



CLINICAL GUIDELINE

Adult Paracetamol Overdose Protocol and Shortened N-acetylcysteine (NAC) Administration Chart

A guideline is intended to assist healthcare professionals in the choice of disease-specific treatments.

Clinical judgement should be exercised on the applicability of any guideline, influenced by individual patient characteristics. Clinicians should be mindful of the potential for harmful polypharmacy and increased susceptibility to adverse drug reactions in patients with multiple morbidities or frailty.

If, after discussion with the patient or carer, there are good reasons for not following a guideline, it is good practice to record these and communicate them to others involved in the care of the patient.

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Important Note:

The Intranet version of this document is the only version that is maintained. Any printed copies should therefore be viewed as 'Uncontrolled' and as such, may not necessarily contain the latest updates and amendments.

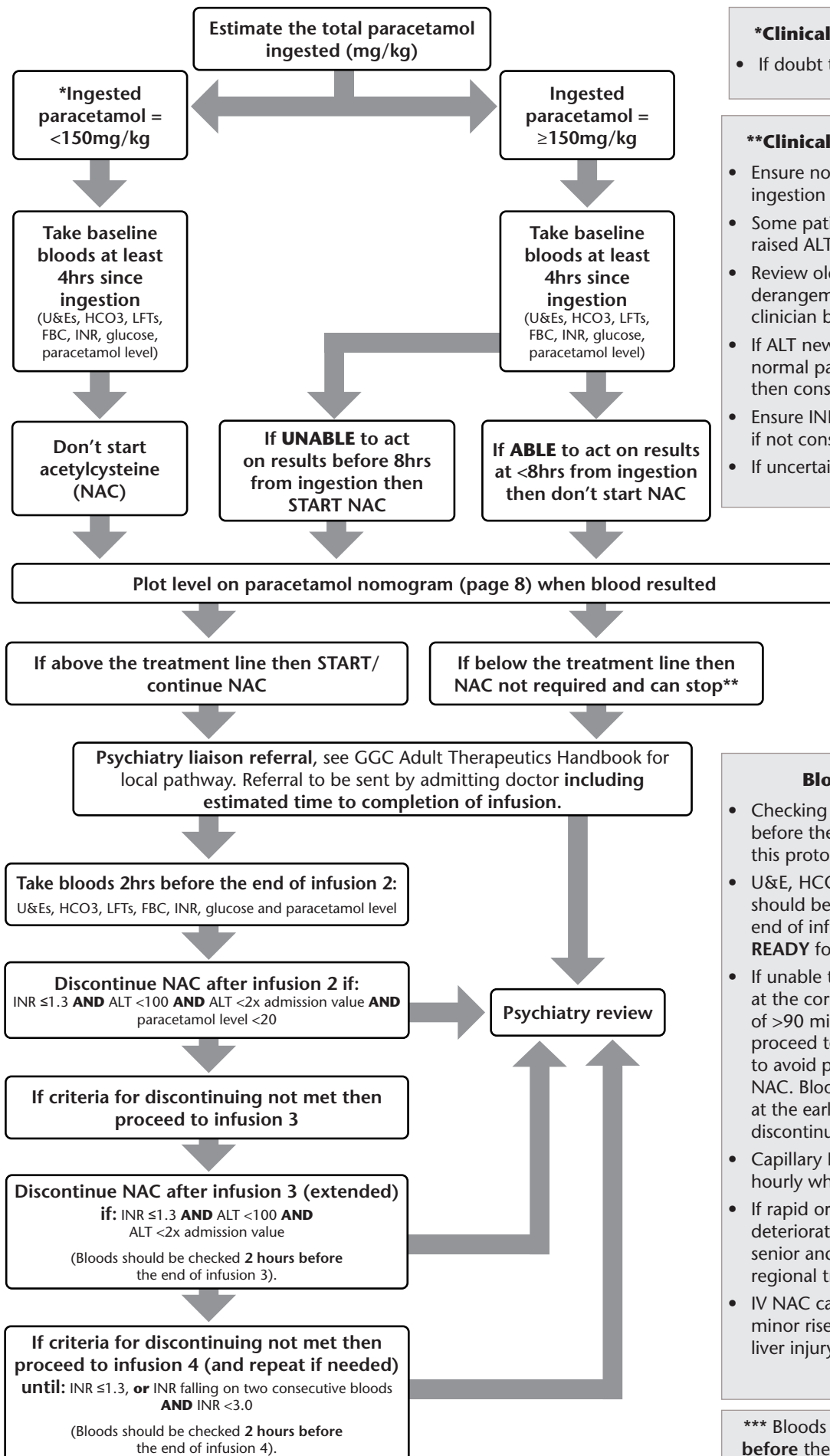
NHSGGC Adult Paracetamol Overdose Protocol and Shortened N-acetylcysteine (NAC) Administration Chart

