

[HOSPITAL / HEALTH AUTHORITY NAME]

# SEIZURES AND STATUS EPILEPTICUS PATHWAY

## Protocol 19: Rapid Recognition, Time-Critical Seizure Termination, Cause Identification, EEG Escalation, and Safe Disposition

DRAFT FOR EMERGENCY MEDICINE, INTERNAL MEDICINE, NEUROLOGY, ANAESTHESIA, CRITICAL CARE, PAEDIATRICS, OBSTETRICS, PHARMACY, LABORATORY, RADIOLOGY, EEG / NEUROPHYSIOLOGY, NURSING, EMS, TRANSFER, AND CLINICAL-GOVERNANCE REVIEW

**IMMEDIATE SAFETY RULE:** Any convulsive seizure lasting 5 minutes or more, or recurrent seizures without recovery to the patient's usual neurological baseline, is status epilepticus and requires immediate treatment. Start the seizure clock, protect the patient, support airway and breathing, check glucose, give a full first-line benzodiazepine dose, and prepare second-line treatment in parallel. Do not wait for IV access, laboratory results, CT, or specialist arrival.

**STATUS:** This is a draft clinical-governance document. Exact medicines, concentrations, routes, infusion rates, monitoring requirements, paediatric weight bands, pregnancy precautions, antidotes, airway and anaesthetic regimens, EEG access, imaging and lumbar-puncture pathways, transfer destinations, and discharge restrictions must be approved locally before implementation. Staff must verify every medicine against the locally approved formulary and product information.

Document control	Details
Document owner	Emergency Department / Medical Services Directorate / Nursing Services / Clinical Governance
Clinical leads	Emergency Medicine; Internal Medicine; Neurology; Anaesthesia / Critical Care; Paediatrics
Supporting departments	Obstetrics; Pharmacy; Laboratory; Radiology; EEG / Neurophysiology; Toxicology / Poison Information; EMS; Patient Transport / Transfer Coordination
Applies to	All clinical and support staff involved in recognition, first aid, triage, stabilization, medication administration, investigation, monitoring, consultation, transfer, admission, discharge, and follow-up of patients with seizures
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Approved by	[Hospital / Health Authority approval body]
Related protocols	Protocols 1-18; resuscitation and airway management; altered mental status; stroke/TIA; acute headache/meningitis; trauma/head injury; diabetic and electrolyte emergencies; poisoning/withdrawal; obstetric emergencies; paediatric emergency assessment; procedural sedation; transfer; capacity/refusal

## 1. Purpose

To provide a standardized, time-critical, age-inclusive, and auditable emergency-department pathway for patients with an active seizure, prolonged seizure, recurrent or cluster seizures, convulsive status epilepticus, suspected non-convulsive status epilepticus, a first suspected seizure, or a breakthrough seizure. The pathway begins at first clinical contact and continues through seizure termination, stabilization, cause identification, reassessment, EEG and imaging decisions, consultation, transfer, admission, discharge, and follow-up.

The protocol aims to reduce avoidable brain injury, hypoxia, aspiration, trauma, metabolic harm, medication error, delayed second-line treatment, unrecognized ongoing electrographic seizures, unnecessary intubation or repeated sedation, missed eclampsia or toxicological causes, unsafe discharge, and fragmented responsibility during transfer.

## 2. Scope

This protocol applies to adults, adolescents, and children presenting from the community, arriving by EMS, walking into the department after a resolved event, deteriorating in the emergency department or hospital, or being transferred from another facility.

It includes epileptic seizures of all known or uncertain causes, convulsive and non-convulsive status epilepticus, first seizures, breakthrough seizures, cluster seizures, febrile seizures, pregnancy-associated seizures, and seizure-like events where the diagnosis is uncertain.

It supplements, but does not replace, advanced airway, cardiac arrest, trauma/head injury, stroke, meningitis/encephalitis, toxicology, alcohol-withdrawal, diabetic, electrolyte, obstetric/eclampsia, neonatal, and paediatric pathways. Neonates and patients requiring continuous anaesthetic infusions require immediate specialist and critical-care involvement.

### 3. Core policy statements

- Every seizure shall be timed from the earliest reliable onset. If onset is unknown and the patient is actively convulsing at first contact, treat as status epilepticus.
- A convulsive seizure lasting 5 minutes or more, or two or more seizures without return to the usual neurological baseline, shall be treated immediately as status epilepticus.
- Triage, seizure first aid, ABC assessment, glucose testing, monitoring, first-line medication, IV/IO access, second-line preparation, and cause assessment shall occur in parallel rather than sequentially.
- No object shall be placed in the mouth. Staff shall not forcibly restrain convulsive movements. Protect the head, remove hazards, loosen restrictive clothing, preserve privacy, and place the patient laterally when feasible and safe.
- An adequate benzodiazepine dose shall be given promptly. Fear of respiratory depression shall not result in dangerous under-dosing; airway and ventilation support must be ready. Untreated status epilepticus also causes respiratory compromise.
- No more than two adequate benzodiazepine doses, including verified prehospital or home rescue doses, should normally be given before moving to an approved second-line antiseizure medicine. Repeated small doses shall not replace a complete regimen.
- Second-line treatment shall be prepared while the first benzodiazepine is being administered and started promptly when seizures persist after two adequate doses or recur without recovery.
- Levetiracetam, fosphenytoin/phenytoin, or sodium valproate are accepted second-line options when clinically appropriate and locally approved. Selection shall consider pregnancy, seizure type, cardiac status, hepatic or renal disease, drug interactions, toxins, and availability.
- Persistent unresponsiveness, unexplained agitation, subtle motor activity, gaze deviation, nystagmus, aphasia, or failure to recover after convulsions shall trigger concern for ongoing non-convulsive status epilepticus and urgent EEG or transfer for EEG.
- Refractory status epilepticus requires immediate senior, anaesthesia/critical-care, and neurology involvement; airway control, continuous EEG, and continuous-infusion anaesthetic therapy shall be arranged without avoidable delay.
- Diagnostic testing shall not delay seizure treatment. Hypoglycaemia, eclampsia, severe electrolyte disturbance, CNS infection, stroke/haemorrhage, poisoning, withdrawal, trauma, and medication non-adherence shall be actively sought and treated concurrently.
- A pregnancy or postpartum patient with a new seizure shall be treated as possible eclampsia while alternative intracranial, metabolic, infectious, and epileptic causes are assessed. Magnesium sulfate is the first-line eclampsia treatment under the obstetric pathway.
- A child shall be weighed or treated using an approved emergency weight estimate. All calculations and maximum doses require an independent double-check.
- Dissociative or functional seizures shall be considered when positive clinical features support the diagnosis, but uncertainty must not delay initial treatment of a genuinely prolonged convulsive event. Once the diagnosis is established, avoid repeated harmful escalation and communicate respectfully.
- No patient shall be discharged before returning to a safe neurological and functional baseline, completing a risk-based assessment, receiving an explicit follow-up and pending-results plan, and having safe supervision, transport, and written seizure precautions.
- Every decision to withhold or stop escalation, intubation, EEG transfer, imaging, lumbar puncture, admission, or antiseizure treatment shall include a documented clinical reason and accountable decision-maker.

### 4. Definitions

Term	Operational definition
Seizure	A transient occurrence of signs or symptoms due to abnormal excessive or synchronous neuronal activity. Motor activity may be generalized or focal, and seizures may occur without visible convulsions.
Convulsive status epilepticus	Continuous convulsive seizure activity for 5 minutes or more, or recurrent convulsive seizures without recovery to the usual neurological baseline. Treat at 5 minutes; do not wait for older 30-minute definitions.
Non-convulsive status epilepticus	Ongoing electrographic seizure activity producing altered consciousness, behaviour, cognition, language, or subtle motor signs without prominent generalized convulsions. EEG is normally required for confirmation.

