling, limp/restricted movement, fever, weight loss, back pain and bladder/bowel/erectile dysfunction) in CYP with a lump/mass.	93.8%
	32. Request x-ray imaging for a rapidly increasing bony lump or mass. This should not delay referral from primary care.	86.6%
Restricted movement/ limp	33. Ask about the presence of the other symptoms of a bone tumour (bone pain, palpable lump, restricted movement/limp, fever, weight loss, back pain and bowel/bladder/erectile dysfunction) in a CYP presenting with restricted movement or limp.	93.9%
	34. Have a high level of concern for a CYP who is normally highly active or sporty but is no longer able to play sport due to the presenting symptom.	87.6%
	35. Request x-ray imaging for a CYP who is non-weight bearing or has restricted movement despite adequate analgesia.	83.5%

***CYP, children and young people.**

Clinical Guideline

Best practice – consultation

Explicitly ask young people, parents and carers about their concerns regarding what the cause of the symptoms are in any consultation.

Strength of evidence	4
Recommendation form	Conditional
Consensus achieved	99% (Delphi Round 1)

Rationale

Parents/carers of children with persistent symptoms are frequently concerned that their child's symptoms may be due a tumour for a significant period of time before the diagnosis is made. Parents/carers may be unwilling to express these concerns for fear of seeming overly anxious or appearing to waste healthcare professionals' time. Explicitly asking parents/carers of their concerns enables them to be expressed, improving communication between all parties. In some cases, parental concern regarding a possible tumour may trigger professional concern and lead to appropriate investigation.

If a parent/carer expresses concerns about a possible bone tumour this should be reviewed carefully.

Strength of evidence	4
Recommendation form	Conditional
Consensus achieved	72% (Delphi Round 1)

Rationale

Parents/carers of children with bone tumours are frequently concerned that their child's symptoms may indicate a tumour for a significant period of time before the diagnosis is made. If, on review, a tumour seems unlikely it is important to explain why in order to maintain trust and communication with the patient and their parents/carers.

Any healthcare professional deciding to review a patient to diagnose or exclude cancer should ensure that the timing of the review does not exceed the national 28 day limit to access a diagnostic test and obtain the result.

Strength of evidence	4
Recommendation form	Conditional
Consensus achieved	89.8% (Delphi Round 1)

Rationale

Symptom progression occurs with childhood cancers, therefore early review is recommended to facilitate detection of any additional symptoms or signs which may make the diagnosis more likely. The current Faster Diagnosis Standard aims for all patients with suspected cancer to have a diagnosis or the "all clear" within 28 days and the Guideline Development Group (GDG) felt that this target should be reflected in this guideline[23].

Offer a telephone or in person interpreter if the patient, parent/carer or healthcare professional are not fluent in English or Welsh.

Strength of evidence	4
Recommendation form	Strong
Consensus achieved	95.9% (Delphi Round 1)

Rationale

The Guideline Development Group (GDG), multi-disciplinary workshop and Delphi panel could all identify individual cases where non-English first language was associated with diagnostic delay. It is essential to take a thorough history when assessing a child who may have a tumour; this is not possible if the patient, parent/carer and healthcare professional are not fluent in a common language.

Be aware that low parental educational level, social deprivation and lack of familiarity with the UK healthcare system may be associated with diagnostic delay. Consider a multi-disciplinary approach for these families (for example health visitor liaison) and provide clear written safety netting for when to seek further medical advice.

Strength of evidence	4
Recommendation form	Conditional
Consensus achieved	90.7% (Delphi Round 1)

Rationale

There is no published evidence linking low parental education, social deprivation and lack of familiarity with the UK healthcare system with diagnostic delay in paediatric bone or abdominal tumours. However, the guideline development team and many members of the first Delphi panel were aware of individual cases in which these factors may have contributed to a prolonged symptom interval. These children may not necessarily need quicker referral but would benefit with thorough safety netting and health visitor support to ensure any new symptoms are not missed.

Be aware that the presence of complex neuro-disabilities or other communication difficulties (e.g. Autistic Spectrum Disorder) may also be associated with diagnostic delay. Care should be taken to elicit concerns from parents or carers that know them best.

Strength of evidence	4
Recommendation form	Conditional
Consensus achieved	98.0% (Delphi Round 1)

Rationale

The multi-disciplinary workshop team highlighted that those with complex neuro-disabilities or other communication difficulties were also more likely to experience a diagnostic delay. Parents may only note a change in their behaviour without knowing the reason why. Care should be taken to listen to parental concern.

Best practice – referral

In primary care, discuss concerns with your local consultant paediatrician hotline or the paediatric consultant on call the same day if there is a high index of suspicion regarding a possible bone tumour in a CYP.