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Paracetamol overdose presenting 0-8hrs

(Ingested total overdose in ≤ 1 hour time period)



*Clinical judgement required

- If doubt then assume ≥ 150 mg/kg

**Clinical judgement required

- Ensure no doubt about time of ingestion or type.
- Some patients have a chronically raised ALT/INR.
- Review old LFTs/INRs and if chronic derangement discuss with a senior clinician before proceeding to NAC.
- If ALT newly abnormal despite normal paracetamol concentration, then consider treating.
- Ensure INR is normal, if not consider treating.
- If uncertainty then treat and review.

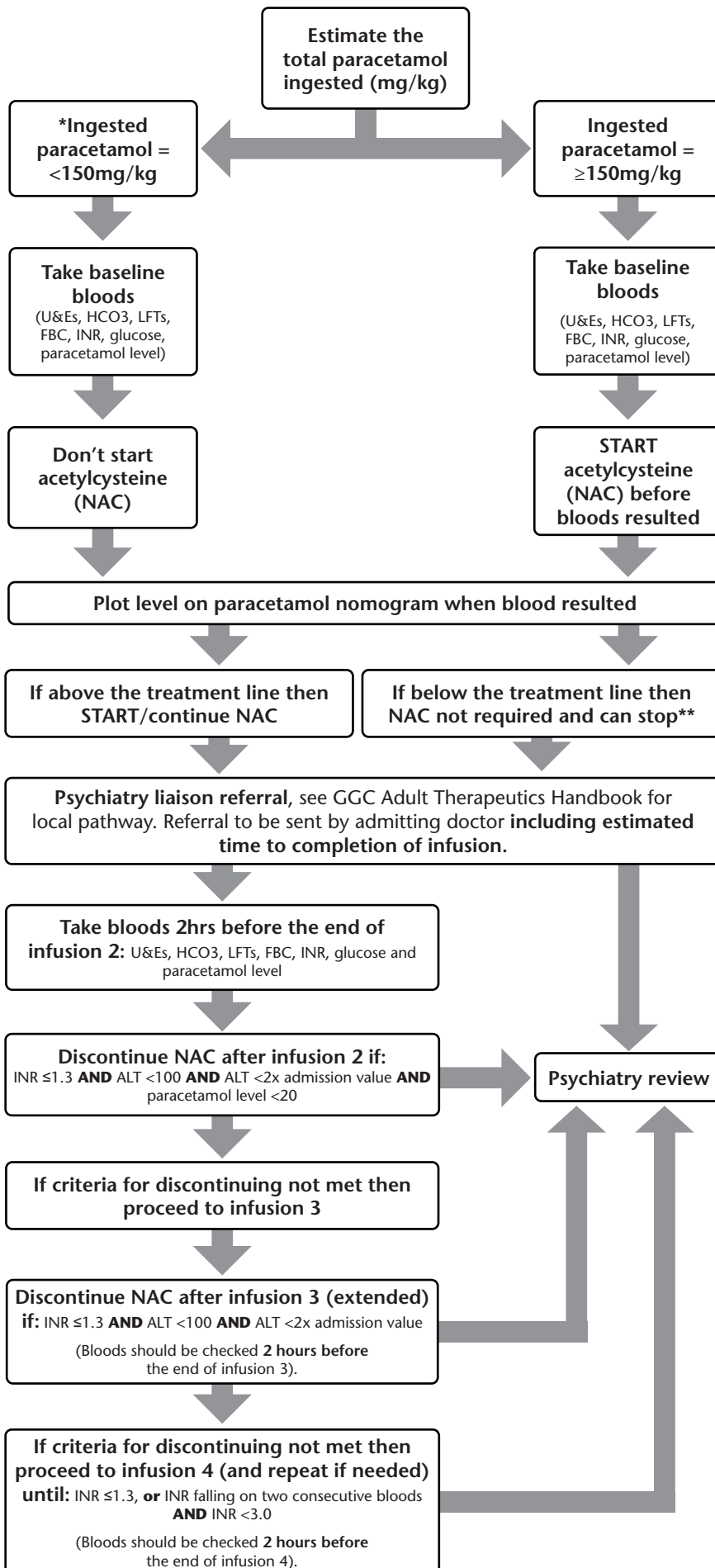
Blood monitoring

- Checking a paracetamol level 2hrs before the end of bag 2 is **NEW** for this protocol.
- U&E, HCO₃, LFTs, glu, FBC and INR should be done **2 hours before** the end of infusion 2. Ensure results are **READY** for the end of the infusion.
- If unable to achieve blood sampling at the correct time and a delay of >90 minutes is predicted then proceed to the next infusion to avoid prolonged omission of NAC. Bloods should be checked at the earliest opportunity and discontinuation criteria referred to.
- Capillary Blood Glucose (CBG) 6 hourly while on NAC.
- If rapid or progressive biochemical deterioration then discuss with senior and consider referral to regional transplant centre.
- IV NAC can be associated with minor rise in INR without an acute liver injury.

*** Bloods should be done **2 hours before** the end of infusion 3 and 4.

Paracetamol overdose presenting 8-24hrs

(Ingested total overdose in ≤ 1 hour time period)



*Clinical judgement required

- If doubt then assume $\geq 150\text{mg/kg}$.