Term	Operational definition
Refractory status epilepticus	Status epilepticus continuing despite an adequate benzodiazepine regimen and one appropriately selected and dosed second-line antiseizure medicine.
Super-refractory status epilepticus	Status epilepticus continuing or recurring 24 hours or more after the start of anaesthetic therapy, including recurrence during reduction or withdrawal.
Cluster or repeated seizures	Typically three or more self-terminating seizures within 24 hours, or a clinically important increase over the person's usual pattern. Treat as a medical emergency when recovery is incomplete, events continue, or an individual plan directs treatment.
Prolonged seizure	A seizure lasting more than 2 minutes longer than that person's usual seizure, or 5 minutes or more when the usual duration is unknown.
Acute symptomatic / provoked seizure	A seizure occurring in close temporal association with an acute systemic, metabolic, toxic, infectious, vascular, or structural insult.
Unprovoked seizure	A seizure without an immediate reversible provoking factor. A first unprovoked seizure does not automatically establish epilepsy or mandate long-term treatment.
Postictal state	The period of neurological recovery after a seizure, potentially including confusion, somnolence, aphasia, weakness, headache, agitation, or behavioural change. Persistent or atypical findings require reassessment.
Dissociative / functional seizure	A seizure-like episode not caused by epileptic electrical activity. Diagnosis should use positive clinical and specialist evidence rather than exclusion or pejorative labelling.
Febrile seizure	A seizure in a child associated with fever and without evidence of CNS infection or another defined acute neurological cause. Local age definitions and paediatric criteria shall be used.

## 5. Roles and accountability

Role	Minimum accountability
Triage / receiving nurse	Recognize active or recent seizure; start the seizure clock; assign immediate acuity when indicated; activate the pathway; obtain prehospital/home treatment details; begin first aid, ABC observations, glucose, and monitoring.
ED nurse	Protect the patient; establish monitoring and IV/IO access; administer approved medicines; document exact doses, routes, and times; perform serial neurological observations; anticipate respiratory support; prepare second-line therapy and transfer equipment.
ED clinician / team leader	Confirm status criteria; lead parallel stabilization and treatment; verify prior doses; select second-line therapy; identify and treat the cause; order EEG/imaging/LP; obtain specialist help; determine airway, admission, transfer, and discharge plans.
Neurology / epilepsy clinician	Advise on diagnosis, medication selection, non-convulsive status, EEG interpretation, refractory treatment, maintenance therapy, first-seizure follow-up, and individual emergency plans.
Anaesthesia / critical care	Prepare and manage airway/ventilation; treat refractory status using approved anaesthetic regimens; support haemodynamic management, continuous EEG, ICU admission, and high-risk transfer.
Paediatrics	Provide weight-based assessment, febrile-seizure evaluation, age-specific differential diagnosis, paediatric medication and airway support, safeguarding review, and disposition.
Obstetrics	Lead possible eclampsia management, magnesium therapy, severe-hypertension treatment, maternal stabilization, fetal assessment after stabilization, and delivery planning.

Role	Minimum accountability
Pharmacy	Maintain rescue and second-line medicine readiness; support dose, concentration, infusion-rate, compatibility, interaction, pregnancy, hepatic/renal, and antidote checks without delaying treatment.
Laboratory / radiology / EEG	Prioritize time-critical samples, imaging, and EEG; communicate critical findings directly; maintain a downtime or transfer pathway when services are unavailable.
EMS / transfer team	Continue seizure timing and monitoring; communicate all prehospital doses and response; match transport personnel and equipment to airway, recurrence, and infusion risks; provide direct handover.
All team members	Use closed-loop communication, independent medicine checks, trauma and dignity safeguards, and explicit ownership of the next treatment and reassessment time.

## 6. Pathway activation and triage

Activate this pathway for active convulsions; seizure lasting 5 minutes or more; recurrent seizures without recovery; cluster seizures; persistent reduced consciousness after a seizure; focal motor activity, gaze deviation, or unexplained episodic behaviour; a first suspected seizure; pregnancy/postpartum seizure; significant injury; or a known epilepsy patient with a clinically important change from baseline.

Category	Operational criteria
RED / immediate resuscitation	Active seizure at 5 minutes or unknown duration; recurrent seizures without baseline recovery; airway/ventilation compromise; cyanosis; shock; severe hypoglycaemia; eclampsia; major trauma; suspected CNS infection with instability; toxin-related seizure; refractory or non-convulsive status; or rapidly deteriorating consciousness.
ORANGE / very urgent	Seizure has stopped but the patient has persistent marked confusion, focal deficit, significant injury, fever/meningism, severe headache, anticoagulant use, pregnancy/postpartum status, repeated seizures, first seizure with high-risk features, or clinically important metabolic abnormality.
YELLOW / urgent	Single self-terminating seizure with complete physiological stability and improving recovery, but requiring prompt clinician assessment, ECG, risk-based investigations, disposition planning, and specialist referral.
GREEN / routine	Not appropriate for a first suspected seizure, unresolved postictal state, recent cluster, or clinically important change from the patient's known pattern. Lower acuity requires clinician confirmation of low risk and safe baseline recovery.

**DO NOT MISS:** Generalized convulsions may stop while electrographic seizures continue. Failure to wake, persistent aphasia or focal weakness, unexplained agitation, subtle facial or limb twitching, eye deviation, or fluctuating consciousness requires urgent reassessment and EEG consideration.

## 7. Seizure first aid and the first 5 minutes

Action	Required practice
Start the clock	Record witnessed onset, time first found convulsing, each medication time, cessation of visible convulsions, and return to baseline. Assign one person to keep and announce time.
Protect	Clear hazards; lower to a safe surface if possible; protect the head; loosen tight clothing; preserve privacy; remove spectacles; do not restrain limbs and do not place anything in the mouth.
Position and airway	Use lateral positioning when feasible; suction secretions; use jaw support and airway adjuncts as indicated; provide bag-mask ventilation for apnoea or inadequate ventilation; apply cervical-spine precautions when trauma is possible.

Action	Required practice
Breathing	Measure oxygen saturation and respiratory effort. Give oxygen for hypoxaemia or anticipated airway intervention; do not delay ventilation support while waiting for a reading.
Circulation	Attach cardiac and BP monitoring; obtain IV access, or IO access when urgent treatment cannot otherwise be delivered; treat shock and dangerous arrhythmia.
Disability	Check bedside glucose immediately, but do not delay a benzodiazepine in an actively convulsing patient. Assess pupils, focality, trauma, temperature, pregnancy/postpartum status, and likely toxin exposure.
Prepare	Bring airway equipment, suction, bag-mask device, first-line rescue medicine, second-line antiseizure medicine, glucose treatment, and weight-based dosing chart to the bedside.

## 8. Time-based treatment algorithm

Seizure time / phase	Required actions
<b>0-5 minutes:</b> stabilization	First aid; ABC; oxygen/ventilation as needed; glucose; monitoring; IV/IO; brief neurological and trauma assessment; identify prior rescue doses; call senior help; prepare benzodiazepine and second-line medicine.
<b>At 5 minutes:</b> initial therapy	Give one full approved benzodiazepine dose immediately. Use IM, intranasal, or buccal treatment when IV access is not immediately available. Continue airway support and treat hypoglycaemia or another immediately reversible cause.
3-5 minutes after first dose	If seizure continues, give one repeat adequate benzodiazepine dose while second-line therapy is being prepared. Count verified adequate home/EMS doses toward the total.
By 10-20 minutes	If seizure persists after two adequate benzodiazepine doses or recurs without recovery, administer one full second-line antiseizure medicine load. Do not continue serial small benzodiazepine doses.
By 20-40 minutes	Reassess for clinical cessation and command following. If ongoing, confirm the second-line dose was complete; call neurology and anaesthesia/critical care; prepare refractory-status treatment, intubation, continuous EEG, ICU admission, and transfer if needed.
40 minutes and beyond	Treat as refractory status epilepticus. Use an approved continuous-infusion anaesthetic or specialist-directed alternative with continuous EEG. Continue investigation and cause-directed treatment in parallel.
After visible cessation	Continue close monitoring. If the patient does not promptly move toward the expected baseline, presume possible ongoing non-convulsive seizure until evaluated. Arrange urgent EEG; do not assume all unresponsiveness is postictal or medication-related.

