

# GUIDELINE ON THE MANAGEMENT OF SLEEPING DIFFICULTIES IN CHILDHOOD

## Incorporating GUIDANCE ON THE USE OF MELATONIN FOR SLEEPING DIFFICULTIES IN CHILDREN/YOUNG PEOPLE WITH NEURODISABLING AND NEURODEVELOPMENTAL CONDITIONS

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## 1. Introduction / Background

Healthy sleep is an essential part of any child and young person (CYP)'s development, growth and wellbeing.

Sleep is regulated by the hypothalamus (part of the brain that links the nervous system to the endocrine system). The hypothalamus receives sensory input from light sensitive cells in the eye and controls the timing and length of sleep. When light exposure reduces (as it gets darker) the pineal gland (a small gland found near the centre of the brain) produces the hormone melatonin to help induce sleep. There is a balance between wakefulness and sleep that changes during typical child development.

The sleep-wake regulation changes rapidly over the first year of life and throughout childhood with the development of the circadian rhythm between 10-12 weeks of age, sleep duration increasing with increasing age, number of night awakenings decreasing between 0-2 years, longest time asleep increasing between 0-2 years and number of daytime naps decreasing up to 2 years (Barbara *et al*).

The typical requirements for sleep for children at various ages to promote optimal health can be found in the table below (taken from American Academy of Paediatrics Consensus Statement 2016, Paruthi *et al*)

Age	Sleep requirement per 24 hours
4 - 12months	12 - 16 hours (including naps)
1 - 2 years	11 - 14 hours (including naps)
3 - 5 years	10 - 13 hours (including naps)
6 - 12 years	9 - 12 hours
13 - 18 years	8 - 10 hours

Lack of sleep can cause varying difficulties including impairment in attention, memory, behaviour, school performance, growth, development and family function. This can make assessment of development and behavioural difficulties difficult where poor sleep is also present; this is a common challenge encountered in practise as children with neurodevelopmental difficulties are at much higher risk of sleep problems.

Behavioural sleep problems are common with moderate or severe problems reported in 17% of 1 year old children (Child: Care, Health and Development 1990 ) and some form of sleep problem in 20% of 5 year olds and 6% of 11 year olds (Rona *et al*, 1998)

Sleeping difficulties in children with an underlying neurodevelopmental (including neurogenetic) conditions are common. Sleep is known to be important in establishing neural networks within the developing brain. It is also essential for attention, concentration and improving cognition. Sleeping difficulties in an individual child affects the whole family, causing reduction in sleep for siblings, parents and carers. This in turn causes similar difficulties for the sibling in terms of attention and cognition. For the parents this can also reduce well-being, reduces their ability to concentrate and can affect employment and their ability to parent successfully (Rona *et al* 1998, Appleton *et al* 2012). Behaviour strategies are the first line management for all children with sleeping difficulties. After behaviour strategies have been used, some children with neurodevelopmental and neurodisabling conditions do still struggle with their sleep. In these children only the prescribing of melatonin may be considered by a secondary care specialist. This medication should not be prescribed by primary care.

## **2 Assessment of Sleep Difficulties**

An assessment of the nature of the sleep problem should be attempted and if possible environmental and other factors identified, e.g. pain or discomfort, fear and anxiety, obstructive sleep apnoea (OSA), or other specific sleep disorder. A precise sleep disorder diagnosis may not be possible in a child or young person with severe learning disability, autism spectrum disorder or other neurodisability.

### **2.1 Sleep History**

It is important to take a sleep history. This can include the use of a sleep diary over a two week period, to help assess the pattern of sleep difficulty, and to aid in the assessment of severity.

Excluding a medical cause for sleep difficulties and the red flag features is most important .

Brief sleep history should include:

- Any physical illness or discomfort currently experienced, such as gastro-oesophageal reflux, constipation, pain, muscle spasms, restless legs, bedwetting, nocturnal seizures.
- Neurodevelopmental difficulties or known neurodisability.
- Medication and dietary history, and potential effect on sleep, for example ADHD medication (particularly stimulant forms of medication), diet (caffeine), cigarettes, alcohol, medication, and illicit drug use.
- Any safeguarding concerns which may impact
- Emotional or mental health concerns

## **RED FLAGS**

Consider referral for sleep study or ENT opinion:

- Snoring loudly
- choking during sleep
- appearing to stop breathing during sleep

Unusual, distressing or injurious behaviours may indicate referral to specialist sleep service for polysomnography. (This is only provided in specialist centres)

Other health conditions associated with sleep difficulties:

- Significant developmental delay
- Seizures
- Symptoms of gastro-oesophageal reflux not responded to treatment

## **2.2 Specific groups of children and young people – neurodisability (for example physical disability, children and young people with visual or hearing impairment, learning disability)**

