CAFFEINE USE IN PRETERM INFANTS– NEONATAL CLINICAL GUIDELINE

Caffeine Flow Chart

Infant meets criteria for Caffeine

↓

All Infants
- <30 weeks gestation
- <1500g birth weight
- Receiving CPAP from birth
- First 10 days preparing for extubation from ventilation

Consider for babies 30-34 weeks gestation if:
- Apnoea of prematurity
- Early extubation
- Weaning off IPPV
- Post surgical procedures

↓

Loading and Maintenance dosage – refer to RCHT Neonatal Formulary
AND
Monitor oxygen saturations and heart rate

STOP CAFFEINE
- After 35 weeks gestation or
- The infant is free of apnoea requiring intervention for 7 days
- At least 7 days prior to discharge

DISCONTINUE monitoring 48 hours after caffeine stopped

1. Aim/Purpose of this Guideline
1.1 To standardise Caffeine use within the network and provide auditable standards.
2. **The Guidance**

2.1 **Introduction**
- Apnoea of prematurity is defined as periods over 20 seconds of apnoea or less if associated with bradycardia and desaturation.
- Apnoea of prematurity is common but infants should be assessed to exclude other causes of apnoea such as sepsis, anaemia, NEC, encephalopathy, respiratory illness or apnoea secondary to medication.
- Methyl xanthines (Caffeine, aminophylline and theophylline) are used as respiratory stimulants to prevent apnoea and facilitate extubation. They stimulate the respiratory centre and increase the basal metabolic rate.
- Caffeine has a long half-life of around 100 hours, thus it can be safely given once daily and has less toxicity than the other methyl xanthines. It has a wider therapeutic to toxic ratio and has reliable enteral absorption.

2.2 **Potential benefits:**
- Reduction in apnoea².
- Reduction in chronic lung disease³,⁴.
- Improvement in extubation failure within 7 days⁵.
- Prevention of postoperative apnoea⁶.
- Diuretic effect.
- Reduction, although not statistically significant, in the incidence of severe retinopathy of prematurity.
- Improved rate of survival without neuro-developmental disability at 18-21 months⁷ corrected. This statistically significant improvement has not been shown to persist at 5 years, although there was a continuing reduction in severity of motor impairment⁸.
- Improved white matter structure on MRI⁹.

2.3 **Potential risks/disadvantages:**
- Tachycardia, agitation, tachypnoea, tremors, vomiting, jitteriness and seizures (symptoms of Caffeine toxicity).
- Potential to worsen gastro-oesophageal reflux.
- Transient decreased weight gain (first 3 weeks of life).
- No significant difference in death rate, severe hearing loss⁷ or necrotising enterocolitis³ but some studies have suggested a reduction in intestinal and cerebral blood flow¹⁰.
- Possible association with nephrocalcinosis, particularly in conjunction with diuretic therapy¹¹.

2.3 **Treatment criteria:**
Although there is no firm evidence it is suggested that Caffeine should be commenced in all infants¹².
- Less than 30 weeks gestation, or
- Birth weight less than 1500g.
This should be started immediately in babies receiving CPAP from birth and within the first 10 days during the process of preparing for extubation in ventilated babies.

Consider starting in 30-34 week gestation infants for:
- Apnoea of prematurity.
- Facilitating early extubation – aim to start 24hrs prior to planned extubation and within 6hrs of an unplanned extubation\(^1\).
- To wean off from positive pressure ventilation.
- Post-surgical procedures – as at increased risk of apnoeas\(^6\).

### 2.4 Monitoring
- Babies receiving Caffeine should have saturation and ECG monitoring.
- Monitoring can be discontinued 48 hours after Caffeine is stopped if clinically appropriate.

### 2.5 Dosage and regimen:
Refer to local Caffeine citrate RCHT neonatal formulary:
RCH Shared Folder (S:) -> RCH-WCSH -> Child Health -> Medical -> NNU Formulary
- **Loading dose:** 20mg/kg intravenous (or oral if tolerating more than half fluid requirement as feed).
- **Maintenance dose:** 5-10mg/kg intravenously or oral, once daily, 24 hours after loading dose.