Strength of evidence	4
Recommendation form	Strong
Consensus achieved	90.1% (Delphi Round 1)

Rationale

Children with tumours may deteriorate quickly. Therefore, if there is a high likelihood that a child may have a tumour, they should be assessed promptly and arrangements for imaging should be made as quickly as possible.

Discuss concerns over the telephone with the consultant paediatrician hotline or local equivalent service before referring a CYP from primary care in which differential diagnosis includes a possible tumour to ensure the CYP is seen within the most suitable timeframe (ideally within two weeks).

Strength of evidence	4
Recommendation form	Strong
Consensus achieved	89.6% (Delphi Round 2)

Rationale

A prolonged symptom interval with bone tumours occurs in part due to delay between initial referral from primary care and assessment in secondary care. The Department of Health has advised that a patient (adult or child) presenting with symptoms that are potentially indicative of a malignancy should be assessed by a healthcare professional with expertise in that area within two weeks[24]. However, data shows that only 2% of children referred via the old two week wait system (now known as urgent suspected cancer pathway) actually receive a childhood cancer diagnosis[25][26]. The paediatricians amongst the multi-disciplinary workshop felt strongly that cases should be discussed with them if there is a suspicion of cancer as they would be able to ensure the child or young person is seen in the most appropriate place as soon as possible.

Best practice – imaging

Request a plain x-ray in AP and lateral view as the initial investigation for a CYP who has a suspected bone tumour. This should not delay referral from primary care.

Strength of evidence	4
Recommendation form	Strong
Consensus achieved	76.2% (Delphi Round 1)

Rationale

The expert radiologists present at the multi-disciplinary workshop agreed that a plain x-ray in AP and lateral views were the initial investigation of choice for suspected bone tumours. “This should not delay referral from primary care” was added after the Delphi consensus based on the free text comments from some primary care clinicians who reported that they are not able to request paediatric investigations directly or that there are often long waits for imaging. It was felt that waiting for an x-ray should not delay referral from primary care. It is important to note here that a normal X-ray with ongoing symptoms warrants further imaging (MRI).

For bone tumours, imaging results should be interpreted by a professional with expertise and training in reporting x-rays in children and young people.

Strength of evidence	4
Recommendation form	Conditional
Consensus achieved	Not applicable

Rationale

Normal and abnormal imaging findings can vary significantly between children and adults. To reduce the risk of misdiagnosis, the multi-disciplinary workshop group agreed that imaging in children should be interpreted by a healthcare professional with expertise in this area.

Predisposing factors

Be aware that some predisposing factors, such as history of Li-Fraumeni syndrome or hereditary retinoblastoma, are associated with an increased risk of childhood bone tumours. Verify the presence of predisposing factors with parents/patients as they may lower the threshold for referral and investigation.

Strength of evidence	2++
Recommendation form	Strong
Consensus achieved	79.4% (Delphi Round 1)

Rationale

Family cancer syndromes, in particular, Li-Fraumeni syndrome and hereditary retinoblastoma are associated with an increased risk of childhood bone tumours and so their presence should alert the clinician to this possibility and may lower their threshold for referral and investigation[27].

Presentation of a child with a potential bone tumour

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

Core symptoms

- **Bone pain**
- **Swelling**
- **Bone mass/Lump**
- **Restricted movement/limp**

Associated symptoms

- **Persistent back pain especially with associated bladder/bowel/ erectile dysfunction**
- **Fever**
- **Weight loss**

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

Strength of evidence	2++
Recommendation form	Strong
Consensus achieved	

Rationale

The selection of core symptoms was based on data from meta-analyses and discussions at a multidisciplinary workshop. Fever, weight loss, bladder/bowel/erectile dysfunction were also agreed by Guideline Development Group (GDG) and the multi-disciplinary workshop members as associated symptoms. Back pain is not a common presenting symptom in children and so should be taken seriously. The multidisciplinary workshop group agreed that whilst these symptoms were not individually common, they were all signs that in combination with the main symptoms, should warrant thought about malignancy.

Assessment of a child with a potential bone tumour

History

Take a detailed history, including the presence or absence of the other symptoms on the list above, history of injury, predisposing factors and a family history for CYP presenting with symptoms suggestive of a bone tumour.

Strength of evidence	4
Recommendation form	Strong
Consensus achieved	99% (Delphi Round 1)

Be aware that bone tumours can present with systemic symptoms such as fever, malaise and weight loss. Ask about these associated symptoms when seeing patients with other symptoms suggestive of a bone tumour.

Strength of evidence	2+
Recommendation form	Strong
Consensus achieved	96.8% (Delphi Round 1)

Be aware that bone tumours causing spinal cord compression can affect bladder, bowel dysfunction. Ask for the presence of urinary or faecal incontinence (and erectile dysfunction in adolescent males) when taking a history, especially if the presenting complaint is back pain.