In addition to the above consideration should be given to the following (list not exhaustive but illustrative)

- Medical causes for sleep disturbance for example acute infection or pain, respiratory complications, gastro-oesophageal reflux, constipation, pressure sores

- Musculoskeletal and Orthopaedic causes - contractures, subluxation of hips
- Neurological - nocturnal seizures, suspected central sleep apnoea

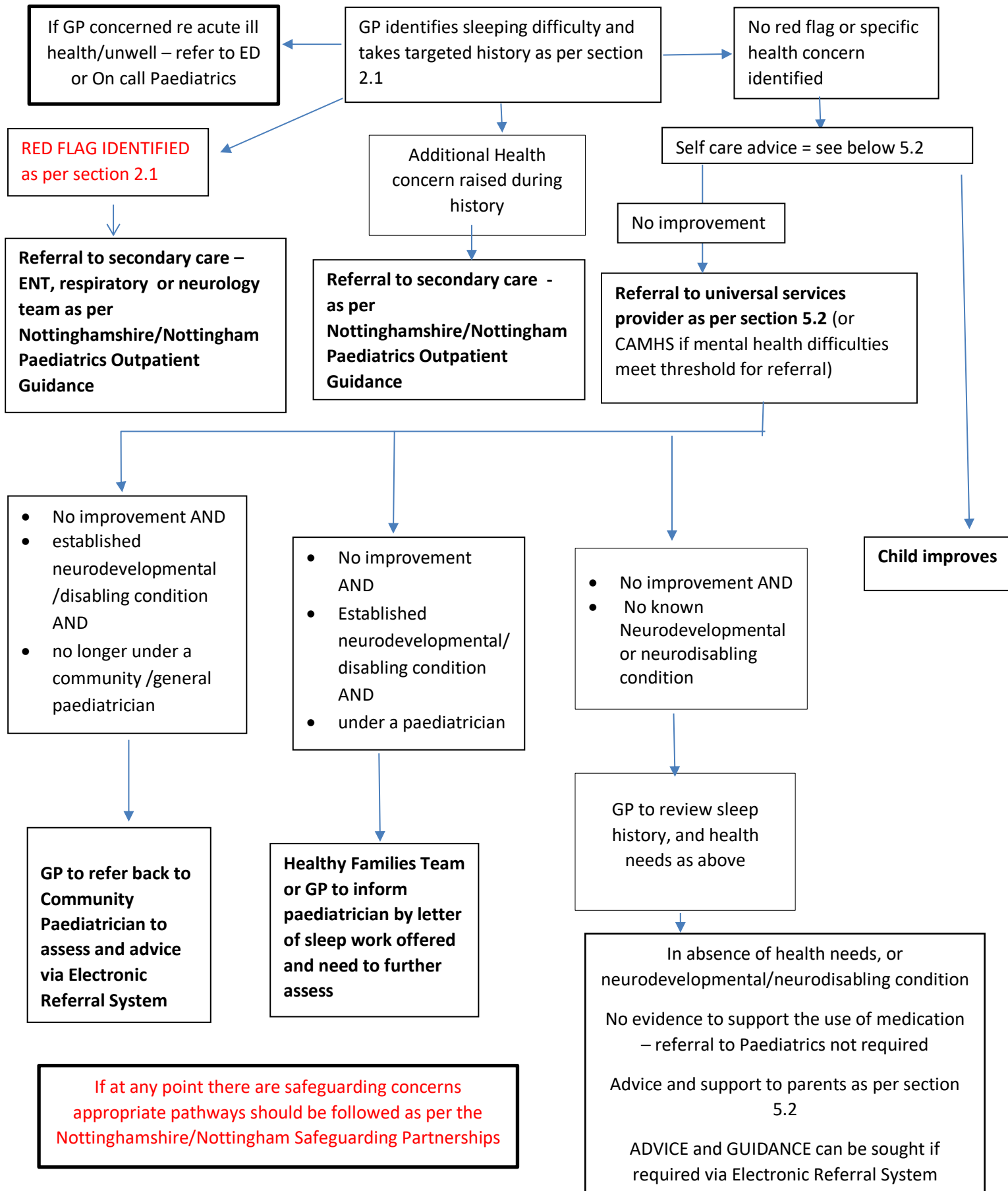
New or worsening sensory impairment (has the child had a recent hearing and vision assessment)

### **3 Referral criteria from Primary Care**

There are several services available to GPs to refer children who have sleeping difficulties within universal services. These are dependent on the area a child lives in, please see Behavioural Management section 5.2.

The GP should take a detailed sleep history (see assessment above) and consider referral to a universal service in the first instance, unless there is one or more red flag.