## 9. Immediate stabilization: ABCDE

### 9.1 Airway and breathing

- Call an airway-skilled clinician early for prolonged seizure, repeated benzodiazepines, apnoea, hypoventilation, aspiration, severe hypoxaemia, major trauma, pregnancy/eclampsia, or anticipated refractory treatment.
- Use basic airway manoeuvres, suction, adjuncts, lateral positioning, and bag-mask ventilation as required. End-tidal carbon dioxide monitoring is recommended after intubation and useful during high-risk sedation where available.
- Intubation is based on ventilation, oxygenation, airway protection, aspiration, refractory status, and anticipated course; a numerical GCS alone does not determine the need.
- Neuromuscular blockade stops visible movement but does not stop cerebral seizure activity. Never paralyse without adequate anaesthesia, antiseizure treatment, and an urgent EEG plan.

### 9.2 Circulation

- Attach continuous ECG, cycling BP, and pulse oximetry. Obtain at least one reliable IV line; establish a second line or IO access for ongoing status or instability.

- Treat hypotension, dysrhythmia, severe hypertension associated with eclampsia or another hypertensive emergency, and electrolyte-related conduction disturbance using the relevant pathway.
- After prolonged convulsions, assess for dehydration, lactic acidosis, hyperthermia, rhabdomyolysis, myocardial stress, and aspiration; avoid unnecessary large fluid volumes in eclampsia, heart failure, or renal failure.

### 9.3 Disability, glucose, and temperature

- Check glucose immediately. Treat clinically significant hypoglycaemia with an approved age- and weight-appropriate dextrose preparation; use glucagon when vascular access is unavailable and it is appropriate. Do not delay glucose for thiamine.
- Give thiamine promptly when severe malnutrition, chronic alcohol dependence, or Wernicke risk is suspected, but never postpone dextrose in hypoglycaemia.
- Document pupils, gaze, focal motor signs, GCS components or age-appropriate consciousness scale, and neurological trend. Todd paralysis may occur, but persistent focal deficit requires stroke or intracranial-lesion assessment.
- Measure core temperature. Treat hyperthermia and investigate infection, toxic syndromes, heat illness, or medication-related causes.

### 9.4 Exposure, trauma, and dignity

- Examine for head injury, tongue or oral injury, shoulder dislocation, fractures, burns, incontinence, pregnancy, injection marks, rash, meningism, and signs of poisoning or withdrawal.
- Use spinal precautions when the mechanism, examination, or persistent unconsciousness warrants them. Avoid routine immobilization when no trauma risk exists.
- Remove wet or restrictive clothing, prevent hypothermia, protect privacy, and use calm, non-stigmatizing communication during recovery.

## 10. First-line benzodiazepine treatment

Give one of the following locally approved regimens. Use the fastest reliable route. A full dose is safer and more effective than repeated under-dosing. Verify medicine concentration, route, cumulative prior doses, and maximum dose.

Route / medicine	Typical emergency regimen for local validation	Key safety points
IV lorazepam	0.1 mg/kg IV, maximum 4 mg per dose, given over about 2 minutes; may repeat once after 3-5 minutes if seizure continues.	Preferred when reliable IV access and resuscitation facilities are immediately available. Prepare ventilation support; count all adequate prior doses.
IM midazolam	<b>Adult or patient over 40 kg:</b> 10 mg IM once. <b>Weight 13-40 kg:</b> 5 mg IM once, where included in the local algorithm.	Do not delay treatment to obtain IV access. Use a sufficiently large muscle and approved concentration.
Intranasal midazolam	0.2 mg/kg, maximum 10 mg, particularly for children or when IV access is unavailable.	Split between nostrils when volume requires; use an approved atomizer and concentration. Buccal midazolam may be used according to an individual or local age-band plan.
IV diazepam	0.15-0.2 mg/kg IV, maximum 10 mg per dose; may repeat once according to the approved algorithm.	Shorter redistribution than lorazepam; follow with a longer-acting antiseizure medicine when status has occurred.
Rectal diazepam	0.2-0.5 mg/kg according to age/product, maximum 20 mg, when other rapid routes are unavailable and the local plan authorizes use.	Preserve dignity; use product-specific age/weight instructions and record the route clearly.

**MEDICATION SAFETY:** Normally give no more than two adequate benzodiazepine doses before second-line treatment. Verify all home, EMS, referral-facility, and ED doses. A dose is not “missing” merely because it was given by a different route.

## 11. Urgent control therapy: second-line antiseizure medicine

If convulsive status continues after two adequate benzodiazepine doses, give one complete second-line load promptly. ESETT found similar overall effectiveness among levetiracetam, fosphenytoin, and valproate; selection should therefore be individualized. Do not reduce the loading dose solely because maintenance dosing will later require renal adjustment unless a specialist directs otherwise.

Medicine	Typical loading regimen for local validation	Selection and precautions
Levetiracetam	60 mg/kg IV, maximum 4,500 mg; administer using the approved infusion time, commonly over 10-15 minutes.	Few acute interactions and no mandatory cardiac monitoring beyond standard status care. Often preferred when pregnancy, cardiac instability, or uncertain interactions make alternatives less suitable. Adjust subsequent maintenance for renal function.



Medicine	Typical loading regimen for local validation	Selection and precautions
Fosphenytoin	20 mg phenytoin equivalents (PE)/kg IV, maximum 1,500 mg PE; maximum adult rate 150 mg PE/min.	Prescribe and document in PE units. Continuous ECG and BP monitoring. Use caution with hypotension, bradycardia, heart block, and sodium-channel blocker toxicity.
Phenytoin	20 mg/kg IV, maximum 1,500 mg; maximum adult rate 50 mg/min and slower when clinically indicated.	Use only with approved compatible diluent/line; continuous ECG and BP. Tissue injury and infusion reactions are important risks. Fosphenytoin is preferred where available.
Sodium valproate	40 mg/kg IV, maximum 3,000 mg, commonly over 10 minutes.	Avoid when a suitable alternative exists in pregnancy or possible pregnancy; avoid or obtain specialist advice in severe liver disease, known mitochondrial disorder, urea-cycle disorder, pancreatitis, or major thrombocytopenia.
Phenobarbital	15-20 mg/kg IV, maximum usually 1,000 mg, under expert guidance when preferred agents are unavailable or as later-line therapy.	High risk of respiratory depression, hypotension, and prolonged sedation, especially after benzodiazepines. Requires full resuscitation capability and careful infusion-rate monitoring.

- Do not use phenytoin or fosphenytoin reflexively for seizures caused by tricyclic or other sodium-channel blocker toxicity.
- Valproate may be particularly useful for generalized or myoclonic seizure patterns but requires pregnancy and hepatic/mitochondrial screening.
- When the seizure stops after benzodiazepine treatment but status criteria were met, give a longer-acting antiseizure medicine when indicated to prevent recurrence, guided by cause, known epilepsy plan, and specialist advice.
- If a second-line medicine was partially administered before transfer or arrival, confirm the exact amount before completing or changing treatment.

## 12. Refractory and super-refractory status epilepticus

Status continuing after an adequate benzodiazepine regimen and a complete second-line load is refractory. Do not wait for another prolonged period of visible convulsions before escalating.