Strength of evidence	2+
Recommendation form	Strong
Consensus achieved	94.8% (Delphi Round 1)

If there is an associated injury, take a detailed history of the injury including the mechanism of injury and timings of the onset of symptoms after the injury occurred.

Strength of evidence	4
Recommendation form	Strong
Consensus achieved	95.9% (Delphi Round 1)

Rationale

Childhood bone tumours can present with symptoms that may occur with other, more common childhood illnesses. Taking a detailed history, including specifically enquiring about any other symptoms and predisposing factors, facilitates identifying those children who may have tumours and need imaging from the majority who do not.

The Guideline Development Group (GDG) and the multi-disciplinary workshop members felt that taking a detailed history, including specifically enquiring about any other symptoms, may lower the threshold for investigation. This should also include asking about relevant neurological symptoms, such as bladder or bowel dysfunction when spinal cord compression is suspected, and, where there is an associated injury, obtaining details of the mechanism of injury and the timing of symptom onset.

Assessment

Examine the limb or joint in question, the joint above and below, and perform a neurological and musculoskeletal examination (eg, pGALS) in a CYP with signs/symptoms suggestive of a bone tumour.

Strength of evidence	4
Recommendation form	Strong
Consensus achieved	90.7% (Delphi Round 1)

Rationale

The Guideline Development Group (GDG) agreed that assessment of pain needs to include a musculoskeletal examination and a neurological examination to identify any additional signs which would raise suspicion of cancer.

Be aware that weight loss can be a sign of a bone tumour. Measure weight and compare to any previous measurements in CYP with signs or symptoms suggestive of a bone tumour. Plot

Strength of evidence	4
Recommendation form	Conditional
Consensus achieved	66.0% (Delphi Round 1)
Consensus achieved	88.3% (Delphi Round 2)

Rationale

The Guideline Development Group (GDG) felt that poor growth, especially weight loss is a worrying feature in addition to pain. As such, measuring and comparing the weight to previous is advised.

Be aware that an initial normal x-ray does not exclude a bone tumour. If symptoms or clinical suspicion persists, referral to secondary care is warranted. In secondary care, a discussion with a radiologist about the most appropriate repeat imaging is advised.

Strength of evidence	4
Recommendation form	Strong
Consensus achieved	88.6% (Delphi Round 1)

Rationale

Although this is not found in the literature, all members of the multi-disciplinary team were aware of cases especially axial cases, where initial x-ray had not shown a bone tumour and so if symptoms were persistent despite a normal x-ray, then referral to secondary care or discussion with radiology would be warranted to ensure prompt MRI imaging.

Be aware that pelvic bone tumours may not initially show on an x-ray. If the persistent symptom is pelvic pain and the x-ray has been reported as normal, referral to secondary care is warranted. In secondary care, discuss with a paediatric radiologist for further advice on imaging.

Strength of evidence	4
Recommendation form	Strong
Consensus achieved	85.6% (Delphi Round 1)

Rationale

Axial tumours, such as pelvic tumours may not initially show on an x-ray. It was agreed by the multi-disciplinary team that this was important to highlight as this was a significant reason for delay in this subgroup who would either need repeat X-ray or MRI if symptoms were persisting.

Signs and symptoms of a child with a potential bone tumour

Bone pain

Ask about the presence of the other symptoms of a bone tumour (swelling, palpable lump, restricted movement/limp, fever, weight loss, back pain and bowel/bladder/erectile dysfunction) in a CYP presenting with persistent bone pain (occurring on most days for a 2-week period).

Strength of evidence	4
Recommendation form	Conditional
Consensus achieved	99% (Delphi Round 1)

Be aware that children aged younger than 4 years, or those with communication difficulties, are frequently unable to describe pain; their behaviour eg, withdrawal, holding their leg, not weight bearing may indicate bone pain. Look for these signs on examination.

Strength of evidence	2++
Recommendation form	Strong
Consensus achieved	96.0% (Delphi Round 1)

Be aware that an initial normal x-ray does not exclude a bone tumour. If symptoms or clinical suspicion persists, consider discussion with paediatric radiologist and repeat x-ray or further imaging (MRI).

Strength of evidence	4
Recommendation form	Conditional
Consensus achieved	85.6% (Delphi Round 1)

Be aware that x-ray imaging is not always the most suitable imaging modality for persistent bony back pain. Discuss with a paediatric radiologist to decide upon the most suitable imaging of choice.

Strength of evidence	3
Recommendation form	Strong
Consensus achieved	87.6% (Delphi Round 1)

Diagnostic pitfalls

Be aware that delayed diagnosis has been associated with: Failure to re-image a child or young person with persistent symptoms who has previously had a normal x-ray, especially in pelvic tumours.