**Clinical judgement required

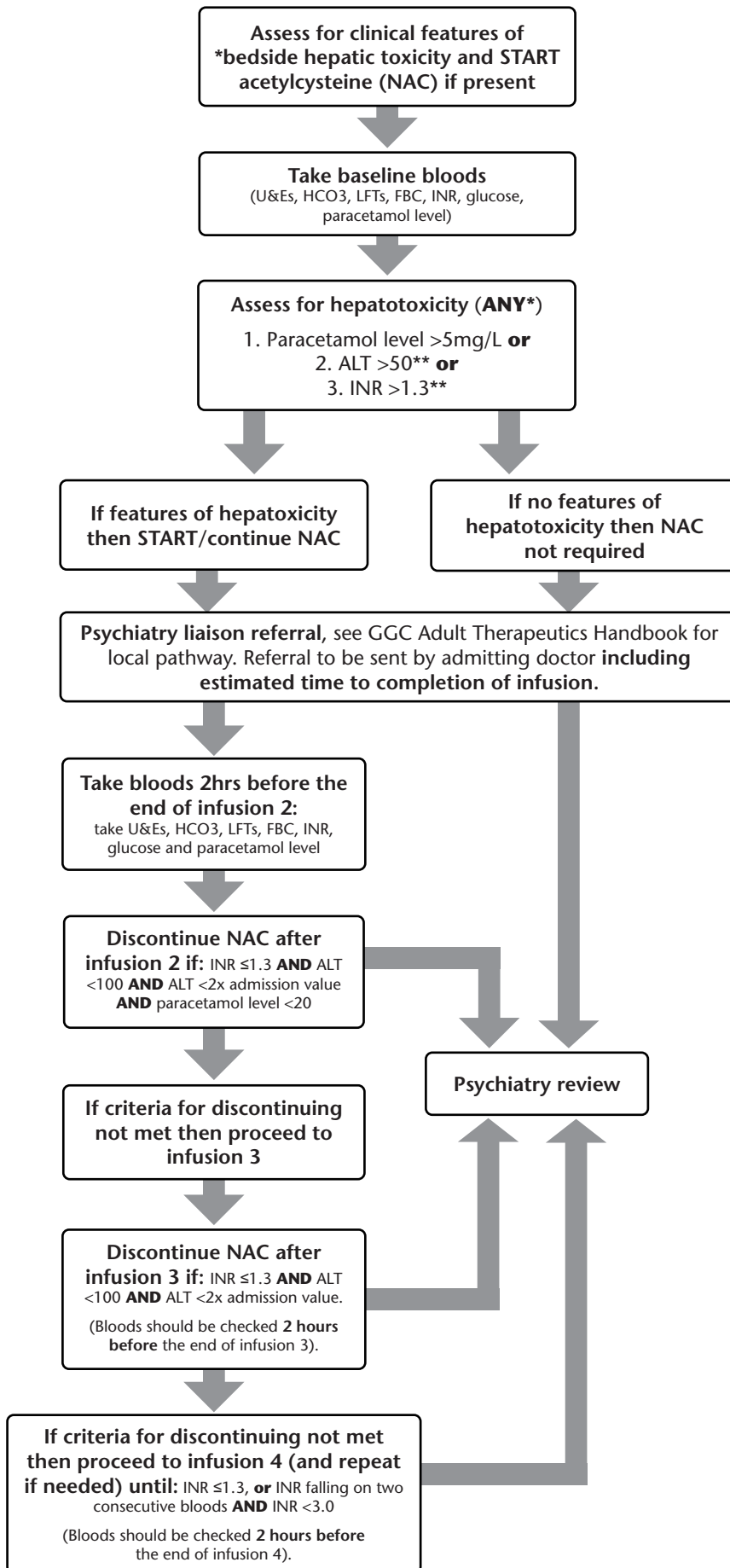
- Ensure no doubt about time of ingestion or type.
- Some patients have a chronically raised ALT/INR.
- Review old LFTs/INRs and if chronic derangement discuss with a senior clinician before proceeding to NAC.
- If ALT newly abnormal despite normal paracetamol concentration, then consider treating.
- Ensure INR is normal, if not consider treating.
- If uncertainty then treat and review.

Blood monitoring

- Checking a paracetamol level 2hrs before the end of bag 2 is **NEW** for this protocol.
- U&E, HCO₃, glu, LFTs, FBC and INR should be done 2hrs before the end of each infusion 2. Ensure results are **READY** for the end of the infusion.
- If unable to achieve blood sampling at the correct time and a delay of >90 minutes is predicted then proceed to the next infusion to avoid prolonged omission of NAC. Bloods should be checked at the earliest opportunity and discontinuation criteria referred to.
- Capillary Blood Glucose (CBG) 6 hourly while on NAC.
- If rapid or progressive biochemical deterioration then discuss with senior and consider referral to regional transplant centre.
- IV NAC can be associated with minor rise in INR without an acute liver injury.

Paracetamol overdose presenting >24hrs

(Ingested total overdose in ≤ 1 hour time period)



*Clinical judgement required

- Bedside hepatic toxicity: Jaundice, tender liver, hypoglycaemia, encephalopathy, unexplained lactic acidosis.
- Ensure no doubt about time of ingestion or type.
- If uncertainty then treat and review with bloods.

**Clinical judgement required

- Some patients have a chronically raised ALT/INR.
- Review old LFTs/INRs and if chronic derangement discuss with a senior clinician before proceeding to NAC.

