# Generalised Convulsive Status Epilepticus

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| **Title:** | Generalised Convulsive Status Epilepticus in CYP under 16 years |
| **Version:** | **3** |
| **Supersedes:** | Version 2 – June 2022 |
| **Application:** | The guideline is intended for use by any hospital team caring for infants, children and young people under 16 years age across the Paediatric Critical Care Network in the North-West (England) & North Wales region. |

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| **Originated /Modified By:**<br>**Designation:** | **Version 1: 2012 (reviewed no changes needed 2014)**<br>H. Northover, Consultant Paediatrician, Royal Bolton Hospital.<br>T. Martland, Consultant Paediatric Neurologist, Royal Manchester Children's Hospital.<br>R. Appleton, Consultant Paediatric Neurologist, Alder Hey Children's Hospital.<br>J. Samuel, Consultant Paediatric Intensivist, Royal Manchester Children's Hospital<br>**Version 2 (June 2022)**<br>Kate Parkins, PICM Consultant, North-West & North Wales Transport Service (NWTS)<br>Constantinos Kanaris, PICM consultant, NWTS<br>Gillian Rennie, Specialty Doctor in Anaesthetics, Royal Blackburn Hospital,<br>Jeen Tan, Consultant Paediatric Neurologist, Royal Manchester Children's Hospital<br>**Version 3:**<br>Kate Parkins, PICM Consultant, North-West & North Wales Transport Service (NWTS)<br>Nicola Longden, clinical nurse specialist, NWTS |
| Reviewed **by:** | 1. North-West & North Wales Paediatric Critical Care Operational Delivery Network<br>2. Lewis Nicholls, Paediatric Pharmacist, PCC ODN & RMCH<br>3. Paediatric Neurology teams at both RMCH & AHCH |
| **Ratified by:** | 1. North-West & North Wales Paediatric Critical Care Operational Delivery Network<br>2. RMCH (Host Trust): Paediatric Policies & Guidelines & Pharmacy & Medicines Management Committees |
| **Date of Ratification:** | 1. PCC Oversight: 11.02.2026<br>2. RMCH Policies & Guidelines Committee: 13.02.26 |

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| **Amendments** | |

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| **Issue / Circulation Date:** | **13.02.26** |
| **Circulated by:** | **NWTS & North-West and North Wales Paediatric Critical Care Network** |
| **Dissemination and Implementation:** | **PCC, SiC & LTV ODN** |
| **Date placed on NWTS / PCC, SiC & LTV ODN websites** | **13.02.26** |

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| **Planned Review Date:** | **February 2029** |
| **Responsibility of:** | Clinical lead North-West (England) & North Wales Paediatric Critical Care ODN & NWTS guideline team |

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| **EqIA Registration Number:** | **2026-49** |

## 1. Detail of Procedural Document

**Guideline for Management of Generalised Convulsive Status Epilepticus in Children & Young People (CYP) under 16 years.**

## 2. Equality Impact Assessment

<table>
<tr><td colspan="3">Equality Impact Assessment<br>Please record the decision whether the policy, service change or other key decision was assessed as relevant to the equality duty to:<br>Eliminate discrimination and eliminate harassment<br>Advance equality of opportunity<br>Advance good relations and attitudes between people</td></tr>
<tr><td>Relevant</td><td>YES</td><td rowspan="2">Guideline relevant for paediatric age group only<br>Intended for use across North-West (England) & North Wales region for those under 16 years of age.<br>Appropriate PEWS and observation target ranges included for all age groups.<br>Risk of occult hypoxaemia highlighted IE that it is more than 3 times greater in Black vs White pts AND may over-estimate $SpO_2$ between 1.5-5%.</td></tr>
<tr><td colspan="2">Where the decision was RELEVANT, please record details of the outcome of the full impact assessment and summarise the actions that will be taken to eliminate or mitigate adverse impact, advance equality or justification for the impact.</td></tr>
<tr><td colspan="2">EqIA registration Number for RMCH:</td><td>2026-49</td></tr>
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## 3. Consultation, Approval and Ratification Process

This guideline was developed with input from:
· North-West (England) and North Wales Paediatric Transport Service (NWTS) - medical & nursing
· Paediatric Neurology Consultants from Royal Manchester & Alder Hey Children's Hospitals
· Representatives from local regional hospitals within the North-West (England) & North Wales Paediatric Critical Care operational delivery network; includes medical, nursing and AHP (paediatrics, anaesthetics, and emergency medicine teams)
· Both Paediatric Critical Care Units (Royal Manchester & Alder Hey Children's Hospital)

These guidelines were circulated amongst the North-West (England) and North Wales Paediatric Critical Care Operational Delivery Network for comments on the 15th January 2026.
All comments received have been reviewed and appropriate amendments incorporated.
The guideline was signed off by the PCC ODN guidelines committee & ODN oversight on 11.02.26

For ratification process for network guidelines see appendix 1.