- Call neurology, anaesthesia, critical care, and the receiving neurocritical-care centre immediately. Start transfer arrangements early when continuous EEG or ICU capability is unavailable locally.
- Prepare rapid-sequence intubation with haemodynamic and aspiration precautions. Continue the selected second-line antiseizure medicine and correct the underlying cause.
- Use a locally approved continuous-infusion anaesthetic regimen, such as midazolam or propofol in adults, titrated by experienced critical-care clinicians to clinical and EEG seizure control. Paediatric regimens require paediatric critical-care guidance.
- Continuous EEG is essential after paralysis and strongly recommended throughout anaesthetic treatment. If unavailable, arrange urgent transfer and use the safest specialist-directed interim plan.
- Monitor ventilation, BP, temperature, glucose, electrolytes, CK, renal function, acid-base status, aspiration, rhabdomyolysis, pressure injury, thrombosis, infection, and anaesthetic-specific complications.
- Super-refractory status requires tertiary neurocritical-care management and investigation for autoimmune encephalitis, occult infection, toxic/metabolic disease, structural lesions, genetic/metabolic disorders, and other uncommon causes.

**CRITICAL WARNING:** Persistent motor activity after a complete second-line load is an airway, critical-care, and EEG emergency. Repeating small benzodiazepine doses without a definitive escalation plan creates delay and cumulative respiratory harm.

## 13. Has the seizure stopped? Recovery and non-convulsive status

Visible convulsions ending does not alone prove that status epilepticus has terminated. Termination is supported by return toward the patient's usual responsiveness or EEG-confirmed seizure cessation.

Finding	Required response
Rapid, progressive recovery toward usual baseline	Continue close airway and neurological monitoring; complete cause assessment; prevent recurrence; reassess after each medication and before disposition.
No meaningful recovery or worsening	Treat as possible ongoing non-convulsive status, intracranial emergency, toxic/metabolic coma, infection, or medication/respiratory complication. Obtain urgent EEG and senior review.
Persistent focal deficit or aphasia	Activate stroke/intracranial pathway. Todd paralysis is a diagnosis of exclusion when deficits are prolonged, severe, new, or accompanied by vascular risk.

Finding	Required response
Subtle twitching, eye deviation, nystagmus, automatisms, fluctuating response	Request urgent EEG; document video if consent and policy allow; continue seizure precautions and specialist-directed treatment.
Paralysed or deeply sedated patient	Clinical observation cannot exclude seizures. Continuous EEG is required as soon as possible.
Agitation or combativeness	Protect staff and patient; treat hypoxia, pain, urinary retention, hyperthermia, hypoglycaemia, intoxication, and delirium. Use the least restrictive intervention and avoid assuming behaviour is psychiatric.

## 14. Focused history and collateral information

- Exact onset, duration, sequence, focal onset, eye/head deviation, colour change, breathing, injuries, incontinence, tongue injury, recovery, and whether events repeated before baseline returned.
- Obtain eyewitness accounts and available phone video. Ask what happened immediately before the event, including posture, prodrome, chest pain, palpitations, exertion, sleep, fever, headache, trauma, pregnancy symptoms, and substance exposure.
- Known epilepsy type, usual seizure semiology and duration, baseline neurological status, emergency plan, recent frequency, prior status/intubation, current neurologist, and rescue medicine.
- All medicines and recent changes: antiseizure medicine names, doses, last doses, adherence, vomiting, drug levels if known, interacting medicines, recent withdrawal, and access barriers.
- Alcohol, benzodiazepines, recreational drugs, prescribed stimulants, antidepressants, isoniazid, theophylline, tramadol, bupropion, antihistamines, pesticides, carbon monoxide, and possible overdose.
- Fever, infection, immunosuppression, cancer, HIV risk, recent travel, headache, neck stiffness, rash, stroke symptoms, renal/liver disease, diabetes, electrolyte loss, and endocrine disease.
- Pregnancy possibility, gestational age, postpartum interval, hypertension, headache, visual symptoms, epigastric/right-upper-quadrant pain, oedema, and obstetric history.
- Family history of epilepsy or sudden death, developmental history in children, sleep deprivation, flashing-light exposure where relevant, and recent psychological stress without prematurely assuming a functional cause.

## 15. Focused examination

Domain	Minimum assessment after immediate threats are controlled
Neurological	GCS components or age-appropriate scale; pupils; gaze; speech/language; face and limb symmetry; tone; reflexes where useful; sensation; coordination and gait only when safe; meningism; serial trend.
Airway / respiratory	Protective reflexes, secretions, aspiration, tongue injury, ventilation, oxygenation, chest examination, and post-intubation tube confirmation.
Cardiovascular	Pulse, BP, perfusion, rhythm, murmurs, heart failure, signs of stimulant or tricyclic toxicity, and orthostatic assessment only after full recovery when appropriate.
Trauma / musculoskeletal	Scalp and facial injury, cervical spine, shoulder dislocation, fractures, burns, compartment risk, and safeguarding indicators.
Infection / systemic	Temperature, rash, meningism, ENT/chest/urinary source, sepsis, dehydration, jaundice, renal failure, and immunocompromise.
Toxicological	Pupils, skin moisture, temperature, bowel sounds, clonus/rigidity, secretions, odour, injection marks, pill fragments, and toxidrome.
Maternal	Gestational/postpartum status; severe hypertension; oedema; headache/visual symptoms; epigastric pain; bleeding; fetal/obstetric assessment after maternal stabilization.
Paediatric	Weight, developmental baseline, fontanelle in infants, hydration, fever source, rash, signs of abuse, metabolic disease, and age-specific neurological examination.

## 16. Investigations

### 16.1 Immediate bedside investigations

- Bedside glucose for all unexplained or active seizures.
- Continuous ECG rhythm, oxygen saturation, and BP; 12-lead ECG after stabilization, especially after a first suspected seizure or when syncope/toxicity is possible.



- Pregnancy test in patients of childbearing potential when results can affect treatment, without delaying emergency seizure control.
- Point-of-care blood gas and electrolytes where available for prolonged seizure, respiratory compromise, severe metabolic illness, or toxin exposure.
- Weight or approved emergency estimate for all weight-based therapy.

## 16.2 Laboratory testing

Test group	Indications / notes
Core for status or persistent alteration	CBC; glucose; sodium, potassium, bicarbonate, calcium, magnesium; renal function; liver tests; venous/arterial blood gas and lactate as clinically indicated. Lactate may rise transiently after a convulsion; interpret the trend and context.
Antiseizure medicines	Obtain levels for medicines with clinically useful assays, particularly when non-adherence, toxicity, altered pharmacokinetics, pregnancy, organ failure, or interaction is suspected. Do not delay treatment for a level.
Toxicology	Targeted ethanol, paracetamol, salicylate, toxic alcohol, or drug testing according to history and toxidrome. Broad urine screens have limitations and should not replace clinical assessment.
Complications	CK, urinalysis, troponin, coagulation tests, osmolality, phosphate, and renal monitoring when prolonged convulsions, hyperthermia, rhabdomyolysis, trauma, or cardiac injury is suspected.
Infection / inflammation	Cultures, inflammatory markers, malaria or regionally relevant testing, HIV/immunocompromise investigations, and CSF studies according to presentation. Start indicated antimicrobials without waiting for all results.
Metabolic / endocrine	Ketones, ammonia, cortisol, thyroid tests, or inborn-error testing only when clinically indicated. In children with unexplained recurrent or refractory seizures, involve metabolic/genetic specialists early.

Serum prolactin is not a routine ED test to distinguish epileptic from dissociative events. A normal result does not exclude an epileptic seizure and an elevated result is not diagnostic.