Routine levels are not required but consider checking if there is poor response to dosage increase or signs of possible toxicity\(^13\).

Review dose with weekly weight increase.

Stop Caffeine:
- After 35 weeks gestation, or
- The infant is free of apnoea requiring intervention for 7 days.
- At least 7 days prior to discharge.

### 3. Monitoring compliance and effectiveness

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>In order to monitor compliance with this guideline it will be included in the neonatal clinical audit programme with findings presented at the Child Health directorate audit meeting. Any deficiencies/ action plan will be presented at the Clinical Governance meeting. Any clinical incident reports relating to this guideline will be monitored against it.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>Neonatal Unit Governance Lead Consultant</td>
</tr>
<tr>
<td>Tool</td>
<td>Clinical Audit</td>
</tr>
<tr>
<td>Frequency</td>
<td>Within neonatal audit programme</td>
</tr>
<tr>
<td>Reporting arrangements</td>
<td>Any incident arising or audit findings outwith the protocol will be presented at Child Health Directorate Governance meeting</td>
</tr>
<tr>
<td>Acting on recommendations and Lead(s)</td>
<td>Any case where these criteria are not met will be discussed and additional training needs identified and acted upon.</td>
</tr>
<tr>
<td>Change in practice and lessons to be shared</td>
<td>Lessons will be shared with all relevant stakeholders</td>
</tr>
</tbody>
</table>
4 Equality and Diversity

4.1 This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the ‘Equality, Diversity & Human Rights Policy’ or the Equality and Diversity website.

4.2 Equality Impact Assessment

The Initial Equality Impact Assessment Screening Form is at Appendix 2.
Appendix 1. Governance Information

<table>
<thead>
<tr>
<th>Document Title</th>
<th>CAFFEINE USE IN PRE-TERM INFANTS–NEONATAL CLINICAL GUIDELINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Issued/Approved:</td>
<td>MARCH 2016</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>MARCH 2016</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>MARCH 2019</td>
</tr>
<tr>
<td>Directorate / Department responsible (author/owner):</td>
<td>Neonatal Unit. Children, Women’s and Sexual Health. South West Neonatal Network</td>
</tr>
<tr>
<td>Contact details:</td>
<td>01872 252667</td>
</tr>
<tr>
<td>Brief summary of contents</td>
<td>The Guideline applies to all units within the South West Neonatal Network and aims to standardise Caffeine use within the network and provide auditable standards.</td>
</tr>
<tr>
<td>Target Audience</td>
<td>RCHT</td>
</tr>
<tr>
<td>Executive Director responsible for Policy:</td>
<td>Executive Director</td>
</tr>
<tr>
<td>Date revised:</td>
<td>New Guideline</td>
</tr>
<tr>
<td>This document replaces (exact title of previous version):</td>
<td>Not Applicable</td>
</tr>
<tr>
<td>Approval route (names of committees)/consultation:</td>
<td>RCH Neonatal Guidelines Group, South West Neonatal Network generated Guideline</td>
</tr>
<tr>
<td>Divisional Manager confirming approval processes</td>
<td>Tim Mumford</td>
</tr>
<tr>
<td>Name and Post Title of additional signatories</td>
<td>Not Required</td>
</tr>
<tr>
<td>Signature of Executive Director giving approval</td>
<td>{Original Copy Signed}</td>
</tr>
<tr>
<td>Publication Location (refer to Policy on Policies – Approvals and Ratification):</td>
<td>Internet &amp; Intranet</td>
</tr>
<tr>
<td>Document Library Folder/Sub Folder</td>
<td>Child Health, Neonatal Guidelines</td>
</tr>
<tr>
<td>Links to key external standards</td>
<td>None</td>
</tr>
</tbody>
</table>
Related Documents:

5. Henderson-Smart DJ, Davis PG. Prophylactic methylxanthines for extubation in preterm infants Cochrane database Syst Review 2010 Issue 12: No. CD00139