**Flowchart for referral from Primary Care**



### **3.1 Referral to secondary care:**

Children should **only** be referred to secondary care **specifically** for sleep difficulties in the following situations (in line with Nottinghamshire and Nottingham City Referral Guidelines for Paediatric Outpatients from Primary Care - <https://midnottspathways.nhs.uk>, F12 ):

- Child has signs of sleep disordered breathing and may require referral to ENT/consideration for a sleep study
- Children/Young People
  - with a diagnosis of a neurodevelopmental/neuro-disabling condition AND
  - in whom there is evidence that the family have accessed universal/targeted sleep support without success – See section 5.2

Any additional medical concerns should be referred in line with the Nottinghamshire and Nottingham City Referral Guidelines for Paediatric Outpatients from Primary Care ( Nottinghamshire - <https://midnottspathways.nhs.uk>, Nottingham City - F12 ):

NB: Medication is **not** helpful for CYP who have sleeping difficulties but no recognised neurodevelopmental disorder

## **4 Onward Referral for Sleep difficulties within secondary/tertiary care**

### **4.1 Specific groups of children and young people – Those children in which medical assessment of their sleep where a sleep study is recommended**

There are specific groups of children and young people who will need timely specialist assessment and intervention.

It is recommended that specific patient groups should be referred for a sleep study:

- Those children in whom obstructive sleep apnoea is suspected
- Those children in whom central sleep apnoea is suspected

### **4.2 Specific groups of children and young people – those whose initial sleep assessments suggest complex or unusual pathology, medical assessment of their sleep is complex or unusual**

In children with excessive daytime sleepiness, or where the history does not appear typical of a neurodevelopmental-based sleep problem, a multi-latency sleep test (MLST) should be considered. This may require discussion with a neurologist or referral to a specialist sleep service.

## 5 Behavioural Management of Sleep Difficulties

### 5.1 Behavioural and environmental sleep interventions

In preschool children evidence suggests that up to 82% of children showed clinically significant reductions in bedtime resistance and night awakenings with behavioural interventions (Mindell *et al* and Sricharan *et al*). There is also evidence that good sleep hygiene in older children and adults has a positive effect on the amount and quality of sleep (Irish *et al*). In particular behavioural interventions are evidenced to improve both sleep initiation and sleep maintenance (Cerebra 2017).

### 5.2 Universal services available for sleep support and advice in absence of red flag features

All children with sleeping difficulties should be signposted to appropriate services who can help offer sleep hygiene advice. Services available giving good sleep hygiene practices (including workshops, tailored advice for child and family, online apps) include:

#### Nottingham City

Under 5 years old – Local Children’s Centres – families can self-refer

(<https://www.nottinghamshire.gov.uk/care/early-years-and-childcare/childrens-centre-service>)

5 - 19 years – Nottingham City Community Public Health Nursing service (previously school nursing team)

(0115 883 4333)

0 - 5 years Nottingham City Health Visiting Service (previously health visitor team)

(0115 883 8900)

Behaviour and Emotional Health Team

#### Nottinghamshire

Under 5 years old – Local Children’s Centres – families can self-refer



<https://www.nottinghamshire.gov.uk/care/early-years-and-childcare/childrens-centre-service>)

0 - 19 years – Nottinghamshire Healthy Families Team (HFT) (Integrated public health nursing service – previously school nurse and health visitors)  
(<https://www.nottinghamshirehealthcare.nhs.uk/healthy-family-teams>)

0 - 19 years - Nottinghamshire Small steps service for children with suspected or confirmed ADHD or ASD or concerning behaviours.  
(Referral by email [NottinghamshireSmallSteps@family-action.org.uk](mailto:NottinghamshireSmallSteps@family-action.org.uk))

0 - 18 years Nottingham Integrated Children’s Disability service - for children with disabilities  
(<https://www.nottinghamshire.gov.uk/care/childrens-social-care/integrated-children-s-disability-service>)

Further information on sleep for professionals can be found at a number of charities and organisations including:

[Healthy sleep tips for children - NHS \(www.nhs.uk\)](https://www.nhs.uk/healthysleeptipsforchildren)

<https://www.thechildrenssleepcharity.org.uk/>

<https://www.familylives.org.uk/>

<https://cerebra.org.uk/get-advice-support/sleep-advice-service/>

<https://www.autism.org.uk/about/health/sleep.aspx>

## **6 Medication for Sleep Difficulties**

### **6.1 Considerations prior to medication use:**

- Children/Young People are within the secondary care service with a diagnosis of a neurodisabling/neurodevelopmental or mental health condition.
- All families should have been offered, accessed or be in the process of accessing a universal level sleep support
- Families should have completed a sleep assessment within Secondary Care
- Families should have been offered sleep intervention within Secondary care as available. (see appendix)