## 17. Neuroimaging, lumbar puncture, and EEG

### 17.1 Brain imaging

Urgent non-contrast CT is indicated when haemorrhage, stroke, trauma, mass effect, CNS infection complication, or another acute structural cause is possible. New-onset adult seizures generally require neuroimaging; emergency CT is prioritized when immediate pathology must be excluded, while MRI is more sensitive for many epileptogenic lesions and may follow after stabilization.

- Obtain urgent imaging for persistent altered consciousness or focal deficit, first seizure with concerning features, head trauma, anticoagulant use, severe headache, fever or immunocompromise, malignancy, pregnancy/postpartum neurological syndrome, age extremes, focal onset, status epilepticus, or a major change in known seizure pattern.
- Known epilepsy with typical brief seizure, complete baseline recovery, normal examination, and no new risk factor does not automatically require repeat emergency CT. Document the reason when imaging is deferred.
- Use stroke vascular imaging when focal deficit, thunderclap headache, suspected venous thrombosis, dissection, reversible cerebral vasoconstriction syndrome, or other vascular pathology is possible.
- Pregnancy is not a reason to delay essential maternal brain imaging. Use radiology and obstetric guidance for modality and contrast decisions.

### 17.2 Lumbar puncture

- Perform lumbar puncture when CNS infection, inflammatory disease, subarachnoid haemorrhage not otherwise excluded, or another CSF diagnosis is suspected and the procedure is safe.
- Image first and obtain senior review when there is focal deficit, signs of raised intracranial pressure, markedly impaired consciousness, immunocompromise, new seizure in a suspected meningitis presentation, or another contraindication concern.
- Do not delay indicated empiric antibiotics, antivirals, or other emergency treatment while waiting for CT, lumbar puncture, or transfer.

### 17.3 EEG

- Request urgent EEG for failure to return toward baseline, suspected non-convulsive status, unexplained coma or fluctuation, refractory status, persistent focal symptoms, subtle motor phenomena, or after neuromuscular blockade.
- Continuous EEG is required for patients receiving continuous-infusion anaesthetic therapy and strongly recommended in refractory status.

- When EEG is unavailable, discuss with neurology, use a rapid-response limited montage if locally available, and transfer when the result will change urgent management. Do not allow a normal short EEG to overrule strong clinical concern without specialist review.

## 18. Cause-directed emergency treatment

Cause / clue	Immediate response
Hypoglycaemia	Give age- and weight-appropriate dextrose immediately; use glucagon if suitable and no access; identify insulin, oral hypoglycaemic, sepsis, liver failure, alcohol, adrenal, or nutritional cause; monitor for recurrence.
Severe sodium, calcium, or magnesium disturbance	Activate the relevant electrolyte-emergency pathway and correct in a controlled manner. Symptomatic severe hyponatraemia requires emergency hypertonic-saline treatment under an approved protocol.
CNS infection / encephalitis	Obtain cultures and CSF when safe, but start indicated empiric antibiotics and antiviral therapy promptly. Manage sepsis, raised intracranial pressure, and isolation requirements.
Stroke, haemorrhage, venous thrombosis, or structural lesion	Activate Protocol 18 and neurosurgical/stroke pathways; obtain urgent imaging; manage BP, anticoagulant reversal, reperfusion, mass effect, or transfer as indicated.
Head injury	Maintain trauma priorities, cervical-spine safety, urgent CT, bleeding reversal, and neurosurgical consultation. A seizure may be the first sign of significant intracranial injury.
Alcohol or sedative withdrawal	Use an approved symptom-triggered or escalating benzodiazepine regimen, thiamine, glucose/electrolyte correction, and monitored admission when severe. A single dose is often insufficient for severe withdrawal.
Isoniazid toxicity	Give pyridoxine after benzodiazepine treatment: known ingestion, gram-for-gram up to the locally approved maximum; unknown amount, 70 mg/kg IV, maximum 5 g. Contact poison information urgently.
Tricyclic / sodium-channel blocker toxicity	Treat seizures with benzodiazepines and QRS widening/hypotension with sodium bicarbonate under the toxicology pathway. Avoid phenytoin/fosphenytoin unless a toxicology specialist specifically directs.
Stimulant, theophylline, organophosphate, or other poisoning	Use aggressive benzodiazepine therapy, temperature and cardiovascular control, cause-specific antidotes, and poison-centre advice. Decontamination and enhanced elimination are substance-specific.
Medication non-adherence or low level	Identify access, vomiting, interaction, formulation, and adherence barriers. Replace or load medicines only after verifying the regimen and cumulative dose with pharmacy/neurology.
Eclampsia	Call obstetrics and anaesthesia; stabilize ABC; give magnesium sulfate using the approved obstetric regimen; treat severe hypertension; assess for intracranial mimics; plan delivery after maternal stabilization.

## 19. First suspected seizure and breakthrough seizure

### 19.1 First suspected seizure

- Confirm that the episode could be a seizure while assessing syncope, dysrhythmia, hypoglycaemia, stroke/TIA, migraine, sleep disorder, movement disorder, and dissociative events.
- Obtain detailed witness history or video, full examination, glucose and metabolic assessment, and a 12-lead ECG. Perform risk-based imaging and other investigations.
- Determine whether the seizure was acute symptomatic/provoked or apparently unprovoked. Correct reversible causes and document the uncertainty.
- Do not automatically start long-term antiseizure therapy after every first seizure. The decision depends on recurrence risk, imaging/EEG findings, neurological disease, patient priorities, and specialist advice.
- Arrange assessment by a clinician with expertise in first seizures or epilepsy within 2 weeks, sooner when risk or local pathways require it.
- Give written first-aid, safety, driving, work, bathing, swimming, and return instructions before discharge.

### 19.2 Breakthrough seizure in known epilepsy

- Compare the event with the patient's documented usual pattern. A new focal onset, prolonged duration, repeated events, injury, fever, pregnancy, persistent deficit, or incomplete recovery is not "just epilepsy."
- Check adherence, access, recent medicine or formulation changes, vomiting/diarrhoea, sleep deprivation, infection, alcohol/substances, interactions, pregnancy, organ failure, and emergency-plan use.
- Confirm the exact maintenance regimen before administering replacement doses. Avoid duplicate loading when home or prehospital doses are uncertain.

- Use the person's individualized rescue plan when available and clinically appropriate. Update or create a plan after status, prolonged, or cluster seizures when recurrence is a concern.

## 20. Special populations

### 20.1 Children and adolescents

- Use actual weight or an approved emergency estimate, age-appropriate airway equipment, and independent dose checks. Do not delay treatment while obtaining an exact scale weight in an active seizure.
- A child seizing for 5 minutes or more follows the status algorithm. Early paediatric/critical-care consultation is required for infants, refractory status, metabolic concern, CNS infection, major trauma, or failure to recover.
- A simple febrile seizure is typically generalized, brief, single in 24 hours, and followed by complete recovery in the usual age range. Evaluate the cause of fever and the child's overall appearance; routine CT, EEG, or antiseizure medication is not required solely for a well child with a clearly simple event.
- Complex or atypical febrile events - prolonged, focal, repeated, outside the usual age range, or with incomplete recovery - require senior paediatric assessment and risk-based investigation.
- Neonatal seizures, infantile spasms, and seizures in very young infants require urgent specialist pathways. Consider non-accidental injury and safeguarding when history, examination, or developmental context raises concern.

### 20.2 Pregnancy and postpartum

- Treat a new seizure after 20 weeks of pregnancy or in the postpartum period as possible eclampsia even when hypertension or proteinuria was not previously known. Activate obstetric and anaesthesia support immediately.
- Magnesium sulfate is first-line for prevention and treatment of eclamptic seizures; use the locally approved loading, recurrence, maintenance, toxicity-monitoring, and calcium-antidote regimen. Benzodiazepines remain appropriate for ongoing status or seizures not controlled by magnesium under senior guidance.
- Maternal stabilization comes first. After stabilization assess severe hypertension, HELLP features, stroke/haemorrhage, cerebral venous thrombosis, posterior reversible encephalopathy, infection, metabolic disease, and medication levels.
- Where clinically suitable, prefer an alternative to valproate in pregnancy or possible pregnancy. Do not withhold effective emergency seizure treatment when life or brain function is threatened; obtain specialist input as soon as possible.