Training Need Identified? No
### Version Control Table

<table>
<thead>
<tr>
<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nov 2015</td>
<td>V1.0</td>
<td>Initial Issue. South West Neonatal Network generated Guideline</td>
<td></td>
</tr>
<tr>
<td>March 2016</td>
<td>V2.0</td>
<td>Formatted, reviewed and approved by Neonatal Guidelines Group.</td>
<td>Formatted by Kim Smith. Staff Nurse</td>
</tr>
</tbody>
</table>

All or part of this document can be released under the Freedom of Information Act 2000

This document is to be retained for 10 years from the date of expiry.

This document is only valid on the day of printing

**Controlled Document**

This document has been created following the Royal Cornwall Hospitals NHS Trust Policy on Document Production. It should not be altered in any way without the express permission of the author or their Line Manager.
# Appendix 2. Initial Equality Impact Assessment Form

<table>
<thead>
<tr>
<th>Name of the strategy / policy / proposal / service function to be assessed (hereafter referred to as policy) (Provide brief description):</th>
<th>Caffeine use in pre-term infants. Neonatal Clinical Guideline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directorate and service area:</td>
<td>Is this a new or existing Policy?</td>
</tr>
<tr>
<td>Women and Children’s Health</td>
<td>New. Network generated guideline</td>
</tr>
<tr>
<td>Name of individual completing assessment: Paul Munyard</td>
<td>Telephone: 01872 252667</td>
</tr>
</tbody>
</table>

1. **Policy Aim***
   Who is the strategy / policy / proposal / service function aimed at?
   
   This guideline is aimed at all staff responsible for prescribing or administering caffeine to pre-term infants within the hospital setting.

2. **Policy Objectives***
   
   As Above

3. **Policy – intended Outcomes***
   
   As Above

4. **How will you measure the outcome?**
   **Audit:**
   1. Prescribed dose of Caffeine citrate.
   2. Gestation when Caffeine commenced.
   3. Use of cardio-respiratory monitoring until a minimum of 48 hours after discontinuing Caffeine.
   4. Discontinuation of Caffeine when infant has not required positive airway pressure support or episodes of apnoea for at least 5 days.
   5. Discontinuation of Caffeine at least 7 days prior to discharge.

5. **Who is intended to benefit from the policy?**
   Neonatal Patients
   Medical and Nursing staff

6a) **Is consultation required with the workforce, equality groups, local interest groups etc. around this policy?**
   No. Consultant led, Neonatal Guidelines Group approved guideline

   b) **If yes, have these *groups been consulted?**
   C). Please list any groups who have been consulted about this procedure

7. **The Impact**
   Please complete the following table.

<table>
<thead>
<tr>
<th>Equality Strands:</th>
<th>Yes</th>
<th>No</th>
<th>Rationale for Assessment / Existing Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are there concerns that the policy could have differential impact on:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Sex (male, female, transgender / gender reassignment)</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race / Ethnic communities /groups</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disability - learning disability, physical disability, sensory impairment and mental health problems</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religion / other beliefs</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marriage and civil partnership</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pregnancy and maternity</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian</td>
<td>x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

You will need to continue to a full Equality Impact Assessment if the following have been highlighted:
- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation- this excludes any policies which have been identified as not requiring consultation. or
- Major service redesign or development

8. Please indicate if a full equality analysis is recommended. No
9. If you are not recommending a Full Impact assessment please explain why.

No area indicated

Signature of policy developer / lead manager / director
Dr Paul Munyard

Date of completion and submission 16 March 2016

Names and signatures of members carrying out the Screening Assessment
1.

2.

Keep one copy and send a copy to the Human Rights, Equality and Inclusion Lead, c/o Royal Cornwall Hospitals NHS Trust, Human Resources Department, Knowledge Spa, Truro, Cornwall, TR1 3HD

A summary of the results will be published on the Trust’s web site.

Signed _______ Kim Smith _______

Date _______ 29:03:2016 _______