Strength of evidence	4
Recommendation form	Conditional

Rationale

The guideline development team felt that it was particularly important to highlight presenting symptoms and signs which, whilst not necessarily common presentations of childhood bone tumours, were, in their experience, particularly associated with a prolonged symptom interval and diagnostic difficulty. To make these areas easy to identify in the guideline they have been headed with the caption “Delayed diagnosis has been associated with:”. The above statement leads on from the preceeding statement.

Request X-ray imaging for

Persistent bone pain (occurring on most days for a two-week period). In primary care, request of imaging should not delay referral to secondary care.

Strength of evidence	4
Recommendation form	Strong
Consensus achieved	83.5% (Delphi round 1)

Localised bone pain that is waking a child or young person at night.

Strength of evidence	4
Recommendation form	Strong
Consensus achieved	85.5% (Delphi round 1)

Unexplained bone pain (ie, without any preceding injury).

Strength of evidence	4
Recommendation form	Strong
Consensus achieved	81.5% (Delphi round 1)

Swelling

Ask about the presence of the other symptoms of a bone tumour (bone pain, palpable lump, restricted movement/limp, fever, weight loss, back pain and bowel/bladder/erectile dysfunction) in a CYP presenting with persistent swelling (occurring on most days for a two-week period).

Strength of evidence	2++
Recommendation form	Conditional
Consensus achieved	96.9% (Delphi Round 1)

Be aware that swelling due to a bone tumour can present discretely or diffusely.

Strength of evidence	4
Recommendation form	Conditional
Consensus achieved	not applicable*

Be aware that swelling due to a bone tumour can occur along the long bone or around a joint.

Strength of evidence	4
Recommendation form	Conditional
Consensus achieved	not applicable*

Be aware that swelling due to a bone tumour can present with overlying erythema and be warm to touch.

Strength of evidence	4
Recommendation form	Conditional
Consensus achieved	not applicable*

*The multidisciplinary workshop group agreed these statements. The Guideline Development Group (GDG) felt that this needed to be highlighted but the RCPCH evidence team felt this did not need to go out for consensus.

Diagnostic pitfalls

Be aware that delayed diagnosis has been associated with: Attributing a red warm swelling to infection despite no improvement with antibiotics. Arrange to see the CYP at the end of the course of antibiotics to assess response. If there has been no response, consider discussion with secondary care for advice.

Strength of evidence	3
Recommendation form	Conditional
Consensus achieved	87.7% (Delphi round 1)

Rationale

The multidisciplinary team agreed that in delayed diagnosis had been seen when a swelling had been presumed to be infective despite no improvement.

Request X-ray imaging for

Persistent swelling (present for two weeks or more) rapidly increasing in size.

Strength of evidence	4
Recommendation form	Strong
Consensus achieved	75.2% (Delphi round 1)

Persistent swelling (present for two weeks or more) not resolving despite treatment with regular anti-inflammatories OR antibiotics.

Strength of evidence	4
Recommendation form	Strong
Consensus achieved	78.3% (Delphi round 1)

Bone mass/lump

A bony mass or lump which is increasing in size can be a sign of an underlying bone tumour and requires referral to secondary care.

Strength of evidence	2++
Recommendation form	Strong
Consensus achieved	95.9% (Delphi Round 1)

Ask and examine for the other signs and symptoms suggestive of a bone tumour (bone pain, swelling, limp/restricted movement, fever, weight loss, back pain and bladder/bowel/erectile dysfunction) in CYP with a lump/mass.

Strength of evidence	4
Recommendation form	Conditional
Consensus achieved	93.8% (Delphi Round 1)

Request X-ray imaging for

A rapidly increasing bony lump or mass. This should not delay referral from primary care.

Strength of evidence	4
Recommendation form	Strong
Consensus achieved	86.6% (Delphi round 1)

Restricted movement/limp

A toddler or young child with a limp is a common presentation and in most cases will not be due to a bone tumour.

There is current NICE CKS guidance on acute limp that should be followed in the first instance for these children: **https://cks.nice.org.uk/acute-childhood-limp#!topicSummary**

Strength of evidence	2++
Recommendation form	Strong
Consensus achieved	Not applicable

A bone tumour in the upper limb can manifest as restricted movement, for example the

Strength of evidence	2++
Recommendation form	Strong
Consensus achieved	Not applicable

Ask about the presence of the other symptoms of a bone tumour (bone pain, palpable lump, restricted movement/limp, fever, weight loss, back pain and bowel/bladder/erectile dysfunction) in a CYP presenting with restricted movement or limp.

Strength of evidence	2++
Recommendation form	Strong
Consensus achieved	93.9% (Delphi round 1)

Have a high level of concern for a CYP who is normally highly active or sporty but is no longer able to play sport due to the presenting symptom.