## 4. Disclaimer

These clinical guidelines represent the views of the North-West (England) and North Wales Paediatric Transport Service (NWTS) and the North-West (England) and North Wales Paediatric Critical Care Operational Delivery Network (PCC ODN). They have been produced after careful consideration of available evidence in conjunction with clinical expertise and experience.
It is intended that trusts within the Network will adopt this guideline and educational resource after review and ratification (including equality impact assessment) through their own clinical governance structures.
**The guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient.**

**Clinical advice is always available from NWTS on a case-by-case basis via the referral line: 08000 84 83 82**

Please feel free to **contact NWTS (01925 853 550)** regarding these documents if there are any queries.

# Generalised Convulsive Status Epilepticus

CONTINUING SEIZURE ACTIVITY

**Pre hospital setting: > 5 mins of seizure activity**

**Diazepam rectal (max 10mg if <12yrs; 20mg if >12yrs)**
**or Midazolam buccal (max 10mg)** see page 4 for dose banding

**Hospital setting**

**STOP & ASSESS: Airway / Breathing / Circulation / GCS + Pupils**
**Administer high flow oxygen 15 L/min**
**Obtain IV / IO access + bloods: gas with lactate & glucose + FBC, U&E's, calcium, magnesium, CRP & ammonia**
**Check blood glucose: if < 3 mmol/L: give IV 3mL/kg 10% glucose followed by maintenance fluids**
**Check sodium: if hyponatraemic (< 130 mmol/L): consider 2.7% Sodium Chloride bolus @ 3mL/kg**
**Confirm seizure clinically & check duration**

**5 mins post 1st benzodiazepine**

**Peripheral venous line (PVL) or intraosseous (IO)**

**Always follow an individuals' rescue plan**

YES → **Lorazepam 0.1mg/kg (max 4mg) IV/IO over 1 minute**
**If lorazepam not available**
**Diazepam emulsion 0.3-0.4 mg/kg IV/IO (max 10mg)**

NO → **Midazolam buccal (max 10mg)**
see page 4 for dose banding

**Place an IO / PVL ASAP**

**ONGOING SEIZURE ACTIVITY CALL FOR SENIOR HELP: CONSIDER 2222**

**PAUSE & CHECK: has pt had TOTAL 2 doses benzodiazepines** (include any pre-hospital)?

NO → **Lorazepam 0.1mg /kg IV or IO (max 4mg)**
**If lorazepam not available**
**Diazepam emulsion 0.3-0.4 mg/kg IV or IO (max 10mg)**

YES

**Continuously re-assess Airway, Breathing, Circulation, GCS + Pupils**

**5 mins post 2nd benzodiazepine**

**ALL patients/age groups:**
**GIVE LEVETIRACETAM** 40mg/kg (max 3 gram) IV or IO over 5 mins
**USE FULL LOADING DOSE EVEN if** the pt is **on maintenance oral levetiracetam**
NB dilute 1:1 with 0.9% sodium chloride (min volume 10 mL; MAX concentration 50 mg/mL)

**10 mins post levetiracetam**

**RE-ASSESS 10 MINS AFTER LEVETIRACETAM**
**IF SEIZURE CONTINUES / ENCEPHALOPATHIC / LOW GCS: CALL ANAESTHETIST / INTENSIVIST**
**WHILST PREPARING FOR INTUBATION (do NOT delay intubation for 3rd anti-convulsant):**
**CONSIDER 2rd long-acting anti-convulsant: either IV PHENYTOIN or IV PHENOBARBITAL**
**If CGA > 44 weeks & NOT on maintenance phenytoin: PHENYTOIN** 20mg/kg (MAX dose 2 gram) IV / IO
**Administer over MIN 20 minutes (infusion rate: 1mg/kg/minute not to exceed 50mg/min)**
**AVOID Phenytoin in ANY potential toxin ingestion/overdose**
**If NEONATE (ie up to 44 weeks CGA) or already on maintenance phenytoin USE PHENOBARBITAL**
20mg/kg (max 1 gram) IV / IO over 20 minutes or rate 1mg/kg/min (dilute to 20 mg/mL)

**AFTER LEVETIRACETAM INFUSION**

**MODIFIED RAPID SEQUENCE INDUCTION (see NWTS Intubation guideline)**
1-2 mg/kg KETAMINE IV & 1 mg/kg ROCURONIUM IV +/- 1-2 microgram/kg Fentanyl IV
AVOID suxamethonium if high $K^+$/ AKI / Myopathy
**OR** use either
1-3mg/kg PROPOFOL IV (or 3-5 mg/kg THIOPENTONE IV)
Consider lower doses if evidence of shock / low cardiac output for all induction agents

****Paraldehyde** may be considered if in specific rescue plan or consultant discretion.
**Dose per rectum (PR):** 0.8 mL/kg MAX 20 mL (prediluted preparation with olive oil).
Give at same time as levetiracetam is being drawn up. NB avoid in liver disease.