### 20.3 Older adults, frailty, and dementia

- Older adults have a high likelihood of stroke, haemorrhage, tumour, infection, medication toxicity, organ failure, and non-convulsive status. A new seizure usually requires imaging and admission or close specialist assessment.
- Hypoactive non-convulsive status may be mistaken for delirium or dementia. Obtain collateral baseline information and use serial examination and EEG.
- Review polypharmacy, renal/hepatic dosing, anticoagulants, falls, aspiration, mobility, pressure risk, and the safety of the home environment before disposition.

### 20.4 Renal or hepatic impairment and immunocompromise

- Loading doses used to terminate status are often not reduced simply because maintenance dosing will later be adjusted; selection and subsequent dosing require pharmacy/neurology input.
- Avoid or use specialist caution with valproate in severe hepatic disease and with medicines or metabolites likely to accumulate. Consider dialysis-related causes, uraemia, transplant medicines, opportunistic infection, and malignancy.
- Immunocompromised patients require a low threshold for imaging, cultures, empiric CNS infection treatment, lumbar puncture when safe, and admission.

### 20.5 Dissociative / functional seizures

- Consider positive features such as fluctuating course, asynchronous movements, prolonged events with preserved physiology, eye closure with resistance, or documented prior video-EEG diagnosis, while recognizing that none is perfectly diagnostic in isolation.
- When active convulsive status cannot be excluded, provide initial emergency care. Once experienced review supports a dissociative event and physiology is stable, stop unnecessary escalation, remove noxious stimulation, provide calm reassurance, and protect dignity.
- Explain that the events are real and treatable. Arrange appropriate neurology and psychological/psychiatric follow-up rather than framing the event as deliberate behaviour.

## 21. Monitoring and reassessment

Clinical state	Minimum monitoring and reassessment
Active seizure / status	Continuous ECG and oxygen saturation; frequent BP; continuous observation; seizure clock; airway and ventilation; glucose response; medication timing; motor/focal signs; temperature; senior review after each treatment step.
After benzodiazepines or loading medicine	Respiratory rate and effort, oxygenation, BP/rhythm, consciousness, pupils, focal findings, recurrence, infusion reaction, and adverse effects. Keep airway equipment immediately available.

Clinical state	Minimum monitoring and reassessment
After apparent cessation	Serial neurological examination until usual baseline or a documented new baseline is reached. Record time of command following, speech recovery, mobility, oral safety, and any focal deficit.
Refractory / intubated	Continuous EEG, invasive or frequent haemodynamic monitoring, capnography, temperature, glucose, electrolytes, acid-base state, CK/renal function, aspiration, pressure areas, and anaesthetic-specific surveillance.
Observation before discharge	No recurrence during the clinically appropriate observation period; stable physiology; improving or complete recovery; safe oral intake when relevant; safe mobility; responsible supervision; follow-up and pending-result ownership confirmed.

The responsible clinician shall define and document the next reassessment time. Any recurrence, delayed recovery, new focal deficit, worsening headache, fever, hypoxia, hypotension, or behavioural change triggers immediate senior reassessment and reconsideration of EEG, imaging, infection, toxicity, or admission.

## 22. Consultation, escalation, and transfer

- Contact neurology urgently for status epilepticus, recurrent seizures without baseline recovery, suspected non-convulsive status, first seizure with high-risk features, refractory epilepsy, new focal signs, pregnancy-related medication decisions, or diagnostic uncertainty affecting disposition.
- Contact anaesthesia/critical care for airway compromise, repeated benzodiazepines with respiratory deterioration, refractory status, severe aspiration, shock, continuous anaesthetic therapy, or high-risk transfer.
- Contact paediatrics early for infants, children with status or complex febrile seizure, incomplete recovery, CNS infection, metabolic/genetic concern, or safeguarding risk.
- Contact obstetrics immediately for pregnancy or postpartum seizure, possible eclampsia, severe hypertension, or maternal-fetal risk.
- Contact poison information/toxicology for suspected ingestion, withdrawal, isoniazid, tricyclic, theophylline, stimulant, pesticide, or unclear toxidrome.
- Transfer early when continuous EEG, neurocritical care, paediatric intensive care, obstetric critical care, neurosurgery, MRI, or specialist investigation is unavailable locally. Acceptance does not end the referring team's duty to treat and monitor.
- Before departure, match escort, airway capability, oxygen, suction, monitoring, rescue medicines, infusion pumps, and transport urgency to the risk of recurrence or deterioration.

## 23. Disposition

Disposition	Indications / requirements
Critical care / resuscitation admission	Refractory or super-refractory status; intubation; continuous anaesthetic; ongoing non-convulsive status; severe respiratory, haemodynamic, toxic, metabolic, infectious, obstetric, or intracranial emergency.
Monitored ward / specialist admission	Status terminated but significant recurrence risk; cluster seizures; incomplete recovery; first seizure with structural lesion or serious provocation; focal deficit; significant injury; CNS infection concern; major medication change; unsafe social context; pregnancy/postpartum seizure; complex paediatric presentation.
Observation unit	Selected fully stabilized patients requiring serial neurological assessment, medicine replacement, short-term investigation, or confirmation of safe recovery, where explicit observation criteria and escalation capability exist.
Discharge	Only after a self-terminating event with stable physiology, return to safe baseline, no red flags requiring admission, completed or clearly assigned investigation, reliable supervision/transport, medication reconciliation, written precautions, and guaranteed follow-up.
Death / end-of-life pathway	Use the relevant protocol for catastrophic intracranial disease, refractory status with treatment limitation, expected death, organ-support decisions, family communication, documentation, and bereavement care.

## 24. Discharge information and safety

- Explain the working diagnosis, uncertainty, likely provoking factors, test results, pending results, medicines given, adverse effects to watch for, and who owns follow-up.
- Provide seizure first aid: protect from injury, time the event, place laterally when possible, do not restrain, do not put anything in the mouth, and call emergency services for a seizure lasting 5 minutes, repeated seizures without recovery, injury, breathing difficulty, pregnancy, or a first event.
- Advise no driving until cleared under applicable local law. Document that driving restrictions were discussed; do not invent a duration when jurisdictional rules are not confirmed.
- Until specialist review, avoid swimming alone, unsupervised bathing, heights, open flames, high-risk machinery, and activities where sudden loss of awareness could be fatal. Prefer showers and ensure responsible supervision appropriate to risk.
- Review regular antiseizure medicines, missed-dose instructions, rescue plan, alcohol/substance risks, sleep, illness, and medicine interactions. Do not abruptly stop antiseizure medicines.
- First suspected seizure or recurrence after remission requires urgent specialist assessment, normally within 2 weeks. Give the date, location, contact process, and return pathway rather than a vague instruction to “follow up.”

## 25. Documentation and handover

Required element	Minimum documentation
Timeline	Onset or first found seizing; each event; baseline recovery between events; all medication doses/routes/times; cessation of visible movement; return toward baseline; activation and consultation times.
Description	Witnessed semiology, focal onset, eye/head deviation, colour/breathing, injuries, incontinence, tongue injury, responsiveness, video availability, and post-event state.
Assessment	ABCDE, glucose, GCS components, pupils, focal findings, trauma, temperature, pregnancy/postpartum status, likely cause, differential diagnosis, and serial changes.
Medicines	Home/EMS/referral/ED rescue doses, second-line load, concentrations, calculated and maximum doses, double-check, infusion start/finish, response, adverse events, and maintenance plan.
Investigations	ECG, laboratory, drug levels, imaging, LP, EEG, critical results, pending tests, and accountable reviewer.
Decision-making	Reason for medicine selection, airway or no-airway decision, imaging/LP/EEG plan, admission/transfer/discharge rationale, capacity and consent, treatment limits, and specialist advice.
Handover	Current neurological state, recurrence risk, airway/oxygen needs, last and next medicine, pending actions, observation frequency, emergency plan, receiving clinician, and direct verbal handover.