Strength of evidence	4
Recommendation form	Strong
Consensus achieved	87.6% (Delphi round 1)

Rationale

The multidisciplinary workshop group and the Guideline Development Group (GDG) agreed that a bone tumour in the pelvis or lower limb may present as a limp, and that a bone tumour in the upper limb may manifest as restricted movement. They considered that this should be highlighted in the guideline but did not require it to be sent out for consensus.

The workshop group agreed that they had all come across cases where persistent parental or carer concern that their child is no longer able to play a sport at a high level despite health professional reassurance had led to significant diagnoses. The Delphi panel agreed that there should be a high level of concern for those who are unable to continue high level sport due to symptoms.

Diagnostic pitfalls

Be aware that delayed diagnosis has been associated with failure to enquire about activities of daily living.

Strength of evidence	4
Recommendation form	Conditional
Consensus achieved	Not applicable

Rationale

The Guideline Development Group (GDG) and multidisciplinary workshop group agreed that this statement should be highlighted in the guideline but did not require it to be sent out for consensus. Asking about activities of daily living will highlight which CYP are significantly affected by the pain, thereby likely reducing the threshold for further investigation.

Request X-ray imaging for

X-ray imaging is required for A CYP who is non-weight bearing or has restricted movement despite adequate analgesia.

Strength of evidence	4
Recommendation form	Strong
Consensus achieved	83.5% (Delphi round 1)

Summary of recommendations for healthcare professionals

The Guideline Development Group (GDG) has also developed a quick reference guide and a one-page summary of guideline recommendations for healthcare professionals (see Appendix 1).

Implementation strategy and future work

Guideline implementation

The guideline implementation will be supported with the launch of the Child Cancer Smart awareness campaign **(www.cclg.org.uk/childcancersmart)** including clinical guidelines, quick reference and educational package for healthcare professionals.

All evidence generated by the Guideline Development Group (GDG) for the development of the guidelines, as well as any campaign outcomes, will be published and disseminated through professional conferences and in peer-reviewed journals.

Further review policy

The guideline is a stand-alone guideline written by the Guideline Development Group (GDG), jointly led by the CCLG and University of Nottingham. To ensure it provides high quality evidence to healthcare professionals across the country, this guideline requires five-yearly review. If new evidence or changes in referral pathways, then a full revision will be conducted in line with AGREE II criteria.

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Appendix 1:

Summary of Recommendations

Diagnosis of bone tumours in children and young pe

A summary for healthcare professionals

Consider a bone tumour in any child presenting with:

- Bone pain
- Swelling
- Bone mass/lump
- Restricted movement/limp

Associated symptoms:

- Persistent back pain, especially with associated bladder/bowel/ erectile dysfunction
- Weight loss

Ask about common predisposing factors

- Personal history of Li-Fraumeni syndrome
- Hereditary retinoblastoma

Assess with:

History
- associated symptoms
- any predisposing factors
- family history
- detailed injury history

Examination of:
- Joint/limb
- Joint above and below
- Weight
- Neurological examination
- pGALS examination*

https://ped-rheum.biomedcentral.com/articles/10.1186/1546-0096-11-44]

Diagnostic pitfalls

- Initial symptoms of bone tumour can be attributed to injury
- Symptoms frequently fluctuate - resolution then recurrence does not exclude a bone tumour
- An initial normal X-ray does not exclude a tumour
- Atrributing a red, warm swelling or a bony lump/mass to infection despite no response to antibiotics
- Not enquiring about activities of daily living

Referral from primary care

- High risk of tumour: SAME DAY referral to secondary care
- Lower risk*: discuss with paediatrics by phone to advise best route

Imaging

- High risk of tumour: URGENT X-ray imaging
- Lower risk*: X-ray imaging within 4 weeks

*bone tumour in differential diagnosis, low index of suspicion

Bone pain

- Consider a bone tumour in any
- Ask about the presence of the (swelling, palpable lump, restri loss, back pain and bowel/blad presenting with persistent bon
- Bone pain from a bone tumour
- or night
- Injuries can be a red herring. T including the onset of the symp secondary to an injury will get

X-ray imaging required with:

- Persistent bone pain, especiall
- Localised bone pain that is wal at night
- Unexplained bone pain (i.e. wit
- Bone pain that is out of propor does not improve 2 weeks fro
- Bone pain with associated neu
- Persistent back pain or pelvic p radiologist as X-ray may not be

Diagnostic pitfalls:

- Attributing symptoms to an inju
- Assuming that a normal X-ray f

*Persistent = continuous or recurrent bone

Swelling

- Swelling from a bone tumour
- It can occur along the long bo
- Swelling due to a bone tumou erythema
- Ask about the presence of the (bone pain, palpable lump, res weight loss, back pain and bo

X-ray imaging required with:

- Persistent swelling* rapidly inc
- Persistent swelling* not resolv regularanti-inflammatories or a

Diagnostic pitfalls:

- Attributing a red warm swellin improvement with antibiotics

*Persistent swelling present for more than

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Bone mass/lump

- A bony mass/lump which is increasing in size can be a sign of a bone tumour
- Ask and examine for the other signs and symptoms suggestive of a bone tumour (bone pain, swelling, limp/restricted movement, fever, weight loss, back pain and bladder/bowel/erectile dysfunction) in CYP with a lump/mass.