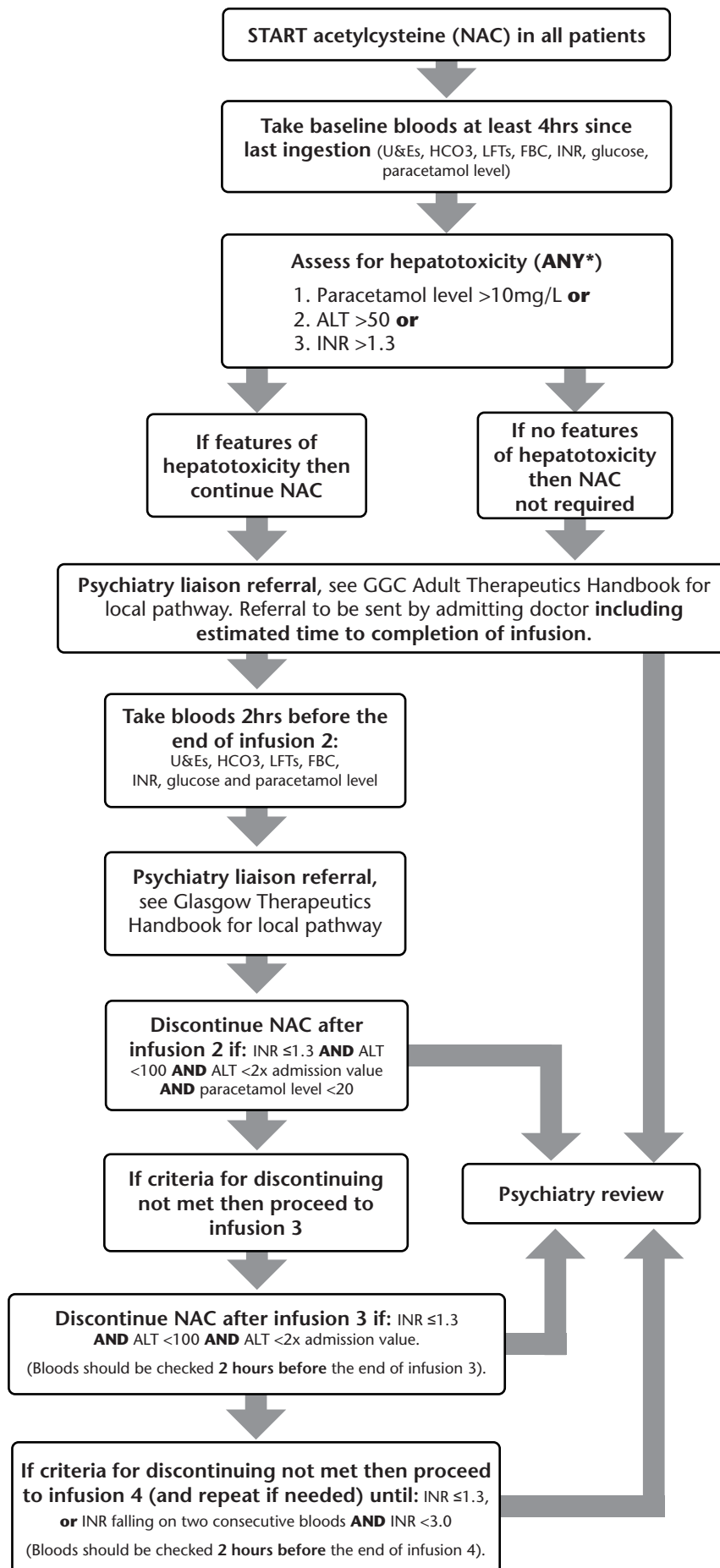
Blood monitoring

- Checking a paracetamol level **2hrs before** the end of bag 2 is **NEW** for this protocol.
- U&E, HCO₃, glu, LFTs, FBC and INR should be done 2hrs before the end of each infusion 2. Ensure results are **READY** for the end of the infusion.
- If unable to achieve blood sampling at the correct time and a delay of >90 minutes is predicted then proceed to the next infusion to avoid prolonged omission of NAC. Bloods should be checked at the earliest opportunity and discontinuation criteria referred to.
- Capillary Blood Glucose (CBG) 6 hourly while on NAC.
- If rapid or progressive biochemical deterioration then discuss with senior and consider referral to regional transplant centre.
- IV NAC can be associated with minor rise in INR without an acute liver injury.