## 26. Quality indicators and audit

Indicator	Suggested local measure
Seizure timing	Percentage of active-seizure cases with onset/first-observed time documented.
Timely first-line treatment	Percentage of status cases receiving an adequate benzodiazepine dose promptly after the 5-minute threshold or first contact.
Avoided under-dosing	Percentage receiving a guideline-concordant first dose and no more than two adequate doses before second-line therapy.
Second-line timeliness	Time from status recognition or second benzodiazepine to start of a complete second-line load.
Glucose safety	Percentage with bedside glucose documented without delaying seizure treatment.
Medication safety	Weight, maximum dose, cumulative prior doses, and independent check documented.
EEG escalation	Percentage with persistent altered consciousness receiving urgent EEG or documented transfer/neurology plan.

Indicator	Suggested local measure
Refractory escalation	Time to anaesthesia/critical care and neurology contact; time to continuous EEG; avoidable transfer delays.
Cause treatment	Proportion with documented assessment for infection, stroke/haemorrhage, metabolic, toxic, adherence, pregnancy/eclampsia, and trauma causes.
Safe disposition	Baseline recovery, driving/safety advice, supervision, follow-up, and pending-results ownership documented.
Equity and dignity	Review of delays or harm related to age, disability, pregnancy, language, stigma, functional diagnosis, finances, transport, or lack of specialist access.

## 27. Training and implementation

- All ED, EMS, paediatric, obstetric, anaesthesia, pharmacy, and nursing teams shall train together on the 5-minute treatment threshold, full benzodiazepine doses, cumulative dose counting, and rapid second-line preparation.
- Resuscitation areas shall display an approved adult and paediatric status algorithm, route-specific rescue doses, maximum doses, concentrations, second-line infusions, and local escalation numbers.
- Simulation shall include no-IV-access status, under-dosed prehospital treatment, paediatric weight estimation, eclampsia, toxicological seizures, non-convulsive status, refractory transfer, and dissociative-seizure de-escalation.
- Medicines and equipment shall be standardized, clearly labelled, and immediately available. Fosphenytoin shall be prescribed in PE units; high-concentration midazolam and look-alike products require safeguards.
- EEG availability, rapid-response alternatives, after-hours activation, image/data transfer, and receiving-centre pathways shall be tested regularly.
- Every serious delay, medication error, unexpected intubation, recurrent seizure after discharge, missed non-convulsive status, or transfer failure shall undergo multidisciplinary review focused on system repair rather than blame.



## ANNEX A. One-page seizure and status epilepticus workflow

Step	Action
1. RECOGNIZE AND TIME	Active seizure at 5 minutes, unknown duration, or recurrent without baseline recovery = status epilepticus. Activate resuscitation pathway.
2. PROTECT + ABC	Clear hazards, protect head, no mouth objects or forced restraint, lateral position when safe, suction, oxygen/ventilation, monitors, IV/IO, glucose.
3. FIRST BENZODIAZEPINE	<b>At 5 minutes:</b> full IV lorazepam OR IM/IN/buccal midazolam OR IV/rectal diazepam using approved dose. Prepare second-line medicine now.
4. REPEAT ONCE	If ongoing after 3-5 minutes, give one repeat adequate benzodiazepine. Count verified home/EMS doses.
5. SECOND-LINE LOAD	<b>Persistent after two adequate doses:</b> give levetiracetam OR fosphenytoin/phenytoin OR valproate using approved full load. Treat cause concurrently.
6. ASSESS CESSATION	Has the patient returned toward baseline or does EEG confirm cessation? If not, suspect non-convulsive or refractory status.
7. REFRACTORY STATUS	Call neurology + anaesthesia/critical care; intubate as indicated; continuous EEG; approved anaesthetic infusion; ICU/tertiary transfer.
8. FIND AND TREAT CAUSE	Glucose/electrolytes; infection; stroke/haemorrhage; trauma; toxin/withdrawal; medication adherence; eclampsia; paediatric metabolic/genetic causes.
9. SAFE DISPOSITION	Baseline recovery, serial examination, recurrence risk, medication plan, safety/driving advice, supervision, follow-up, pending-results ownership, and direct handover.

## ANNEX B. Seizure danger-sign card

**IMMEDIATE STATUS RESPONSE:** seizure lasting 5 minutes or more; unknown duration while still convulsing; repeated seizures without normal recovery; respiratory compromise; severe hypoglycaemia; pregnancy/postpartum seizure; toxin exposure; major trauma; persistent focal deficit; fever/meningism; or failure to wake.

**REFRACTORY WARNING:** ongoing seizure after two adequate benzodiazepine doses plus one complete second-line load. Call neurology and anaesthesia/critical care, secure airway as indicated, start continuous EEG, and arrange ICU/tertiary transfer.

## ANNEX C. First-five-minute checklist

- ☐ Seizure clock started and onset / first-found time documented.
- ☐ Hazards cleared; head protected; no forced restraint or object in mouth.
- ☐ Airway positioned; suction and bag-mask ventilation ready; cervical spine considered.
- ☐ Oxygen saturation, ECG, and BP monitoring attached.
- ☐ Glucose checked without delaying benzodiazepine treatment.
- ☐ IV access obtained or IO / non-IV route selected.
- ☐ Weight or emergency estimate available; pregnancy/postpartum status checked.
- ☐ All home, EMS, and referral doses identified and announced.
- ☐ Full first-line benzodiazepine drawn and independently checked.
- ☐ Second-line antiseizure medicine ordered and being prepared.
- ☐ Senior ED clinician assigned; anaesthesia/paediatrics/obstetrics called when indicated.
- ☐ Trauma, fever, toxin, stroke, and eclampsia clues assessed in parallel.

## ANNEX D. Seizure timing and medication record

Milestone	Time / dose / route / person
Seizure onset / first found convulsing	_____

Milestone	Time / dose / route / person
Arrival / pathway activation	_____
Home rescue medicine	_____
EMS / referring-facility medicine	_____
ED benzodiazepine dose 1	_____
ED benzodiazepine dose 2	_____
Second-line medicine ordered	_____
Second-line infusion start / finish	_____
Visible convulsions stopped	_____
First follows commands / baseline recovery	_____
Neurology contact	_____
Anaesthesia / critical care contact	_____
EEG requested / started	_____
Transfer accepted / departed	_____
Cause of any delay	_____

## ANNEX E. First-line benzodiazepine quick reference

Medicine / route	Dose	Repeat / maximum	Operational note
Lorazepam IV	0.1 mg/kg; max 4 mg	Repeat once after 3-5 min if ongoing	Preferred with immediate IV and resuscitation capacity.
Midazolam IM	<b>&gt;40 kg:</b> 10 mg; 13-40 kg: 5 mg where locally approved	Usually single prehospital/initial IM dose before reassessment	Fast route; do not delay for IV.
Midazolam IN	0.2 mg/kg; max 10 mg	Per approved algorithm	Useful without IV; approved atomizer/concentration.
Diazepam IV	0.15-0.2 mg/kg; max 10 mg	Repeat once per algorithm	Follow with longer-acting medicine when status occurred.
Diazepam rectal	0.2-0.5 mg/kg by age/product; max 20 mg	Usually single rescue dose	Use only when approved and preserve dignity.