X-ray imaging required with:

- A rapidly increasing lump
- A lump/mass with one or more other symptoms

Diagnostic pitfalls:

- Attributing a bony lump/mass to infection despite no response to antibiotics

Restricted movement/limp

- A bone tumour in the pelvis or lower limb can present as a limp
- A bone tumour in the upper limb can manifest as restricted movement
- Ask about the presence of the other symptoms of a bone tumour (bone pain, palpable lump, restricted movement/limp, fever, weight loss, back pain and bowel/bladder/erectile dysfunction. Have a high level of concern for a CYP who is normally highly
- active or sporty but is no longer able to play sport due to the presenting symptom.

X-ray imaging required with:

- A CYP who is non-weight bearing
- Persistent restricted movement despite adequate analgesia

Diagnostic pitfalls:

- Failure to enquire about activities of daily living

*Persistent = present for more than 2 weeks

Associated symptoms

- Persistent back pain especially with associated bladder/bowel/ erectile dysfunction
- Weight loss

For additional support, visit
www.cclg.org.uk/childcancersmart/bone

Appendix 2:

GDG members, multidisciplinary workshop and Delphi participants

GDG Members

1. Emeritus Professor David Walker (Children's Brain Tumour Research Centre, University of Nottingham, Nottingham, UK)
2. Dr Sophie Wilne (Consultant Paediatric Oncologist, Nottingham University Hospitals NHS Trust, Nottingham, UK)
3. Dr Shaarna Shanmugavadivel (CCLG Early Diagnosis Fellow, University of Nottingham, Nottingham UK)
4. Ms Jo-Fen Liu (Early Diagnosis Project Manager, CCLG: The Children's & Young People's Cancer Association, Leicester, UK)
5. Dr Tim Ritzmann, Consultant Paediatric Oncologist, Clinical Associate Professor in Paediatric Neuro-Oncology and molecular biology and Honorary Consultant Paediatric Oncologist, Children's Brain Tumour Research Centre, University of Nottingham, Nottingham, UK

Multidisciplinary Workshop Participants

1. Dr Phillip Dykes (Consultant in Paediatric Emergency Medicine, Nottingham University Hospital NHS Trusts, Nottingham, UK)
2. Dr Lynda Walton (Consultant in Paediatric Emergency Medicine, Nottingham University Hospital NHS Trusts, Nottingham, UK)
3. Dr Damian Roland (Consultant in Paediatric Emergency Medicine, University Hospitals of Leicester NHS Trust, Leicester, UK)
4. Dr Gisela Robinson (Consultant General Paediatrician, Royal Derby Hospital, Derby, UK)
5. Dr Stephanie Smith (Consultant General Paediatrician, Nottingham University Hospital NHS Trusts, Nottingham, UK)
6. Dr Jill Sussens (Consultant General Paediatrician, Nottingham University Hospital NHS Trusts, Nottingham, UK)
7. Dr James Nicholson (Consultant Paediatric Oncologist, Addenbrooke's Hospital, Cambridge, UK)
8. Dr Madhu Dandapini (Consultant Paediatric Oncologist, Nottingham University Hospitals NHS Trust, Nottingham, UK)
9. Dr Mark Brougham (Consultant Paediatric Oncologist, NHS Lothian, Edinburgh, UK)
10. Mr Manoj Shenoy (Consultant Paediatric Surgeon, Nottingham University Hospitals NHS Trust, Nottingham, UK)
11. Mr Daniel Colliver (Consultant Paediatric Surgeon, Nottingham University Hospitals NHS Trust, Nottingham, UK)
12. Dr Paul Nathan (GP, Hollybrook Medical Centre, Derby, UK)
13. Dr Karen Taylor (GP, College Street Medical Practice, Long Eaton, UK)
14. Craig Bowley (Senior Paediatric ACP, Nottingham University Hospitals NHS Trust, Nottingham, UK)

15. Dr Angela Polanco (Parent)
16. Dr Jen Kelly (Grace Kelly Childhood Cancer Trust)
17. Ms Angela Stewart (Project Manager, CCLG: The Children's & Young People's Cancer Association, Leicester, UK)
18. Ms Jo-Fen Liu (Early Diagnosis Project Manager, CCLG: The Children's & Young People's Cancer Association, Leicester, UK)
19. Dr Shaarna Shanmugavadivel (CCLG Early Diagnosis Fellow, University of Nottingham, Nottingham UK)
20. Emeritus Professor David Walker (Children's Brain Tumour Research Centre, University of Nottingham, Nottingham, UK)
21. Dr Sophie Wilne (Consultant Paediatric Oncologist, Nottingham University Hospitals NHS Trust, Nottingham, UK)