*** Bloods should be done **2 hours before** the end of infusion 3 and 4.

Staggered paracetamol overdose

(Ingested total overdose in >1 hour time period in the context of self harm)



*Clinical judgement required

- Some patients have a chronically raised ALT/INR.
- Review old LFTs/INRs and if chronic derangement discuss with a senior clinician before proceeding to NAC.

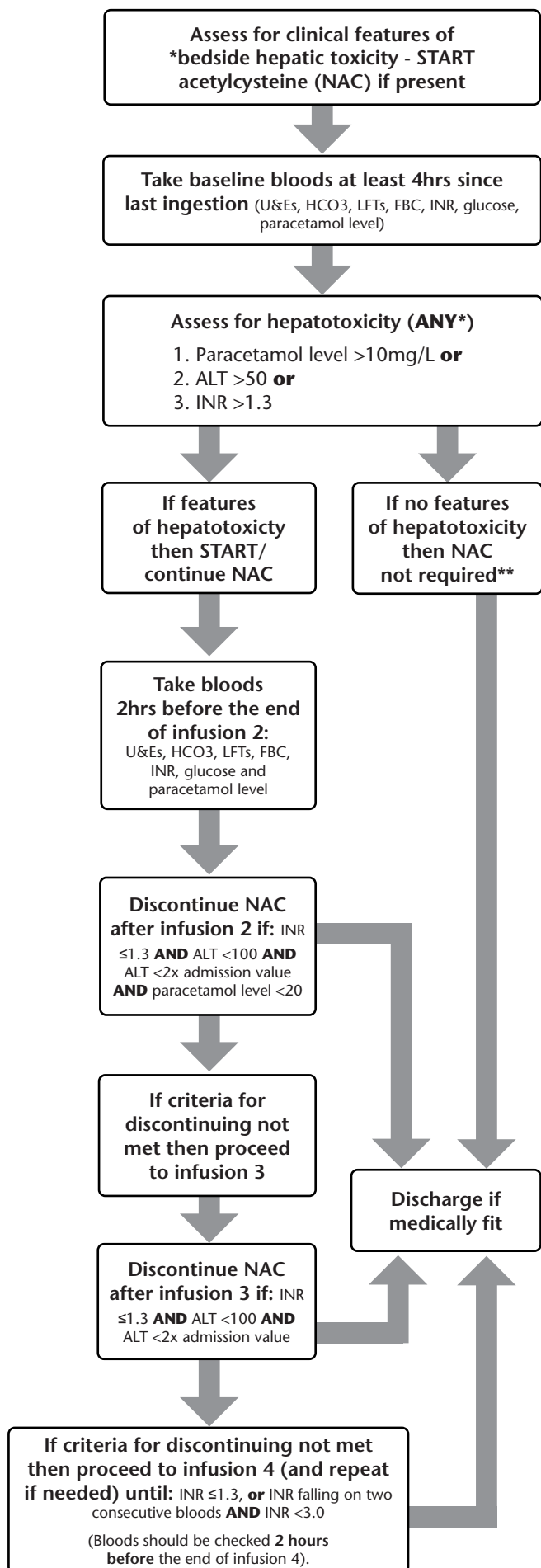
Blood monitoring

- Checking a paracetamol level **2hrs before** the end of bag 2 is **NEW** for this protocol.
- U&E, HCO₃, glu, LFTs, FBC and INR should be done 2hrs before the end of each infusion 2. Ensure results are **READY** for the end of the infusion.
- If unable to achieve blood sampling at the correct time and a delay of >90 minutes is predicted then proceed to the next infusion to avoid prolonged omission of NAC. Bloods should be checked at the earliest opportunity and discontinuation criteria referred to.
- Capillary Blood Glucose (CBG) 6 hourly while on NAC.
- If rapid or progressive biochemical deterioration then discuss with senior and consider referral to regional transplant centre.
- IV NAC can be associated with minor rise in INR without an acute liver injury.