### **6.2 Exceptions**

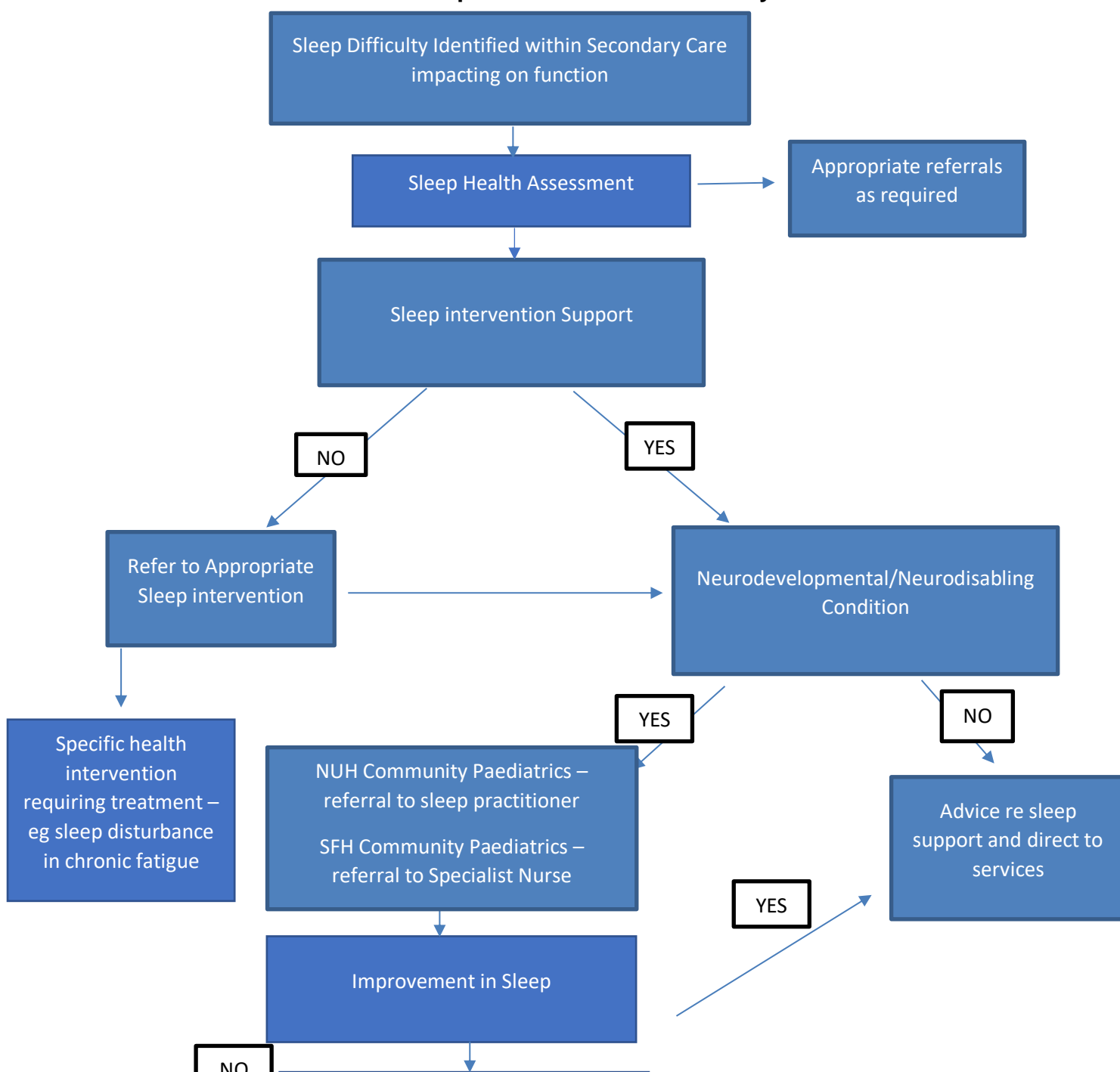
**Families must have completed, or be in the process of completing, behavioural work around sleep prior to medication being considered.**

In exceptional circumstances medication to help modify sleep may be prescribed at

the same time as referral for sleep hygiene advice due to the severity of the problem being discussed at the discretion of the prescribing clinician. Examples include serious and significant safeguarding concerns, significant neurodisability where sleeping disorders are well known to be part of the condition, such as Smith-Magenis Syndrome, Tuberous Sclerosis, West Syndrome and Angelman Syndrome.

Medication can be used as part of a specialist programme for adolescents with chronic fatigue syndrome and sleep disorder as part of that condition. It may also be used within a subspecialist tertiary sleep clinic for children and young people with specific sleep disorders. Good sleep hygiene should still form part of treatment for those patients. It can also be used prior to EEG and other investigations requiring sleep.

