

# Acetylcysteine

**CAUTION:** High Administration Risk Rating

**CAUTION:** Acetylcysteine is administered as a loading dose over 2 hours followed by a maintenance dose.

This information applies to ORAL paracetamol overdoses in adults, for INTRAVENOUS paracetamol overdoses contact the National Poisons Information Centre (NPIC)

- See [TOXBASE](#) to determine the management of the patient depending on the number of hours since ingestion.
- If Acetylcysteine is indicated, follow the tables below

This monograph is for preparation of **intravenous acetylcysteine**  
For nebulised administration see **Acetylcysteine nebulised**

<b>Form</b>	2g per 10mL ampoule (Parvolex®) (200mg per mL)																																																																																																									
<b>Reconstitution</b>	Already in solution <ul style="list-style-type: none"><li>• Draw up using a 5 micron filter needle</li><li>• Use gloves when opening ampoules</li></ul> <b>Dilute further before administration</b>																																																																																																									
<b>Compatibility &amp; Stability</b>	Glucose 5% Sodium Chloride 0.9%																																																																																																									
<b>Administration</b>	<b>IV Infusion – SNAP</b> <b>SNAP</b> (Scottish and Newcastle Acetylcysteine Protocol) (Also known as Modified 12-hour regimen) <b>For Adults ≥40kg</b> <b>First infusion (100mg/kg, max 11g)</b> <ul style="list-style-type: none"><li>• Remove 50mL from a 250mL infusion bag</li><li>• Add required dose to 200mL infusion fluid</li><li>• Infuse over 2 hours</li></ul> <b>Second Infusion (200mg/kg, max 22g)</b> <ul style="list-style-type: none"><li>• Add required dose to 1000mL infusion fluid</li><li>• Infuse over next 10 hours</li></ul> <table><tr><th colspan="7">Acetylcysteine for Adults ≥40kg</th></tr><tr><th>12-hour Regimen</th><th colspan="3">First infusion</th><th colspan="3">Second Infusion</th></tr><tr><th>Infusion fluid</th><td colspan="3">200mL</td><td colspan="3">1000mL</td></tr><tr><th>Duration of infusion</th><td colspan="3">2 hours</td><td colspan="3">10 hours</td></tr><tr><th>Drug dose</th><td colspan="3">100mg/kg</td><td colspan="3">200mg/kg</td></tr><tr><th>Patient weight<sup>1</sup></th><th>Dose<sup>2</sup></th><th>Ampoule volume</th><th>Infusion Rate</th><th>Dose<sup>2</sup></th><th>Ampoule volume</th><th>Infusion Rate</th></tr><tr><th>kg</th><th>mg</th><th>mL</th><th>mL/hour</th><th>mg</th><th>mL</th><th>mL/hour</th></tr><tr><td><b>40-49</b></td><td>4600</td><td>23</td><td>112</td><td>9000</td><td>45</td><td>105</td></tr><tr><td><b>50-59</b></td><td>5600</td><td>28</td><td>114</td><td>11000</td><td>55</td><td>106</td></tr><tr><td><b>60-69</b></td><td>6600</td><td>33</td><td>117</td><td>13000</td><td>65</td><td>107</td></tr><tr><td><b>70-79</b></td><td>7600</td><td>38</td><td>119</td><td>15000</td><td>75</td><td>108</td></tr><tr><td><b>80-89</b></td><td>8600</td><td>43</td><td>122</td><td>17000</td><td>85</td><td>109</td></tr><tr><td><b>90-99</b></td><td>9600</td><td>48</td><td>124</td><td>19000</td><td>95</td><td>110</td></tr><tr><td><b>100-109</b></td><td>10600</td><td>53</td><td>127</td><td>21000</td><td>105</td><td>111</td></tr><tr><td><b>≥110</b></td><td>11000</td><td>55</td><td>128</td><td>22000</td><td>110</td><td>111</td></tr></table> <p><sup>1</sup>Dose calculations are based on weight in middle of each band. <sup>2</sup>Figures have been rounded up to the nearest whole number.</p>	Acetylcysteine for Adults ≥40kg							12-hour Regimen	First infusion			Second Infusion			Infusion fluid	200mL			1000mL			Duration of infusion	2 hours			10 hours			Drug dose	100mg/kg			200mg/kg			Patient weight <sup>1</sup>	Dose <sup>2</sup>	Ampoule volume	Infusion Rate	Dose <sup>2</sup>	Ampoule volume	Infusion Rate	kg	mg	mL	mL/hour	mg	mL	mL/hour	<b>40-49</b>	4600	23	112	9000	45	105	<b>50-59</b>	5600	28	114	11000	55	106	<b>60-69</b>	6600	33	117	13000	65	107	<b>70-79</b>	7600	38	119	15000	75	108	<b>80-89</b>	8600	43	122	17000	85	109	<b>90-99</b>	9600	48	124	19000	95	110	<b>100-109</b>	10600	53	127	21000	105	111	<b>≥110</b>	11000	55	128	22000	110	111
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**For Adults <40kg**

The volume of infusion fluid has been modified to take patient weight into account, as fluid overload is a potential danger

**First infusion (100mg/kg)**

- Dilute each 10mL ampoule of acetylcysteine (200mg in 1mL) with 30mL infusion fluid to give a total volume of 40mL containing 50mg/mL acetylcysteine.

