CHILDREN’S SERVICES
GUIDELINES FOR PARACETAMOL OVERDOSE

1. Determine time of ingestion and if the overdose is staggered. **If the time is not known or the dose is staggered (interval greater than 1 hour) treat with acetylcysteine regardless of Paracetamol level. Sensitivity to Acetylcystein is not a contraindication for it’s use.**
2. How much was taken.
3. Age of patient
4. Continue investigations if suspected ingestion is:

   Adults > 4g
   Children > 80mg/kg

5. If time of ingestions is more than 4 hours take blood sample for paracetamol levels.
   If less than 4 hours check levels at 4 hours.
6. Take samples for LFTs U and Es, INR and venous blood gas
7. Check protocol below according to time post ingestion

   **If vomiting, or has already been given activated charcoal avoid methionine, use acetylcysteine as first line.**

   **If unconscious, follow instructions for > 8 hours.**

TREATMENT

< 2 HOURS

- Adolescents - Activated charcoal for adolescents.
- Young children - Only give charcoal to younger children if seen swallowing a toxic quantity, otherwise await paracetamol level results.

- Take blood for paracetamol levels, INR, U+Es, LFTs, VBG at 4 hours post ingestion.

2 - 4 HOURS POST INGESTION

- Activated charcoal as for < 2 hours.
- Take blood for paracetamol level, INR, U+Es, LFTs, VBG at 4 hours post ingestion.

4 - 8 HOURS POST INGESTION
• Take blood for plasma paracetamol level, INR, U+Es, LFTs, VBG on presentation.

• Activated charcoal or stomach emptying are not indicated.

• Once plasma paracetamol level is available, plot on treatment graph in relation to the time of ingestion.

    If necessary start treatment with: ACETYLICYSTEINE IV. See tables below for infusion dose and time.

    **The full dose of ACETYLICYSTEINE is 300 mg/kg over 21 hours.**

• Monitor blood glucose levels and urine output.
  If the plasma paracetamol level is not available within 8 hours of ingestion then follow instructions for 8 – 15 hours post ingestion.

• **At the end of antidote treatment** a blood sample should be taken for:

    INR
    Plasma Creatinine
    LFTs
    Blood Gases

• If they are normal and the patient is asymptomatic: May then be discharged

• If INR and/or plasma creatinine are raised: Give more acetylcysteine 150mg/kg over 24 hours. Continue to monitor patient.

**8 – 15 HOURS POST INGESTION**

• Start acetylcysteine infusion immediately.

• Take blood for plasma paracetamol level, INR, U+Es, LFTs, VBG

• Monitor blood glucose levels and urine output.

• Once paracetamol level is available plot it on the treatment graph (always in relation to the time of ingestion). Stop treatment if paracetamol level is non-toxic.

• At the end of the acetylcysteine infusion a blood sample should be taken for determination of:

    INR
    U+Es
    LFTs
    Blood Gases

• If they are normal and the patient is asymptomatic the patient can be discharged. A standard letter to be given to parents (see appendix)
• If INR and/or plasma creatinine are raised then give more acetylcysteine at a rate of 150mg/kg over 24 hours. Continue to monitor the patient.

15 – 24 HOURS POST INGESTION

• Start acetylcysteine **immediately**.

• Take blood for plasma paracetamol level and . . INR, U+Es, LFTs, VBG.

• Monitor blood glucose, urine output,

• The infusion may be stopped if all the following criteria can be met at 24 hours post ingestion:
  a) Patient is asymptomatic
  b) INR, LFTs and plasma creatinine normal and
  c) Plasma paracetamol level less than 10 mg/l (0.07 mmol/l)

• If INR, blood gases and/or plasma creatinine are **abnormal**
  **OR**
  Plasma paracetamol level > 10mg/l (0.07 mmol/l) at 24 hours

  Then continue to give more acetylcysteine 150 mg/kg over 24 hours and continue to monitor patient.

24 – 36 HOURS POST INGESTION

• Start acetylcysteine infusion immediately.

• Take blood for INR, plasma creatinine,LFTs and blood gas

• Discuss the further management of the patient with a liver unit.