**Flowchart for sleep assessment in secondary care**



## 7 Melatonin

### 7.1 Background

Melatonin, the hormone of the pineal gland, is normally made in response to dropping light levels at night and inhibited by morning exposure to daylight. When given to humans it has a rapid half-life of half to one hour, producing transient, mild sleep inducing effects (Wassmer *et al*). It lowers alertness, body temperature and performance during the three or four hours after a low dose has been given. Correctly timed, it is able to shift the internal “body clock” both to later and earlier times( Arendt 1996)

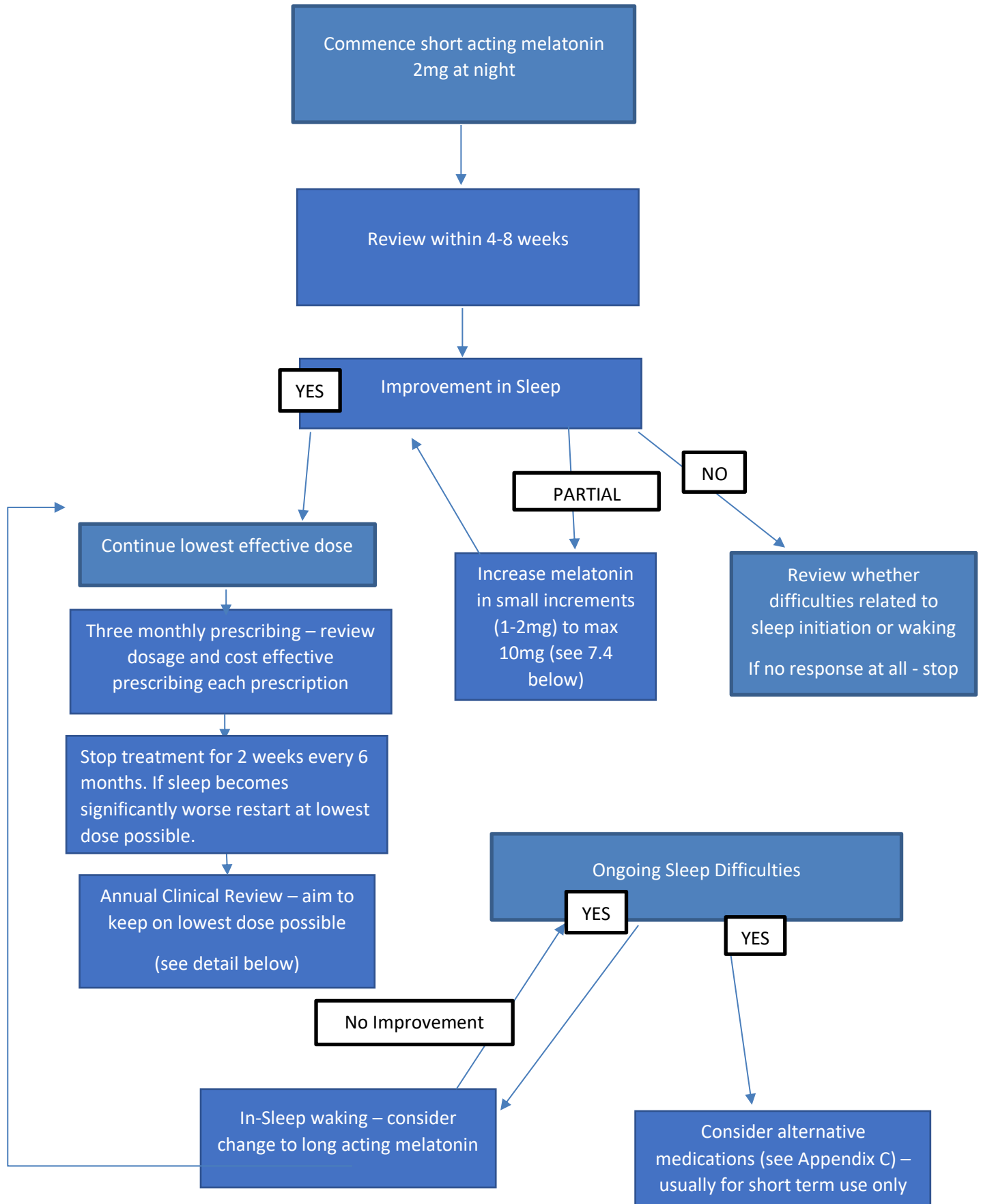
### 7.2 Efficacy

There is one systematic review, two meta-analysis and many published randomised controlled trials which assess the safety and efficacy of melatonin in children and adolescents. Finding of these papers have been that melatonin decreases time to sleep onset, increases overall sleep time and improves overall sleep scores (Appleton *et al*, Abdelgadir *et al*, Gringras *et al*). Melatonin was generally found to have few adverse effects (London New Drugs Group 2008). Few studies have been published reporting the contrary (possibly because of reporting bias). However there have been very few well designed controlled and long term studies. Clinical experience suggests that melatonin can induce and maintain sleep (Wassmet *et al*) and the randomised, double-blinded placebo-controlled MENDS study found that in children with neurodevelopmental difficulties melatonin reduces time to sleep onset by a mean of 45 minutes and prolongs total sleep duration by an average of 23 minutes (Appleton *et al*).A later systematic review (Abdelgadir *et al*, 2018) indicated that sleep onset latency was improved on average by approximately 29 minutes. In addition melatonin improved total sleep duration by an average of 48 minutes. This resulted in reported improvement in family health. Melatonin administration has little impact on frequency of nocturnal waking.