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Child Cancer Smart Oncology Research Lead

Dr Tim Ritzmann, Clinical Associate Professor in Paediatric Neuro-Oncology and molecular biology and Honorary Consultant Paediatric Oncologist, Children's Brain Tumour Research Centre, University of Nottingham, Nottingham, UK

Delphi Consensus Participants

General Paediatricians

1. Dr Louise Wells
2. Dr Laura Ashmore
3. Dr Jo Srinivasan
4. Dr Carol Bertenshaw
5. Dr Caroline Brown
6. Dr Donna Traves
7. Dr Bala Subramaniam
8. Dr Prem Sundaram
9. Dr Imogen Norton
10. Dr Katherine Picanelli
11. Dr Mike Tembo
12. Dr Caroline Scott-Lang
13. Dr Markus Hesseling
14. Dr Jane Hoddes
15. Dr Arindam Das
16. Dr Thomas Kus
17. Dr Andrew Mullett
18. Dr Anusha Ponnampalam
19. Dr Rebecca Proudfoot
20. Dr Soonie Patel
21. Dr Alison Davies
22. Dr Simon Parke
23. Dr Sarah Thompson
24. Dr Anita Demetriou
25. Dr Jane Ellis
26. Dr Ajanta Kamal
27. Dr Katie Yallop

Paediatric Emergency Medicine

1. Dr Ian Lewins
2. Dr Tessa Davis
3. Dr Dani Hall
4. Dr Elizabeth Herrieven
5. Dr Graham Johnson
6. Dr Rachel Parish
7. Dr Anastasia Alcock
8. Dr Jane Bayreuther
9. Professor Andrew Rowland
10. Dr Helen Milne
11. Dr Sakura Hingley
12. Dr Clare Dieppe
13. Dr Liz Saunders
14. Dr Roger Alcock
15. Dr Scott Hendry
16. Dr Michaela Lazner
17. Dr Julie Mott
18. Dr Emma Jenkinson

Paediatric surgeons

1. Mr Ross Fisher
2. Professor Paul Losty
3. Miss Joanne Minford
4. Miss Bhanumathi Lakshminarayanan
5. Mr Timothy Rogers
6. Miss Fiona Murphy
7. Mr Paul Farrelly
8. Miss Kate Cross
9. Mr Khalid Sharif
10. Mr Ross Craigie
11. Miss Sarah Braungart
12. Mr Suren Arul
13. Mr Stefano Giuliani

Paediatric radiologists

1. Dr Sara Harrison
2. Dr Annmarie Jeanes
3. Dr Kate Taylor-Robinson
4. Dr Kieran McHugh
5. Dr Srikrishna Harave
6. Dr Marina Easty

Paediatric oncologists

1. Dr Marcus Andrews
2. Dr Sucheta Vaidya
3. Dr Shama Goyal
4. Dr Maria Michelagnoli
5. Dr Simone Wilkinson
6. Dr Kate Wheeler
7. Dr Shaun Wilson
8. Dr Rachel Cox

GPs

1. Dr David Payne
2. Dr Samara Afzal
3. Dr Angela Wright
4. Dr Edward Snelson
5. Dr Chandni Sagar
6. Dr Lou Millington
7. Dr Greg Butler
8. Dr Faran Rizvi
9. Dr Terri Lovis
10. Dr Sarah Harman
11. Dr Suzanne England
12. Dr Chloe Barter
13. Dr Laura Wilson
14. Dr Rebecca Henderson
15. Dr Rachel Glennie
16. Dr Kate Bishton
17. Dr Sian Kenny
18. Dr Penny Edrich
19. Dr Julia Foley
20. Dr Laura Hannaford
21. Dr Hannah Green
22. Dr Emma Goldstein
23. Dr Joanne Sinclair
24. Dr Samantha Robinson
25. Dr Claire Grimstvedt
26. Dr Teresa Tang
27. Dr Lucy Follis
28. Dr Katherine Teare
29. Dr Laura Maher
30. Dr Sonja Adhiyaman
31. Dr Anum Alamgir
32. Dr Zoe Hunter
33. Dr Bethany Thomas
34. Dr Sarah Cousins
35. Dr Amber Nielsen
36. Dr Verity Lowndes-Burt
37. Dr Christine Clayton
38. Dr Sarah Arthur
39. Dr Kay Jones
40. Dr Hannah Williams
41. Dr Sana Shahid
42. Dr Alison Lee
43. Dr Janet McIlfatrick
44. Dr Rachael King
45. Dr Chiranthi Siriwardena
46. Dr Alexandra Peake
47. Dr Harriet Williamson
48. Dr Pamela Ross
49. Dr Marie Cohen
50. Dr Toni Hazell
51. Dr Elizabeth Lacey
52. Dr Laura Edwards
53. Dr Ella Bosmith
54. Dr Elizabeth Field
55. Dr Christine Gray
56. Dr Clare Nwosu
57. Dr Esmat Abbas