# Generalised Convulsive Status Epilepticus

| MIDAZOLAM buccal dose 0.3 mg/kg max 10 mg | | DIAZEPAM rectal dose 0.5mg/kg max 20 mg | |
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| Neonate (up to 44 weeks CGA) AND infant ≤ 2 months | 0.3 mg/kg | Neonate (< 44 weeks CGA) | 1.25-2.5 mg |
| Infant 3-11 months | 2.5mg | 1 month – 1 year | 5 mg |
| 1-4 years | 5mg | 2-11 years | 5-10 mg |
| 5-9 years | 7.5mg | | |
| 10-17 years | 10mg | 12-17 years | 10-20 mg |

**2.5mg diazepam rectal tubes have been discontinued. For any dose diazepam < 5mg follow NPPG guidance – https://nppg.org.uk/wp-content/uploads/2022/02/NPPG-Position-Statement-Diazepam-V1.pdf**

**DEFINITION Status Epilepticus:** any seizure lasting more than 5 mins or recurrent seizure episodes within 5 mins without returning to pre-convulsive neurological baseline.
NB majority of seizures stop within 5 mins.

**DURATION:** Seizures of longer duration are more difficult to treat. Status epilepticus is life-threatening, and may cause serious neurological sequelae (neuronal death); risk is higher if seizures > 30 minutes
**Refractory status** occurs in up to 30% patients and is associated with high morbidity and mortality.

**SEIZURE RECURRENCE is HIGH:** if only treated with short-acting benzodiazepines or paraldehyde.
Recurrence often occurs within 4-6 hours.
**RECOMMENDATION: give a long-acting IV anti-convulsant as per algorithm on page 3**
**ie IV levetiracetam if seizures last longer than 15 minutes**

**POTENTIAL CAUSES**

- **MOST COMMON:**
  - Febrile convulsions (between 6 months & 6 years): aim normothermia using paracetamol / active cooling
  - Known epilepsy: check anti-convulsant drug levels as non-compliance with medication is relatively common
  - Intercurrent illness causing reduced absorption eg vomiting +/- diarrhoea
- **CONSIDER & EXCLUDE:**
  - **Hypoglycaemia:** glucose < 3 mmol/L give bolus 3 mL/kg 10% glucose & start maintenance fluids with glucose
  - **Hyponatraemia**: sodium (Na) < 130 mmol/L. **If still seizing** give 3-5 mL/kg 2.7 or 3% hypertonic sodium chloride
  - **Hypoxia +/- Ischaemia:** oxygenate & treat hypotension **(see NWTS shock guideline)**
  - **Meningitis / Encephalitis**: follow local antimicrobial guidelines, consider ceftriaxone, acyclovir & clarithromycin. NB don't forget dexamethasone in those over 3 months old (see **NWTS sepsis guideline**)
  - **Head injury** (acute / chronic) **including NAI**: follow **major trauma pathway**
  - **Intracranial bleed, Space Occupying Lesion or Blocked VP shunt**: follow **major trauma pathway**
  - **Cerebral infarct:** d/w NWTS & paediatric neurology (via conference call)
  - **Hypertensive emergency**: d/w NWTS & paediatric renal consultant (via conference call)
  - **Toxins** including drugs of abuse: send urine for toxicology. Consult TOXBASE if specific substance known or specific toxidrome to guide ongoing management.
  - **Inborn error of metabolism**: check ammonia & ketones: follow **NWTS hyperammonaemia guideline**
  - **Pre-eclampsia/Eclampsia:** send urine for pregnancy test. **Management:** urgent d/w obstetrics + NWTS

**BASELINE INVESTIGATIONS IN ALL UNDER 16 YEARS OLD PTS WITH SEIZURES LASTING > 30 MINUTES:**

- Blood gas including lactate and glucose
- FBC, Clotting, U&Es, CRP, Liver function tests, Amylase, Calcium, Magnesium, Phosphate
  - If evidence AKI: check creatinine kinase levels (ie for evidence of rhabdomyolysis)
- Ammonia & ketones +/- blood & urine samples for inborn error metabolism
- Insulin, cortisol, growth hormone and thyroid function tests if hypoglycaemic
- Urine for beta-HCG/pregnancy testing in those females' post-puberty

**Toxicology**: send **urine for toxicology** ASAP when no apparent aetiology uncertain.
If specific substance suspected from history, send specific serum toxicology level (not just urine toxicology).
**NB it is advisable to send a chain of custody form with urine or serum toxicology samples**

**Check Phenytoin** level/concentrations (if used acutely) ideally 1 to 1.5 hours after the loading dose has completed
Blood level less than 10 microgram/mL, consider further loading dose 5 mg/kg over 20 minutes

**Febrile:** Blood, urine, NPA (respiratory viral screen including COVID-19) & viral cultures Bacterial/viral PCR (i.e meningococcal, pneumococcal, HSV)

**NEVER lumbar puncture** immediately after prolonged seizure as ↑↑ risk of raised intracranial pressure and coning
NB normal CT scan does NOT exclude raised intra-cranial pressure

**PHENYTOIN is relatively contra-indicated in Dravet's Syndrome BUT may be used in prolonged seizures AFTER other agents fail to control seizures. Ideally always discuss with tertiary neurology first.**
**Avoid Phenytoin** in ANY potential toxin ingestion/overdose