A Randomised Controlled Trial involving melatonin administration in children with neurodevelopmental disorders suggested improvement in time to onset of sleep that was more marked in those with the longest sleep latency. Melatonin administration was also associated with earlier waking times however, resulting in a more modest improvement in total sleep duration (Gringras *et al*).

No medication related serious adverse event were reported in the systematic review (Abdelgadir *et al*).

**Flow chart for Melatonin Prescribing in Secondary Care**



Improvement

### 7.3 Indications

Melatonin is indicated for the treatment of sleep disorders in children and young people with neurodevelopmental disorders and neurodisabling conditions such as visual impairment, cerebral palsy, attention deficit hyperactivity disorder and autism (Appleton *et al*, Gringras *et al*, NICE 2013). It can occasionally be used in the short term as part of a sleep programme for adolescents with chronic fatigue syndrome and disordered sleep by a specialist.

There is **no** good evidence for the use of melatonin in children who **do not** have a neurodevelopmental disorder.

### 7.4 Dose

The usual starting dose for sleep disorders is 2mg in children above the age of two years. The dose may be increased to 4-6 mg if there is insufficient benefit. The maximum dose is accepted to be 10 mg (BNFc 2019). Doses higher than 10 mg are not considered of greater efficacy and may cause adverse effects. **If no benefit is seen after 2 weeks on the higher dose then melatonin should be stopped.**

Initial prescription should be followed by a review. Consideration should be given to the completion of a further sleep diary to provide evidence for continued use. The aim is to establish healthy sleep habits with the lowest effective dose. Good sleep hygiene measures should be continued and checked by the clinician at each review.

### 7.5 Formulation

Melatonin is available as an immediate release preparation (unlicensed) or in a slow-release licensed form or some preparations licensed and used off-label (for example for adults in jet lag or dementia)

- For children whose sleeping difficulty is initiation of sleep, an unlicensed immediate release form of melatonin would be offered as first line.
- For children who have sleep maintenance difficulties, a slow release licensed preparation would be considered as first line.
- Some children may require a combination of the two. It can often be helpful to try and treat the sleep initiation difficulties first.

Please also see section 7.12 referring to preparations and licensing.

## 7.6 Administration

It is recommended that melatonin be given on an empty stomach, since absorption may be delayed when taken with large meals. It should be taken 30-60 minutes before sleep time.

Powder from capsules may be dispersed in water, milk, yoghurt or fruit juice. The powder may also be mixed with water and flushed down a PEG or NG tube (Bolton hospitals).

## 7.7 Side Effects

Melatonin is generally well tolerated. Sedation, fatigue, headaches, skin disorders, restlessness, tachycardia, itching and nausea have all been reported as side effects associated with melatonin use. This is not a complete list of side effects. Side effect information can be found in the current BNFC and from [www.emc.medicines.org.uk](http://www.emc.medicines.org.uk).

In clinical studies the most common adverse events were headache, pharyngitis, back pain and asthenia. These occurred at a similar frequency to placebo. There was no evidence of withdrawal effects following treatment discontinuation (Regional Drugs and Therapeutics Centre, 2008). Vivid dreams and nightmares have been reported (National Children and Adolescent Learning Disability Psychiatry Network, 2008). Some reports suggest melatonin improves seizure control when used in patients with epilepsy; others indicate that it may worsen seizure control. When used inpatients with epilepsies, it is important to monitor the seizure frequency (Alder Hey Guidance, 2000)

## 7.8 Cautions

The BNFC recommends caution in autoimmune conditions. Information from pharmaceutical companies is limited and advises to avoid. Consideration of risk/benefits and discussion with the family should take place in these circumstances.

Melatonin should be avoided in hepatic impairment, and used with caution in those with renal impairment.

Melatonin is reported to interact with combined hormonal contraceptives, quinolones (ciprofloxacin), SSRIs (fluvoxamine).

Please review up to date information from the BNFC

## 7.9 Duration of treatment

The duration of treatment is variable. It is advised that monitoring should take place regularly initially to see the effect and if no benefit is seen the medication is stopped. For ongoing monitoring please see section 7.10 below.