**Pts 20-39.9kg** Dilute TWO 10mL ampoules with 60mL of diluent (total volume = 80mL) & infuse appropriate volume for patient weight

**Second Infusion (200mg/kg)**

- Dilute each 10mL ampoule of acetylcysteine (200mg in 1mL) with 190mL infusion fluid to give a total volume of 200mL containing 10mg/mL acetylcysteine.

**Pts 20-29kg** Dilute THREE 10mL ampoules with 570mL of diluent (total volume = 600mL) & infuse appropriate volume for patient weight

**Pts 30-39.9kg** Dilute FOUR 10mL ampoules with 760mL of diluent (total volume = 800mL) & infuse appropriate volume for patient weight

Acetylcysteine for Adults <40kg						
12-hour Regimen	First infusion			Second Infusion		
Concentration	50mg/mL			10mg/mL		
Duration of infusion	2 hours			10 hours		
Drug dose	100mg/kg			200mg/kg		
Patient weight <sup>1</sup>	Dose <sup>2</sup>	Infusion volume	Infusion Rate	Dose <sup>2</sup>	Infusion volume	Infusion Rate
kg	mg	mL	mL/hour	mg	mL	mL/hour
<b>20-24</b>	2200	44	22	4400	440	44
<b>25-29</b>	2700	54	27	5400	540	54
<b>30-34</b>	3200	64	32	6400	640	64
<b>35-39</b>	3700	74	37	7400	740	74

<sup>1</sup>Dose calculations are based on weight in middle of each band. <sup>2</sup>Figures have been rounded up to the nearest whole number.

**Specialist advice on those with liver disease.**

Discuss (with liver unit) if any of below:

- ALT > 1000 u/L
- INR >3.0
- ↑ creatinine
- Acidosis or encephalopathy
- ↓BP (MAP < 60 mmHg)
- Pre-existing liver disease

**Adverse reactions**

Anaphylactoid reactions may occur, particularly with initial loading dose. Patient should be carefully observed.

- Temporarily stopping the acetylcysteine may be all that is required.
- Consider an H<sub>1</sub> antihistamine (e.g. chlorphenamine 10 mg IV) and nebulised salbutamol if bronchospasm is present.
- It is essential that the acetylcysteine infusion is restarted once the reaction has settled. Consider slowing the infusion rate (e.g. administer the first bag over twice as long as usual. The normal infusion rate can be used for subsequent bags).

**Monitoring**

- Check bloods (LFTs, INR, U&E, P&S, FBC) 2 hrs before bag 2 infusion due to end

**Can discontinue after the 2nd bag if:**

- INR ≤ 1.3 **and**
- ALT is normal **and**
- Paracetamol conc. < 10 mg/L **and**

	<ul style="list-style-type: none"> <li>• Patient has no symptoms suggesting liver damage</li> </ul> <p><b>If all of these criteria are not met:</b></p> <ul style="list-style-type: none"> <li>• Continue infusion with a 3rd bag of NAC at the same dose and rate as the 2nd. i.e. 200mg/kg over 10 hours</li> <li>• Repeat bloods again after a further 10 hours of treatment</li> </ul> <p><b>Stop treatment after 3<sup>rd</sup> bag (22 hours after commencing NAC) if:</b></p> <ul style="list-style-type: none"> <li>• INR <math>\leq</math> 1.3 <b>and</b></li> <li>• ALT &lt; x2 upper limit of normal <b>and</b></li> <li>• ALT &lt; x2 the admission measurement</li> </ul> <p><b>If all of these criteria are not met:</b></p> <ul style="list-style-type: none"> <li>• Continue infusion at same dose and rate</li> <li>• Discuss with NPIS</li> <li>• Discuss with Liver unit if not already involved</li> </ul>
<b>Extravasation</b>	<p>The first infusion has a high osmolarity and may cause venous irritation and tissue damage in cases of extravasation. If a central venous access device is unavailable, administer via a large peripheral vein monitoring insertion site closely using a recognised phlebitis scoring tool. Re-site cannula at first signs of inflammation.</p>
<b>Additional Information</b>	<ul style="list-style-type: none"> <li>• SNAP (modified 12-hour regimen) is an off label use of acetylcysteine albeit at its licensed dose. This regimen is endorsed by National Poisons Information Service (NPIS) and the Royal College of Emergency Medicine</li> <li>• A ceiling weight of 110kg should be used when calculating the acetylcysteine dose for paracetamol poisoning in obese patients.</li> <li>• NPIS advises that for pregnant patients the toxic dose should be calculated using the patient's pre-pregnancy weight and the acetylcysteine dose (both regimens) should be calculated using the patient's actual pregnant weight.</li> <li>• NB: Due to the dialysability of acetylcysteine for patients on renal replacement therapy the dose of acetylcysteine should be doubled.(Toxbase, UpToDate, RDD)</li> <li>• Paracetamol overdose in Children: see <a href="#">Toxbase</a> for standard 21 hour regimen</li> </ul>

**Information provided relates to Parvolex® (Phoenix Labs)**