## POST RSI: ON-GOING MANAGEMENT including SEDATION for urgent CT scan

- **Place large bore NGT** to reduce the risk of aspiration, reduce diaphragm splinting & improve ventilation & oxygenation.
- **PROPOFOL** infusion (range 1-4 mg/kg/hr) or boluses short-term (ie max 12 hours) to avoid propofol infusion syndrome. NB avoid using propofol in shocked patients or those with poor cardiac output.
  - **Why propofol:** rapid acting, potent anaesthetic agent with anti-convulsant effects. Plus, it allows more rapid assessment of neurology post sedation hold prior to extubation than other agents eg morphine & midazolam.
  - **Avoid propofol** if suspected inborn error of metabolism eg LCAD or mitochondrial disorders
- **NEUROMUSCULAR RELAXANTS:** only use during transfers OR if difficult to oxygenate/establish on ventilator. Discontinuation NMR agents will allow monitoring of ongoing seizure activity & neurological assessment
- **MORPHINE AND MIDAZOLAM INFUSIONS** should only be started **after** d/w NWTS see **NWTS emergency drugs guide**
- **ONGOING SEIZURE MANAGEMENT:** d/w NWTS +/- tertiary neurology (via conference call) see page 6

## NEURO-IMAGING STUDIES: CT/MRI head +/- CONTRAST

**Only consider neuroimaging once patient is stable and seizure activity controlled**

**ALWAYS intubate and ventilate prior to scan if GCS ≤ 8/15 or pt has a variable/fluctuating level of consciousness**

- NB your patient is at risk of aspiration in this situation as they are unable to protect their own airway

**Trauma or NAI:** always discuss with trauma team leader at appropriate tertiary paediatric centre BEFORE scan

**When to consider neuro-imaging:**

- New prolonged seizure
- Suspected raised ICP: bradycardia, hypertension, irregular respiratory rate, fixed dilated pupils or unequal pupils
- Suspected space occupying lesion, haemorrhage or blocked VP shunt or unequal pupils
- Atypical or unilateral / focal seizures
- Suspicion meningoencephalitis
- Cause unknown

**Request contrast enhanced scan if suspicion of venous sinus thrombosis (eg associated with ↑Na) or an abscess**

**When transferring to/from CT or MRI:** always do a risk assessment & use checklists (**see STOPP document**) to ensure patient is transferred by a team with appropriate competencies and with appropriate resuscitation equipment & drugs

## CHOICE OF LONG-ACTING ANTICONVULSANT

**NB ALWAYS follow an individuals' specific rescue plan (if available)**

**LEVETIRACETAM preferred as 1st choice:** easy/faster to draw up, and can be administered **over 5 mins for ALL age groups**
It is as effective as a long-acting anticonvulsant as phenytoin (& vice versa) or phenobarbitone
Compatible with usual IV maintenance fluids, has a low risk of extravasation injury and has a wide safety margin.
ALWAYS wait for 10 minutes post-levetiracetam infusion before re-assessing whether seizure is controlled.

**LEVETIRACETAM = ANTICONVULSANT OF CHOICE FOR SEIZURES DUE TO POTENTIAL TOXINS OR DRUG OVERDOSE**
Phenytoin should not be used due to its own sodium channel blockade effect and inappropriate mode of action

**PHENYTOIN: 2nd choice long-acting anticonvulsant if > 44 weeks CGA and NOT already on maintenance phenytoin**
NB Phenytoin has longer drug preparation time than levetiracetam AND must be **administered over MIN 20 mins**
NB very irritant to veins (always give via large vein), and high risk of extravasation injury or injection site necrosis.
**Adverse effects** (more likely if administration too fast): arrhythmias (atrial or ventricular conduction depression; VF; cardiac arrest) which may be very difficult/impossible to treat; respiratory arrest; liver damage or Steven-Johnson Syndrome

**PHENOBARBITAL = 2nd choice for neonates** (up to 44 weeks CGA) **or pts already on phenytoin or with specific rescue plan**

**PARALDEHYDE:** only used if part of specific rescue plan OR at consultant discretion. **ALWAYS give long acting anti-convulsant ie levetiracetam/phenytoin/phenobarbital if seizure terminates with paraldehyde**.

**During Levetiracetam, Phenobarbitone or Phenytoin Infusion monitor: BP, ECG & HR, RR & $SpO_2$**
**Slow or stop infusion** if hypotension, impaired respiratory effort, ectopics or bradycardia during administration

**MODIFIED RSI for prolonged seizures: Ketamine +/- fentanyl + rocuronium** = preferred induction agents
2nd choice = propofol or 3rd choice = thiopentone: higher risk of hypotension & cardiac arrest with these drugs due to their vasodilatory / hypotensive effects especially if any concerns re shock, low cardiac output or lactic acidosis. If used for induction, consider using lower doses.
**NB Ketamine, propofol and thiopentone all have anti-convulsant properties at doses used for induction of anaesthesia**

## MANAGEMENT OF REFRACTORY SEIZURES POST INTUBATION AND VENTILATION

### After D/W NWTS AND tertiary paediatric neurology

- **Load with 2nd long-acting anti-convulsant**: ie either phenytoin or phenobarbitone (see algorithm page 3 or page 5) or any alternative drug specified in an individual patients' rescue plan.