**The aim is to establish healthy sleep habits with the lowest effective dose of melatonin.**

### **7.10 Monitoring and treatment breaks**

Children prescribed melatonin should have a medical review on an annual basis by a clinician or Specialist Nurse. Families should be encouraged to have breaks from melatonin on a 6 monthly basis to review the need to continue it (BNFc). This reduces the risk of tolerance and hence keeps the effective dose as low as possible. Anecdotal evidence also suggests that in school-aged children and young people, giving melatonin ready for the school the next morning only may also help to reduce tolerance.

Tolerance is characterised by the administration of a medicine in higher doses to achieve the same effect. It is not listed on the Summary of Product Characteristics (SPC) for Circadin®. However, some clinical experience from the National Child and Adolescent Learning Disability Psychiatry Network suggests that the efficacy may be lost if melatonin is prescribed for longer than two years. It suggests that if the melatonin is withdrawn prior to this, sensitivity may be re-established and melatonin successfully re-introduced at a lower dose.

Melatonin may affect the reproductive system by inhibiting the hypothalamic-pituitary-gonadal axis. Growth and sexual health development monitoring is advisable, especially in long-term use. This is primarily the responsibility of the consultant clinician but any concerns from the primary care clinician should be reported to the consultant clinician.

Patients should be followed up at least annually to ensure continuing benefit of melatonin. Standard monitoring of growth and sexual development is recommended i.e. to check height, weight and pubertal development progress as expected.

If melatonin is not being used or is not working it should be discontinued. For prescribers in secondary care, Appendix C details other medication options, although these are rarely prescribed.

### **7.11 Withdrawal**

It is suggested that at least six months of an improved sleep pattern should elapse before withdrawal is attempted, unless the indication was for short term use only. Withdrawal should occur over a period of 3-4 weeks and change in sleep

pattern observed. For some children however withdrawal is not successful and treatment may be necessary long term.

For some children and young people a slower withdrawal may be helpful, for example withdrawing by 2mg every month. This may be particularly helpful prior to transition to adult services (see 7.13).

## 7.12 Medication Formulation and Licensing

Options for melatonin prescribing are listed in the APC formulary and those of individual trusts. There are currently off-label modified release and unlicensed immediate (standard) release preparations available.

### **Parents should be informed that use of short acting melatonin is unlicensed.**

Patient information leaflets are available: NUH Trust leaflet  
[http://nuhnet/nuh\\_documents/Documents/Procurement%20and%20use%20of%20Medicines%20without%20Marketing%20Authorisation%20and%20Medicines.pdf](http://nuhnet/nuh_documents/Documents/Procurement%20and%20use%20of%20Medicines%20without%20Marketing%20Authorisation%20and%20Medicines.pdf)

MFC leaflet: <https://www.medicinesforchildren.org.uk/unlicensed-medicines>

Capsules of short-acting melatonin are available in 2mg, 3mg, 5mg and 10mg and can be opened and dispersed in liquid or mixed with food e.g. yoghurt. Modified-release Melatonin capsules should be swallowed whole.

Local pharmacy support can be accessed to ensure cost effective prescribing e.g. numbers of capsules, capsule pack size and whether liquid or capsule form is used.

Special Products capsules contain gelatin of animal origin. For families who are unable to use these, a vegetarian product, PhysioLogics Melatonin 1mg tablets (standard release), is currently available through the hospital pharmacy.

In a very few circumstances the use of liquid (10mg/10mL) may still be needed (e.g. difficulties with gastrostomy tubes blocking with use of dispersed powder or in children with extremely rigid and inflexible behaviours in whom the other option have been tried and failed).

## 7.13 Transition

Melatonin is unlicensed in the use of adults until the age of 55 years when Circadin can be used.

GPs may not continue prescribing melatonin when young people leave the care of the Paediatric team.



Young People with Intellectual Disabilities *may* be able to access melatonin prescriptions via referral to the adult intellectual disability teams or adult ASD/ADHD teams.

From around the age of 16 years, transition planning should commence. Young people and families should be informed that they may not be able to access melatonin prescriptions after the age of 18 years.

Young people should be encouraged to have a break from their melatonin and the efficacy reviewed to provide evidence that ongoing melatonin may be required.

If a young person has been on melatonin for a number of years, transition should include the gradual withdrawal of melatonin over a period of months.

At the age of 18 years on discharge:

- Young people with intellectual disability should be referred to the Community Adult intellectual disability team requesting ongoing prescription of melatonin
- Young people without onward referral should be referred to their GP to consider ongoing prescription of melatonin only in line with formulary approved indications or to discuss alternative management
- All young people and families should be given medical advice that purchasing medications from the internet is not safe and not advised. Melatonin is a prescription only medication in the UK as advised by the NHS

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## **Appendix A: Nottingham University Hospitals Community Paediatric Service**

Sleep practitioner Service

### **Referral to Sleep Practitioner**

Service available only to children and families aged 2-19 years old who:

- are already known to the Community Paediatric service
- have a diagnosis of a neuro disability or are undergoing assessment
- are experiencing difficulty with sleep – poor sleep hygiene, difficulty settling, night waking and early rising.
- Need support to reduce or stop melatonin

Referrals accepted from community paediatrician, prescribing pharmacist and specialist nurse practitioners in community team.