*** Bloods should be done **2 hours before** the end of infusion 3 and 4.

Therapeutic excess paracetamol overdose

(Ingested total overdose in >1 hour time period with no self harm intent)



***Clinical judgement required**

- Bedside hepatic toxicity: Jaundice, tender liver, hypoglycaemia, encephalopathy, unexplained lactic acidosis.
- Ensure no doubt about time of ingestion or type.
- If uncertainty then treat and review with bloods.

****Clinical judgement required**

- Ensure no doubt about time of ingestion or type.
- If uncertainty then treat and review with bloods.
- Caution in patients weighing <30kg, refer to paediatric regimen on toxbase.

Blood monitoring

- Checking a paracetamol level 2hrs before the end of bag 2 is NEW for this protocol.
- U&E, HCO3, glu, LFTs, FBC and INR should be done 2hrs before the end of each infusion 2. Ensure results are READY for the end of the infusion.
- If unable to achieve blood sampling at the correct time and a delay of >90 minutes is predicted then proceed to the next infusion to avoid prolonged omission of NAC. Bloods should be checked at the earliest opportunity and discontinuation criteria referred to.
- Capillary Blood Glucose (CBG) 6 hourly while on NAC.
- If rapid or progressive biochemical deterioration then discuss with senior and consider referral to regional transplant centre.
- IV NAC can be associated with minor rise in INR without an acute liver injury.

***** Bloods should be done 2 hours before the end of infusion 3 and 4.**

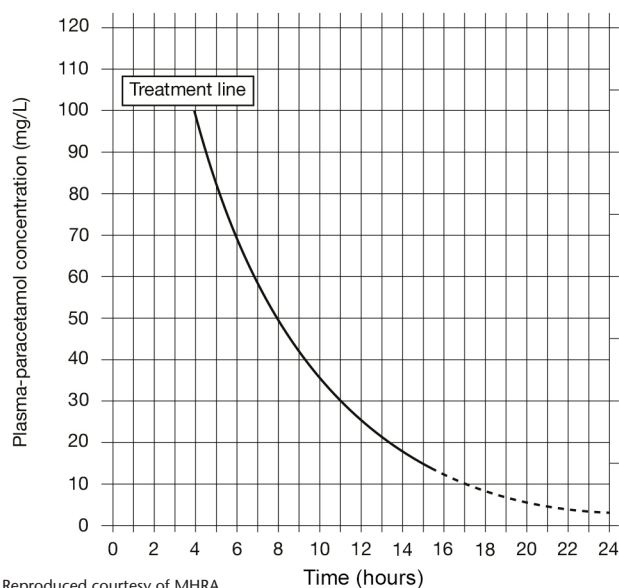
Adult Acetylcysteine Prescribing and Administration Chart

Name: _____
 Address: _____
 DoB: _____
 CHI: _____

Affix patient data label

Ingestion date & time: _____
 Quantity ingested (mg): _____
 Weight (kg): _____
 Calculated paracetamol ingested (mg/kg): _____
 Baseline serum paracetamol concentration (mg/L): _____
 Hours between ingestion & baseline sample: _____

Paracetamol overdose treatment nomogram



- If unclear which of the five protocols to follow (pages 3-7), discuss with a senior clinician.
- In situations where paracetamol levels will be used to determine need for acetylcysteine (refer to appropriate protocol), plot the measured plasma concentration (in mg/L) against the time since ingestion. If plasma level falls **above the line** then give acetylcysteine as detailed below.
- The nomogram is less accurate between 15-24 hours and accurate ingestion time is even more vital.
- Please refer to the GGC Adult Therapeutics Handbook and TOXBASE for information on special patient groups. e.g. pregnancy, extremes of weight.
- Reactions to acetylcysteine include flushing, nausea & vomiting. Consider pausing infusion for 30 minutes and symptomatic relief i.e. antiemetic and/or chlorphenamine.
- Hypersensitivity and anaphylactoid reactions with acetylcysteine are not contraindications as the benefit of treatment still outweighs the risk of not treating.
- True anaphylaxis is rare with acetylcysteine but can be managed by stopping the infusion and then restarting at a slower rate.