### ALTERNATIVE AGENTS ONLY AFTER D/W NWTS AND TERTIARY PAEDIATRIC NEUROLOGY

- **MIDAZOLAM INFUSION**: 100 microgram/kg bolus and start infusion at 120 microgram/kg/hr wait 10 mins, then reassess
  - Increase midazolam infusion by 60 microgram/kg/hr every 15 minutes (max 300 microgram/kg/hr) until seizures controlled. NB DO NOT bolus on increments as escalation rapid
  - Further escalation should ONLY be following discussion with NWTS & tertiary neurologist
  - Midazolam may be increased every 15 minutes until the seizure terminates
  - Mean effective doses reported: 100–780 microgram/kg/hr (range 60–1920 microgram/kg/hr)
  - **CAUTION:** hypotension may develop and fluid bolus +/- vasopressors may be required (see regional **Shock guideline**)
- ***NEW* IV SODIUM VALPROATE:** dose 40 mg/kg, max.3 grams (diluted to a maximum concentration of 50mg/mL with 0.9% sodium chloride or 5% glucose) over 10 mins.
  - **WARNING**: do NOT use Na Valproate in those under 2 years age AND in females of child-bearing age.
  - **Contraindicated** if hyperammonaemia, liver disease, thrombocytopaenia or possible metabolic disease
  - **Contraindicated** in those under 2 years age who are suspected of having POLG-related disorders
- **CONSIDER PYRIDOXINE IF UNDER 18 MONTHS** and idiopathic status epilepticus: dose 100 mg IV
  - **WARNING:** possibility of **apnoea** after administration.
  - Pyridoxine dependent seizures should respond within 10-60 minutes.
  - **Always discuss with paediatric neurology before use**.
- **NB always discuss continuation of usual anti-convulsant(s).** It may be appropriate to give patient's usual anti-convulsant medications IV.

## POTENTIAL SEQUELAE OF CONVULSIVE STATUS EPILEPTICUS

- Blood glucose changes: initial hyperglycaemia, later hypoglycaemia.
- Hyperkalaemia
- Acute Kidney Injury or renal failure: secondary to rhabdomyolysis (always check Creatinine Kinase levels if evidence AKI)
- Disseminated intravascular coagulopathy
- Pulmonary oedema
  - Treatment = intubation & ventilation, and high PEEP (AVOID furosemide due to risk diuresis worsening AKI or causing hypotension)
- Cerebral oedema or raised ICP: management
  - Ventilate to normal pH, avoid hypercarbia, keep well oxygenated ($SpO_2$ 92-96%), and maintain BP within normal limits (see appendix).
  - Prevent hyponatraemia: maintenance fluids ideally should be balanced crystalloid eg Plasmalyte 148 or Hartmann's solution (if not available use 0.9% sodium chloride) with glucose as required.
  - Avoid fluid overload: restrict fluids to 70% normal requirements.
  - **Treatment raised ICP / coning** ie hypertension, bradycardia, fixed and dilated pupils: bolus 3-5 mL/kg hypertonic sodium chloride (preferred option is 2.7% sodium chloride 5 mL/kg if available; if not available use 3 mL/kg for 3-5% sodium chloride) OR 0.25-1 g/kg mannitol over 30 minutes. NB caution with mannitol: it does cause diuresis watch for subsequent hypotension, and / or urinary retention (which will cause a spike in ICP)
- Convulsive status epilepticus (CSE) can be fatal, but mortality is lower in children than in adults—at about 2%–7%
- Adverse neurological consequences:
  - Subsequent epilepsy
  - Motor deficits
  - Learning and behavioural difficulties
  - Main determinant of outcome is the underlying aetiology

There is low risk of morbidity and mortality in children with unprovoked/prolonged febrile CSE. This risk increases significantly in cases with structural or genetic causes

# Generalised Convulsive Status Epilepticus



**EXTUBATION OF CHILD OR YOUNG PERSON INTUBATED FOR STATUS EPILEPTICUS**

Early extubation in uncomplicated CSE is recommended as it reduces the risks associated with transfer and prolonged ventilation and reduces the impact of hospitalisation on the CYP and family.

Repeated regional audit data shows that CYP are appropriately, safely, and successfully extubated by local teams without the need for transfer to PICU.

**TRIAL OF EXTUBATION SHOULD ONLY OCCUR IF CLINICAL SUPPORT IS AVAILABLE TO RE-INTUBATE IF NECESSARY**

**REVIEW THE REASON FOR INTUBATION**

**LIKELY to be successful extubated locally**
- Intubated for apnoea/hypoventilation due to anticonvulsant medication
- Probable febrile convulsion
- Usual seizure type (known epileptic)

**UNLIKELY to be extubated locally: D/W NWTS**
- Previous episodes CSE requiring PICU
- Epilepsy syndromes e.g. Dravet Syndrome
- Intractable or refractory CSE
- Require neuroprotection eg post CPR, traumatic HI

**POST intubation & ventilation: joint paediatric & anaesthetic/ICM review**

Seizures controlled with long-acting anticonvulsant?