N.B. All patient who present with evidence of severe toxicity or fulminant hepatic failure should be given acetylcysteine regardless of the time post overdose.
Annexe I – Revised paracetamol overdose treatment nomogram

Acetylcysteine should be administered by intravenous infusion preferably using Glucose 5% as the infusion fluid. Sodium Chloride 0.9% solution may be used if Glucose 5% is not suitable.

The full course of treatment with acetylcysteine comprises of 3 consecutive intravenous infusions. Doses should be administered sequentially with no break between the infusions. The patient should receive a total dose of 300 mg/kg body weight over a 21 hour period.

ACETYLCYSTEINE 200mg/ mL INJECTION FOR INFUSION

Children

Children are treated with the same doses and regimen as adults. However, the quantity of intravenous fluid used has been modified to take into account age and weight, as fluid overload is a potential danger. Doses should be administered sequentially using an appropriate infusion pump.

Preparation and administration of paediatric infusions

• Weigh the child to determine the correct weight band.
• Read off the table below the total infusion volume required for each dose according to the weight of the child and make up the solutions according to the directions below.

First Infusion

• Prepare a 50 mg/mL solution by diluting each 10 mL ampoule of acetylcysteine (200 mg/mL) with 30 mL glucose 5% or sodium chloride 0.9% to give a total volume of 40 mL.
• Prepare the appropriate volume for the weight of the child.
• The dose is infused over **1 hour** at the infusion rate stated in the table.

**Second Infusion**
• Prepare a 6.25 mg/mL solution by diluting each 10 mL ampoule of acetylcysteine (200 mg/mL) with 310 mL glucose 5% or sodium chloride 0.9% to give a total volume of 320 mL.
• **Prepare the appropriate volume for the weight of the child.**
• The dose is infused over **4 hours** at the infusion rate stated in the table.

**Third Infusion**
• Prepare a 6.25 mg/mL solution by diluting each 10 mL ampoule of acetylcysteine (200 mg/mL) with 310 mL glucose 5% or sodium chloride 0.9% to give a total volume of 320 mL.
• **Prepare the appropriate volume for the weight of the child.**
• The dose is infused over **16 hours** at the infusion rate stated in the table.

*For example for a child weighing 12 kg, the first infusion would be 38 mL infused at 38 mL/h over 1 hour, the second infusion would be 100 mL infused at 25 mL/h over 4 hours and the third infusion is 208 mL infused at 13 mL/h over 16 hours.*

**Paediatric Dosage Table**

<table>
<thead>
<tr>
<th>Paediatric acetylcysteine prescription (each ampoule = 200mg/mL acetylcysteine)</th>
<th>Please circle appropriate weight and volume.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regimen</strong></td>
<td><strong>First Infusion</strong></td>
</tr>
<tr>
<td><strong>Infusion rate</strong></td>
<td>50mg/mL for 1 hour</td>
</tr>
<tr>
<td><strong>Patient Weight</strong></td>
<td><strong>Total Infusion Volume</strong></td>
</tr>
<tr>
<td>kg</td>
<td>mL</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
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<tr>
<td>9</td>
<td>27</td>
</tr>
<tr>
<td>10-14</td>
<td>38</td>
</tr>
<tr>
<td>15-19</td>
<td>53</td>
</tr>
<tr>
<td>20-24</td>
<td>68</td>
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<tr>
<td>25-29</td>
<td>83</td>
</tr>
<tr>
<td>30-34</td>
<td>98</td>
</tr>
<tr>
<td>35-39</td>
<td>113</td>
</tr>
</tbody>
</table>

*Note: Dose calculations are based on the weight in the middle of each band. If the patient weighs more than 40kg use the adult dosage table. Figures have been rounded up to the nearest whole number.*
Older children and young adults

- Weigh the patient to determine the correct weight band.
- Use the adult dosage table to determine the appropriate volume of acetylcysteine (ampoule volume) to be added to the infusion fluid for each of the 3 infusion periods.

First infusion
Add the appropriate volume of acetylcysteine injection to 200 mL of infusion fluid and infuse over 1 hour.

Second infusion
Add the appropriate volume of acetylcysteine injection to 500 mL of infusion fluid and infuse over the next 4 hours.