### **Prior to referral to sleep practitioner**

- Existing medical conditions and medications have been reviewed for any possible contribution to sleep issues
- Any blood tests or investigations felt to be relevant have been completed

### **Sleep Practitioner will:**

- offer two-hour workshops in Nottingham and South Nottinghamshire
- provide 1:1 sleep clinics weekly across Nottingham and South Nottinghamshire
- provide ongoing support to families via telephone clinics
- work closely with community paediatrician, prescribing pharmacist and any other professional involved in care

Families will receive an individual plan tailored to support them to improve their child/children's sleep; this will be reviewed with family & will be adapted if necessary.

The programme will cover but is not limited to:

- Increased parental knowledge of effective sleep hygiene.
- Knowledge of the right amount of sleep appropriate to their age and stage of development.
- Understanding what makes a successful bedtime routine.
- Knowledge of sleep cycles.

## **Appendix B: Sherwood Forest Hospitals Trust (SFH) Community Paediatrics Service**

Children within the care of SFH Community Paediatrics have access to the Specialist Nursing team for additional support with assessing and monitoring sleep difficulties.

### **Service available only to children/young people who:**

- are already known to the Community Paediatric service
- medical causes of sleep problems have been assessed and excluded
- have a diagnosis of a neuro disability or are undergoing assessment
- are experiencing difficulty with sleep – poor sleep hygiene, difficulty settling, night waking and early rising.
- Have already accessed tier 1 level sleep intervention
- Need support to reduce or stop melatonin

### **Service may include:**

- An assessment appointment prior to consideration of medication
- Sleep support strategies and direction to resources
- Review of previously offered universal level sleep interventions

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Nottinghamshire Area Prescribing Committee

- Discussion around possible use of medication where appropriate in liaison with medical practitioner or non-medical prescriber
- Monitoring of sleep and annual review of medication

## Appendix C: Further Options for Prescribing (BNFc, 2019)

The medications below are included for completeness. It is recommended that these medications are initiated by a specialist and are reserved largely for children with neurodevelopmental conditions/neurodisability and only used if melatonin has not been effective. Occasionally these medications may be used for procedures requiring sedation, doses given below are not necessarily those used for sedation and separate guidelines should be consulted.

### 1 Promethazine

Promethazine hydrochloride is a sedating anti-histamine. It is particularly helpful in children whose insomnia is linked to urticaria or itching due to allergy. It is also sometimes useful in treating sleeping difficulties in children with neurodevelopmental conditions.

When using a sedating antihistamine there is a risk of ongoing drowsiness (hangover effect) the following morning. Other side effects are much less common. It should be used with caution in children with epilepsy.

### 2 Alimemazine tartrate

Alimemazine is a sedating antihistamine used to treat urticaria and itching. It is also sometimes used a premedication prior to anaesthesia.

Alimemazine is an **expensive medication** and so should only be used when other alternatives have been tried.

Alimemazine is contraindicated in children with epilepsy, glaucoma, hypothyroidism and liver or kidney disease. It should be used with caution in children with cardiovascular disease as it can cause tachycardia and hypotension.

Children can become tolerant to this medication and the effects of drowsiness can wear off after a few days. Its use should therefore be restricted to the short term. Children can also develop photosensitive rashes if used at high doses.

### 3 Clonidine

Clonidine is usually given for children weaning from sedation on PICU, with a tic disorder or who are hypertensive. It is known to reduce anxiety, improve concentration and aid relaxation. It is therefore occasionally used to help sleeping difficulties. It is not licensed for this indication.

Clonidine causes side effects of constipation, dry mouth, depression, postural hypotension, dizziness. It can also cause worsening sleep disturbance. It should be

avoided in children with arrhythmia or heart failure.

Treatment **MUST** be gradually withdrawn due to the risk of hypertensive crisis if stopped abruptly.

#### **4 Chloral Hydrate**

Chloral hydrate is a hypnotic which is mainly used for sedation prior to hospital procedures. It has previously been used to help children with sleeping difficulties related to neurodisability. Chloral hydrate is still used for some children in such circumstances, particularly when sleep hygiene advice and more conventional medications (such as melatonin) have not been successful. It can also be helpful for some children at the end of life to help sleep.

The main concerns around using chloral hydrate are that children can become dependent to it and develop tolerance. It also has gastrointestinal and behavioural side effects. It should be weaned when withdrawing it as stopping abruptly can cause delirium. It should not be given in children with liver or renal failure.