**YES**

Normal (or no change from previous) CT or MRI
Normal U&E's, glucose, LFTs & ammonia
Normal observations: especially no persistent ↑HR
Pupils equal & reacting to light

**YES**

Good respiratory drive
End tidal $CO_2$ normal + $SpO_2$ > 94% in $FiO_2$ ≤ 0.4
Min. settings on ventilator & normal blood gas & lactate
CVS stability: NOT required > 40 mL/kg fluid bolus +/- inotrope

**SEDATION HOLD**

Neurological status unchanged from pre-morbid state
GCS ≥ 10/15
No flexor or extensor posturing or focal neurology
Pupils equal & reacting to light
Intact airway protective reflexes (cough/gag)
No concerns about difficult airway (easy intubation) or OSA

**YES**

**TRIAL EXTUBATION**

**Successful?**

Admit to PHDU area
Monitor PEWS including GCS
AIM: GCS min 10/15 & improving
Check blood gas post extubation

**NO**

**D/W NWTS +/- neurology**
Add 2nd long-acting IV anticonvulsant eg phenytoin or phenobarbitone see pg 3

**YES**

**Pause & Review**
Seizures controlled after 2nd long-acting IV anticonvulsant given?

**NO**

**D/W NWTS & neurology via conference call**
**Transfer to PICU**

**NB reintubate if airway or respiratory concerns; seizure recurs; if encephalopathic or ↓ GCS ≤ 8/15**

**Discuss with NWTS**

## SELECTED REFERENCES:

**ConSEPT and EcLiPSE - Levetiracetam versus Phenytoin for Status Epilepticus**, Don't Forget the Bubbles, 2019 Roland D, Davis T.

**Levetiracetam versus phenytoin for second-line treatment of convulsive status epilepticus in children (ConSEPT):** an open-label, multicentre, randomised controlled trial Dalziel SR, Borland ML, Furyk J, Bonisch M, Neutze, J, Donath S et al Lancet 2019; 393(10186): 2135-2145

**Levetiracetam versus phenytoin for second-line treatment of paediatric convulsive status epilepticus (EcLiPSE):** a multicentre, open-label, randomised trial. Lyttle MD, Rainford NEA, Gamble C, Messahel S, Humphreys A, Hickey H et al Lancet 2019; 393(10186):2125-2134

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**The treatment of convulsive status epilepticus in children. The Status Epilepticus Working Party.** Appleton R et al. Archives of Disease in Childhood 2000.83(5):415-419

**Lorazepam is the treatment of choice for status epilepticus.** Mitchell WG, Crawford TO. J Epilepsy 3 7-10

**Safety and efficacy of buccal midazolam versus rectal diazepam for emergency treatment of seizures in children:** a randomised controlled trial. McIntyre et al. Lancet. 2005 Jul 16-22;366(9481):205-10

**Advanced Paediatric Life Support Manual 7th Edition**: November 2024

**Review of the new APLS guideline (2022): Management of the convulsing child.** Bacon M, Appleton R, Bangalore H, et al. Archives of Disease in Childhood - Education and Practice 2023; **108:** 43-48.

**Paediatric Anaesthesia** (Oxford Specialist Handbooks in Anaesthesia) Edited by Steve Roberts 2nd edition 2020

**Can critical care transport be safely reduced in children intubated during emergency management of status epilepticus in the United Kingdom: a national audit with case-control analysis.** Knight P, Norman V, Gully R, Wood D, Raffaj D, Riddick L, Hancock S, Revanna S, Uvaise M, Herring S, Worrall M, Daye A, Terris M, O'Brien C, Kumar A, Scott S, Pritchard L, Palaniappan S, Hughes C, Griksaitis MJ, Riphagen S, Ramnarayan P. Arch Dis Child. 2024 May 17;109(6):476-481.

**NICE: Protocols for treating convulsive status epilepticus in adults and children** CG137 last updated: 22 September 2020

**Midazolam infusions for therapeutic management of pediatric refractory status epilepticus:** a systematic review Johnson KT, AlZadjali A, Al Nasseri D, Cunningham J , Shoya K, Hahn CD , Basmaji J, McKinnon NK Front Pediatr. 2025 Apr 14;13:1507325.