Table 1. Acetylcysteine IV dosing & administration

Regimen	First infusion		Second (& extended) infusion	
Infusion fluid	200mL sodium chloride 0.9% or 5% glucose		1000mL sodium chloride 0.9% or 5% glucose	
Preparation	Use 250mL infusion bag and remove 50mL and add required volume of acetylcysteine		Add required volume of acetylcysteine to 1000mL infusion bag	
Duration of infusion	2 hours		10 hours	
Drug dose	100mg/kg acetylcysteine		200mg/kg acetylcysteine	
Weight (kg)	Ampoule volume (mL)	Infusion rate (mL/h)	Ampoule volume (mL)	Infusion rate (mL/h)
30-39	18	109	35	104
40-49	23	112	45	105
50-59	28	114	55	106
60-69	33	117	65	107
70-79	38	119	75	108
80-89	43	122	85	109
90-99	48	124	95	110
100-109	53	127	105	111
≥ 110	55	128	110	111

Each ampoule = 200mg/mL acetylcysteine. Dose calculation based on weight in middle of band. Ampoule rounded up to nearest whole number.

Adult Acetylcysteine Prescribing and Administration Chart

Please ensure that acetylcysteine is also prescribed on the patient's Kardex.

Name: _____
Address: _____
DoB: _____
CHI: _____
<i>Affix patient data label</i>

Infusion 1		Acetylcysteine 100mg/kg over 2 hours									
Prescription						Preparation	Administration checks				
Date	Time	Dose (mL)	Diluent (200mL)	Infusion rate (mL/hr)	Prescriber's signature	Prepared/Checked by	Date Time	Volume remaining (mL)	Volume infused (mL)	Checked by	
						⋮					
Comments:				Stopped by:							
				Date:	Time	Signature					

Infusion 2		Acetylcysteine 200mg/kg over 10 hours									
Prescription						Preparation	Administration checks				
Date	Time	Dose (mL)	Diluent (1000mL)	Infusion rate (mL/hr)	Prescriber's signature	Prepared/Checked by	Date Time	Volume remaining (mL)	Volume infused (mL)	Checked by	
						⋮					
Comments:				Stopped by:							
				Date:	Time	Signature					

Extended treatment

If extended treatment with acetylcysteine is required (see guideline section), continue at the dose and infusion rate used for the second infusion and prescribe on page 10.

Recheck U&Es, bicarbonate, LFTs, FBC and INR 2 hours before the end of infusions 3 and 4 to assess the need to continue.

Refer to appropriate protocol regarding discontinuation of extended treatment

Adult Acetylcysteine Prescribing and Administration Chart

Name: _____
 Address: _____
 DoB: _____
 CHI: _____

Affix patient data label

Infusion 3* (extended treatment)		Acetylcysteine 200mg/kg over 10 hours									
Prescription						Preparation	Administration checks				
Date	Time	Dose (mL)	Diluent (1000mL)	Infusion rate (mL/hr)	Prescriber's signature	Prepared/Checked by	Date Time	Volume remaining (mL)	Volume infused (mL)	Checked by	
Comments:				Stopped by:							
				Date:	Time	Signature					

Infusion 4* (extended treatment)		Acetylcysteine 200mg/kg over 10 hours									
Prescription						Preparation	Administration checks				
Date	Time	Dose (mL)	Diluent (1000mL)	Infusion rate (mL/hr)	Prescriber's signature	Prepared/Checked by	Date Time	Volume remaining (mL)	Volume infused (mL)	Checked by	
Comments:				Stopped by:							
				Date:	Time	Signature					

*These infusions should only be commenced if extended treatment is required. Please refer to protocols (page 3-7) to determine need for extended treatment.

If the patient meets criteria for a further infusion then repeat infusions 3 and/or 4 (extended). Refer to protocols for discontinuation criteria. Prescribe a 5th infusion using a new chart, contacting pharmacy for advice if required.