Third infusion
Add the appropriate volume of acetylcysteine injection to 1 litre of infusion fluid and infuse over the next 16 hours.

### Older Children and Young Adult Dosage Table

<table>
<thead>
<tr>
<th>Weight Band</th>
<th>First Infusion</th>
<th>Second Infusion</th>
<th>Third Infusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infusion fluid</td>
<td>200 mL 5% glucose or sodium chloride 0.9%</td>
<td>500 mL 5% glucose or sodium chloride 0.9%</td>
<td>1000 mL 5% glucose or sodium chloride 0.9%</td>
</tr>
<tr>
<td>Duration of infusion</td>
<td>1 hour</td>
<td>4 hours</td>
<td>16 hours</td>
</tr>
<tr>
<td>Drug dose</td>
<td>110 mg/kg acetylcysteine</td>
<td>50 mg/kg acetylcysteine</td>
<td>100 mg/kg acetylcysteine</td>
</tr>
<tr>
<td>Ampoule volume</td>
<td>mL</td>
<td>mL</td>
<td>mL</td>
</tr>
<tr>
<td>Infusion Rate</td>
<td>mL/h</td>
<td>mL/h</td>
<td>mL/h</td>
</tr>
<tr>
<td>Patient Weight</td>
<td>kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-40</td>
<td>34</td>
<td>17</td>
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<td>51-65</td>
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<tr>
<td>106-115</td>
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<td>28</td>
<td>58</td>
</tr>
</tbody>
</table>

1 Dose calculations are based on the weight in the middle of each band. If the patient weight lies between 40 kg use the paediatric dosage table.

2 Ampoule volume has been rounded up to the nearest whole number.

### ADVERSE EFFECTS OF ACETYLCYSTEINE

IV acetylcysteine may cause:

- Discomfort along the vein of administration.
- Erythematous or urticarial rashes.
- Nausea, vomiting, diarrhoea
- Headache, tinnitus

For mild allergic reactions administer antihistamines and continue treatment.
Anaphylactoid reactions including bronchospasm and hypotension have been reported in sensitive patients or if the initial infusion is given more rapidly than recommended.

In such cases:

- Stop the infusion and give chlorpheniramine, adrenaline, corticosteroids and bronchodilators as necessary.
- If it is less than 8 hours after overdose give oral methionine (if activated charcoal has not been given).
- If it is more than 8 hours after overdose discuss with Poisons Centre.

**Specialist advice on patients with severe liver damage**

A specialist liver centre should be contacted if the INR is
- > 2 at 24 hours
- > 4 at 48 hours
- > 6 at 72 hours

OR

If the patient has any of the following
- Increased plasma creatinine
- Evidence of acidosis
- Hypoglycaemia
- Renal failure
- Hypotension (MAP < 60 mmHg)
- Encephalopathy (drowsiness, confusion, deteriorating level of consciousness)
Letter for parent / guardian

PARACETAMOL OVERDOSE – Read this before you leave hospital

Your child was seen today because you may have taken too much paracetamol.

Taking too much paracetamol can be particularly dangerous because it may cause damage to your child’s liver.

BEFORE YOU LEAVE HOSPITAL
Please think again - is there anything you didn’t tell us?
If you have forgotten to tell us any of the information below, you may be at a greater risk of developing liver damage:

• Are you certain when your child took the tablets?
• How many did he/she take?
• Did he/she take the tablets all at once?

If you have forgotten to tell us any of this information, you MUST return to A&E at once.
Bring this leaflet with you.

We have assessed your child and decided that you are not necessarily at risk of damage to your liver. However:

Come back at once
If your child suffers from any of the following:

• Stomach pains, nausea or vomiting
• His/her skin or the whites of his/her eyes turn yellow
• He/she have not passed urine during the last 8 hours
• He/she has a severe headache, becomes confused or get very drowsy

Any of these conditions may mean that his/her liver has been damaged. You and your child must return to A&E at once.

Because paracetamol poisoning develops over a number of days if your child begin to feel at all unwell you must return to A&E. Bring this leaflet with you.

If you have any questions or need further medical help call this number: 01932 72362

This is a number for Paediatric A&E department

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