## CLINICAL PRACTICE GUIDELINES CONSULTED

- Perth Children's Hospital, Australia, July 2022
- Royal Children's Hospital, Melbourne, Australia, June 2025
- Starship Hospital, Aukland, New Zealand, December 2024
- Southampton & Oxford Retrieval and Transport (SORT) service guidelines, December 2024
- Children's acute transport service (CATS) guidelines version 7 January 2024
- South Thames Retrieval Service (STRS) version 4 2023
- Wales & West Acute Transport for Children (WATCh) version 3 July 2025
- Kids Intensive Care Decision Support (KIDS) – June 2025
- North-East (NECTAR) – September 2024

# Generalised Convulsive Status Epilepticus



| TARGETS for managing any critically sick child | | | |
|---|---|---|---|
| **ALL AGES** | **$SpO_2$ ≥ 94% unless cyanotic CHD** | **Lactate ≤ 2 mmol/L** | **Glucose: ≥ 3 mmol/L** |

**CAUTION inaccurate pulse oximetry ($SpO_2$) readings can occur in severe anaemia, high carbon monoxide levels and hypoperfusion. IN ADDITION, $SpO_2$ may inaccurately over-read masking hypoxaemia (occult or unrecognised hypoxaemia), i.e. ARTERIAL (true) oxygen saturation < 88% when $SpO_2$ ≥ 92%.**
**Risk of occult hypoxaemia is >3xs greater in Black vs White pts AND may over-estimate $SpO_2$ between 1.5-5%.**

| AGE | TARGET MEAN BP | AGE | TARGET MEAN BP |
|---|---|---|---|
| 0-11 Months | 45-55 | 5-12 Years | 60 |
| 1-4 Years | 55-60 | >13 Years | 60-65 |

| Respiratory Rate (Score up to 4) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Score** | **4** | **2** | **1** | **0** | **1** | **2** | **4** |
| 0-11 months | 0-10 | 11-20 | 21-30 | 31-49 | 50-59 | 60-69 | ≥70 |
| 1-4 years | 0-10 | 11-20 | | 21-39 | 40-49 | 50-59 | ≥ 60 |
| 5-12 years | 0-10 | 11-15 | 16-20 | 21-24 | 25-39 | 40-49 | ≥ 50 |
| >13 years | 0-10 | | 11-15 | 16-24 | 25-29 | 30-39 | ≥ 40 |

| ALL AGES Score | Respiratory Distress (Score up to 4) |
|---|---|
| **0 = none** | None |
| **1 = mild** | Nasal flaring, subcostal recession |
| **2 = moderate** | Tracheal tug, intercostal recession, inspiratory or expiratory noises |
| **4 = severe** | Supraclavicular recession, grunting, exhaustion, impending respiratory arrest |

| ALL AGES Score | Oxygen Saturations (Score up to 4) |
|---|---|
| **0** | 95-100% |
| **2** | 92-94% |
| **4** | ≤ 91% |

| ALL AGES Score | Oxygen Requirement (Score up to 4) - ALL AGES |
|---|---|
| **0** | Room Air |
| **2** | 0.01 up to 4 litres/min |
| **4** | 4 or more litres/min<br>**NB** High flow humidified NC oxygen, NIV CPAP or BiPAP score 4 (irrespective of $O_2$ requirement) |

| Heart Rate (Score up to 4) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Score** | **4** | **2** | **1** | **0** | **1** | **2** | **4** |
| 0-11 Months | 0-80 | 81-90 | 91-110 | 111-149 | 150-169 | 170-179 | ≥ 180 |
| 1-4 Years | 0-60 | 61-70 | 71-90 | 91-139 | 140-149 | 150-169 | ≥ 170 |
| 5-12 Years | 0-60 | 61-70 | 71-80 | 80-119 | 120-139 | 140-159 | ≥ 160 |
| >13 Years | 0-50 | 51-60 | 61-70 | 71-99 | 100-119 | 120-129 | ≥ 130 |

| Blood Pressure Systolic (Score up to 4) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Score** | **4** | **2** | **1** | **0** | **1** | **2** | **4** |
| 0-11 Months | 0-50 | 51-60 | 61-70 | 71-89 | 90-99 | 100-109 | ≥ 110 |
| 1-4 Years | 0-50 | 51-60 | 61-80 | 81-99 | 100-119 | 120-129 | ≥ 130 |
| 5-12 Years | 0-70 | 71-80 | 81-90 | 91-109 | 110-119 | 120-129 | ≥ 130 |
| >13 Years | 0-80 | 81-90 | 91-100 | 101-119 | 120-129 | 130-139 | ≥ 140 |

| Capillary Refill Time (CRT) (Score up to 2) | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Score** | **4** | **2** | **1** | **0** | **1** | **2** | **4** |
| All Ages | | ≥ 3 secs | | <3 secs | | ≥ 3 | |

# Generalised Convulsive Status Epilepticus



| CHECK IF YOUR PATIENT HAS ANY ADDITIONAL RISK FACTORS (NPEWS) | | |
|---|---|---|
| **RISK FACTOR** | **THINK!** | |
| ☐ Baseline vital signs outside normal reference ranges | Always score relevant PEWS value even if this is normal for the patient eg cyanotic heart disease | Vital sign: Eg $SpO_2$<br>Patient's normal value: Eg $SpO_2$ = 75-85% |
| ☐ Tracheostomy / Airway Risk / Difficult Intubation | Do you need additional help in an airway emergency? Needs review by local anaesthetics & ENT teams. Consider d/w NWTS early | |
| ☐ Invasive/Non-invasive ventilation/high flow | Check oxygen requirement on additional respiratory support. Remember High Flow/BiPAP & CPAP score max 4 on oxygen delivery | |
| ☐ Neutropenic/immunocompromised | Sepsis recognition & escalation has a lower threshold | |
| ☐ <40 weeks corrected gestational age | Sepsis recognition & escalation has a lower threshold (beware hypothermia) | |
| ☐ Neurological condition (ie meningitis, seizures) | Remember: check pupil response if anything other than ALERT on AVPU | |
| ☐ Neurodiversity or Learning Disability | Be aware of the range of responses to pain & physiological changes | |