Appendix 3:

Strength of evidence and recommendation

Levels of Evidence

Level	Description
1++	High-quality meta-analyses, systematic reviews of randomized controlled trials (RCTs), or RCTs with a very low risk of bias.
1+	Well-conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias.
1–	Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias.
2++	High-quality systematic reviews of case-control or cohort studies; high-quality case-control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal.
2+	Well-conducted case-control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal.
2–	Case-control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal.
3	Non-analytic studies, e.g., case reports, case series.
4	Expert opinion.

Grades of Recommendations:

Grade	Description
A	At least one meta-analysis, systematic review, or RCT rated as 1++, and directly applicable to the target population; or a body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results.
B	A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or extrapolated evidence from studies rated as 1++ or 1+.
C	A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or extrapolated evidence from studies rated as 2++.
D	Evidence level 3 or 4; or extrapolated evidence from studies rated as 2+.

Forms of Recommendation (SIGN 50)[3]

Judgement	Recommendation
Undesirable consequences clearly outweigh desirable consequences	Strong recommendation against.
Undesirable consequences probably outweigh desirable consequences	Conditional recommendation against.
Balance between desirable and undesirable consequences is closely balanced or uncertain	Recommendation for research and possible conditional recommendation for use restricted to trials.
Desirable consequences probably outweigh undesirable consequences	Conditional recommendation for.
Desirable consequences clearly outweigh undesirable consequences	Strong recommendation for.

'Strong' recommendations should be made where there is confidence that, for the vast majority of people, the intervention/action will do more good than harm (or more harm than good). The recommendation should be clearly directive and include 'should/ should not' in the wording.

'Conditional' recommendations should be made where the intervention/action will do more good than harm for most patients, but may include caveats eg on the quality or size of the evidence base, or patient preferences. Conditional recommendations should include 'should be considered' in the wording.

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child cancer smart

Are you Child Cancer Smart?

Child Cancer Smart is an evidence-based public and professional awareness campaign to improve early diagnosis of cancer in children and teenagers aged 0-18.

The campaign recommends that if a child has had

3 persistent symptoms

or

3 visits to the doctor

or

3 weeks of unexplained symptoms

their doctor should pick up the phone and call the local on-call paediatrician.

Early diagnosis can save lives.

Find out more at www.cclg.org.uk/childcancersmart

Why 3 symptoms, 3 visits or 3 weeks?

This message for professionals has been chosen based on the evidence we have. We know that some symptoms of cancer are more obvious than others and so whilst, for some, cancer will be considered very quickly, for others it may take longer.

In the Childhood Cancer Diagnosis (CCD) study, 50% of solid tumours were diagnosed within 3 weeks of seeing a healthcare professional, and leukaemias often much more quickly than that.

We want to shorten the time for the other 50%. Ensuring healthcare professionals are considering cancer in children at the 3-week mark if symptoms are progressive and unexplained will help us reach our target of diagnosing 75% of children and teenagers within 3 weeks from first contact with a healthcare professional.

Let us know what you think, or get involved

If you've got any feedback on the Child Cancer Smart campaign, we'd love to hear it.

If you would like to get involved and support the Child Cancer Smart campaign - whether by contributing to the guideline development process, acting as one of our clinical champions, or in many other ways, we would be delighted to hear from you.

Contact us by completing the form at **www.cclg.org.uk/childcancersmart/your-thoughts**

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CCLG and The Children & Young People's Cancer Association are operating names of The Children's Cancer and Leukaemia Group, registered charity in England and Wales (1182637) and Scotland (SC049948).

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We are CCLG: The Children & Young People's Cancer Association. We unite the children and young people's cancer community, driving collective action and progress. Powered by expertise, we work together to create a brighter future for children and young people with cancer.

Research is the key to better treatments, improved care, and potential cures. We fund and lead world-class research, fuelling groundbreaking work led by brilliant minds. Collaboration is at the heart of our approach - bringing together the right people and organisations to drive progress and deliver real impact.

We provide trusted information and guidance for children and young people with cancer, their families, and everyone supporting them. Our expertise helps them navigate the challenges of cancer and its impact, offering reassurance and clarity when it's needed most.

Through our professional membership, we bring together the brightest minds in childhood cancer, creating a national network that drives progress. Together, we shape better treatment and care - developing guidelines, sharing knowledge, offering expert advice, leading pioneering research, and creating essential resources and education for professionals. Our collective expertise sets the standard, advocating for excellence at every level - local, national, and global.