| NPEWS ESCALATION LEVEL | ACTIONS | MEDICAL REVIEW | OBSERVATIONS / PLAN |
|---|---|---|---|
| **E0 – no concerns**<br>**Score = 0** | None | Not required | Continue current observations |
| **E1 – Increased monitoring**<br>**Score = 1- 4** | Inform Nurse-in-Charge<br>Consider medical review (ST3+ or equivalent)<br>Ensure feedback to parents | As required<br>Discuss with Nurse-in-Charge whether medical review required | Reassess within 60 mins & document ongoing plan |
| **E2 – Needs clinical review (within 30 mins)**<br>**Score = 5-8** | Review by Nurse-in-Charge<br>Ensure feedback to parents | Within 30 mins<br>Review by ST3+ or equivalent<br>Discuss stabilisation plan with consultant | Reassess within 30 mins & document ongoing plan<br>Continuous $SpO_2$ monitoring |
| **E3 – Needs rapid review (within 15 mins)**<br>**Score = 9-12** | Immediate review by Nurse-in-charge<br>Discuss medical plan with consultant<br>Senior feedback to parents | Within 15 mins<br>Alert to ST3+ or equivalent<br>Stabilisation plan to be agreed after review by consultant<br>Consider NWTS referral after consultant review | Reassess every 30 mins<br>Continuous monitoring $SpO_2$, RR, & ECG<br>Record full GCS if change in AVPU |
| **E4 – Needs emergency review (immediate)**<br>**Score > 12** | Immediate review by Nurse-in-Charge<br>Consider immediate 2222 call for immediate emergency medical response<br>Inform paeds consultant<br>Senior feedback to parents | Immediate<br>Alert to ST3+ or equivalent<br>Consultant review ASAP<br>Anaesthetic review<br>Consider NWTS referral after appropriate initial interventions | Reassess every 15 mins<br>Continuous $SpO_2$, ECG, & RR<br>Record full GCS if change in AVPU |

NB Escalation levels can also be selected and triggered if parent or carer expresses concern that their child needs increased monitoring +/- clinical review despite PEWS, OR parent or nursing gut instinct irrespective of score.

**Medical Plan for Stabilisation:**

Structured plan must be documented including:

1. Specific actions to be taken
2. Expected outcome
3. Outcome deadline / in timeframe
4. Escalation if outcome not met by deadline / in timeframe

**Emergency Drug Guide (wt based) via NWTS website home page** - for intubation drugs / sedation regime / inotropes…..
***https://www.nwts.nhs.uk/emergency-drug-guides***

**GUIDELINES FOR < 16 YEARS:** ***www.nwts.nhs.uk/clinicalguidelines***

**STOPP tool =** Safe Transfer of Paediatric Patients which includes risk assessment prior to transfer, and checklists
NWTS LocSIPPS includes sizes of ETT, suction, NGT, CVL & arterial lines and checklist for paediatric intubation
**Guidelines include:** intubation and difficult airway, sepsis, shock, insertion of intraosseous needle, collapsed neonate or infant, management of under 16 years outside PCC level 3 unit, and transfer

**EDUCATION:** ***www.nwts.nhs.uk/education-website***
Includes recordings of NWTS education eg time critical transfers, sepsis, airway management etc
Login details for NWTS education site are available from your nursing, AHP and medical paediatric critical care operational delivery network links
OR via email: info@nwts.nhs.uk

**CONTACT NUMBERS:**

**NWTS** (North-West (England) & North Wales Paediatric Transport Service): **Referrals 08000 84 83 82**
General enquiries: 01925 853 550
Regional Paediatric Intensive Care Unit Alder Hey Childrens Hospital: 0151 252 5241
Regional Paediatric Intensive Care Unit Royal Manchester Childrens Hospital: 0161 701 8000

**FOR DRUG DOSES:**

**British National Formulary for Children**

**Emergency Drug Guide via https://www.nwts.nhs.uk/emergency-drug-guides**

**Guideline authors: version 3**
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Nicola Longden, clinical specialist nurse, NWTS

**Consulted parties:**
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North-West (England) & North Wales Paediatric Transport Service (NWTS)
North-West (England) and North Wales Paediatric Critical Care Operational Delivery Network
PICU, Royal Manchester Children's Hospital
PICU, Alder Hey Children's Hospital

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For the most up to date version of this guideline please visit PCC / SiC / LTV ODN
https://northwestchildrensodnhub.nhs.uk/ or
NWTS website: https://www.nwts.nhs.uk/clinicalguidelines/regionalguidelines-a-z

## Ratification Process