**COUNT ALL DOSES:** Normally no more than two adequate benzodiazepine doses in total before second-line treatment. Verify route, dose, concentration, and time. Underdosing is a common cause of apparent treatment failure.

## ANNEX F. Second-line selection support

Medicine	Load	Often favoured when	Avoid / caution when
Levetiracetam	60 mg/kg IV; max 4,500 mg	Pregnancy; cardiac instability; many interactions; rapid preparation	Behavioural effects; adjust maintenance in renal failure.
Fosphenytoin	20 mg PE/kg; max 1,500 mg PE	Focal epilepsy; familiar cardiac-monitored pathway	Heart block, bradycardia, hypotension, sodium-channel toxin; prescribe in PE.
Phenytoin	20 mg/kg; max 1,500 mg	Fosphenytoin unavailable and safe monitored infusion possible	Cardiac disease, hypotension, tissue injury risk, incompatibility, sodium-channel toxin.
Valproate	40 mg/kg; max 3,000 mg	Generalized/myoclonic patterns; cardiac concerns	Pregnancy, severe liver disease, mitochondrial/urea-cycle disorder, major thrombocytopenia.
Phenobarbital	15-20 mg/kg; max usually 1,000 mg	Preferred agents unavailable; specialist later-line use	Respiratory depression, hypotension, prolonged sedation.

## ANNEX G. Refractory-status checklist

- ☐ Two adequate benzodiazepine doses and one complete second-line load verified.
- ☐ Ongoing clinical seizure or EEG seizure confirmed / strongly suspected.
- ☐ Neurology and anaesthesia/critical care at bedside or directly consulted.
- ☐ Airway, haemodynamic, aspiration, and difficult-airway risks reviewed.
- ☐ Continuous EEG requested and transfer initiated if unavailable.
- ☐ Approved anaesthetic bolus/infusion selected; infusion pump and monitoring ready.
- ☐ Second-line antiseizure medicine continued; maintenance plan assigned.
- ☐ Glucose, sodium, calcium, magnesium, temperature, blood gas, and toxin causes reviewed.
- ☐ CT/MRI, CNS infection, stroke/haemorrhage, eclampsia, and autoimmune causes considered.
- ☐ CK, renal function, urine output, pressure areas, VTE, aspiration, and nutrition plan started.
- ☐ Family / decision-maker updated and treatment goals documented.
- ☐ Direct receiving-centre handover and transport risk plan completed.

## ANNEX H. Non-convulsive status and EEG prompts

- ☐ No return toward usual baseline after convulsions.
- ☐ Persistent aphasia, neglect, weakness, gaze deviation, or altered behaviour.
- ☐ Subtle facial/limb twitch, nystagmus, automatisms, or unexplained fluctuation.
- ☐ Unexplained coma after sedation, cardiac arrest, brain injury, infection, or stroke.
- ☐ Neuromuscular blockade or continuous anaesthetic obscures clinical signs.
- ☐ Urgent EEG requested with exact clinical question and medication timeline.
- ☐ Rapid-response limited EEG considered when full EEG unavailable.
- ☐ Neurology consulted and transfer arranged when EEG cannot be obtained promptly.
- ☐ Clinical, respiratory, metabolic, and structural causes reassessed while awaiting EEG.

## ANNEX I. Minimum diagnostic bundle

Every status / persistent case	Add according to context
Glucose; ECG/rhythm; BP/oxygen/temperature; CBC; sodium, potassium, calcium, magnesium, bicarbonate; renal and liver function; blood gas/lactate as indicated; pregnancy status; medicine history and levels where useful.	Cultures/CRP; CK/troponin/coagulation; toxicology and ethanol; ammonia/osmolality/phosphate; CT/CTA/MRI; LP; EEG; autoimmune/metabolic/genetic testing; obstetric and fetal assessment.

## ANNEX J. Imaging and lumbar-puncture safety prompts

- ☐ New-onset seizure or major change from usual pattern.
- ☐ Persistent altered consciousness or focal neurological deficit.
- ☐ Status epilepticus, focal onset, severe headache, trauma, anticoagulant use, fever, immunocompromise, malignancy, pregnancy/postpartum syndrome, or age-specific concern.
- ☐ Non-contrast CT prioritized for acute haemorrhage/trauma/mass; MRI planned for sensitive structural assessment when stable.
- ☐ CTA/CTV/MRV considered for stroke, dissection, cerebral venous thrombosis, or vascular syndrome.
- ☐ LP indicated for CNS infection/inflammation or selected SAH assessment and is safe to perform.
- ☐ CT before LP and senior review when raised-ICP risk, focal deficit, marked impaired consciousness, immunocompromise, or other contraindication concern exists.
- ☐ Empiric antibiotics/antivirals not delayed for imaging, LP, or transfer.

## ANNEX K. Toxic and metabolic seizure prompts

Pattern / exposure	Priority action
Hypoglycaemia	Immediate dextrose or appropriate glucagon; repeat glucose; find cause.
Severe hyponatraemia	Approved hypertonic-saline emergency pathway; avoid delayed or uncontrolled correction.
Isoniazid	Benzodiazepine plus pyridoxine; unknown dose 70 mg/kg IV, max 5 g; poison-centre advice.

Pattern / exposure	Priority action
Tricyclic / sodium-channel blocker	Benzodiazepine; ECG; sodium bicarbonate for QRS widening/hypotension; avoid phenytoin unless directed.
Alcohol / sedative withdrawal	Escalating benzodiazepines, thiamine, electrolytes, monitored admission.
Stimulant / serotonin / heat	Benzodiazepines, active cooling, cardiovascular and complication management.
Organophosphate	PPE/decontamination, atropine, oxime where indicated, benzodiazepine, airway support.
Theophylline	Aggressive seizure/cardiovascular treatment and urgent toxicology advice; consider enhanced elimination.

## ANNEX L. Maternal seizure checklist

- ☐ Pregnancy possibility, gestational age, and postpartum interval established.
- ☐ Obstetrics and anaesthesia called immediately.
- ☐ ABC, lateral tilt/position as feasible, aspiration safety, glucose, ECG/BP/oxygen monitored.
- ☐ Possible eclampsia recognized even without known prior hypertension/proteinuria.
- ☐ Approved magnesium sulfate loading/maintenance regimen started; toxicity monitoring and calcium antidote available.
- ☐ Severe hypertension treated using obstetric pathway.
- ☐ CBC/platelets, renal/liver tests, urine protein and HELLP evaluation sent.
- ☐ Stroke/haemorrhage, cerebral venous thrombosis, PRES, infection, metabolic and epileptic causes assessed.
- ☐ Essential maternal imaging not delayed; fetal assessment follows maternal stabilization.
- ☐ Valproate avoided when an effective alternative is suitable; all decisions documented.

## ANNEX M. Paediatric seizure checklist

- ☐ Actual or estimated weight and age documented; all doses double-checked.
- ☐ 5-minute status threshold applied; non-IV rescue route used without delay when needed.
- ☐ Fever source, meningism, rash, hydration, glucose, electrolytes, trauma, and safeguarding assessed.
- ☐ Simple versus complex/atypical febrile seizure documented.
- ☐ Infant, neonatal, infantile-spasm, metabolic, genetic, CNS infection, and abusive-head-trauma concerns considered.
- ☐ Paediatric/critical-care consultation obtained for status, incomplete recovery, complex presentation, or age concern.
- ☐ Parents/carers given first aid, rescue-plan, return, fever, bathing/swimming, and follow-up instructions.

## ANNEX N. First-seizure discharge checklist

- ☐ Returned to safe neurological and functional baseline; observations stable; no recurrence.
- ☐ Witness history/video reviewed; seizure versus syncope/other event assessed.
- ☐ Glucose, ECG, focused laboratory and imaging needs completed or explicitly assigned.
- ☐ No fever/meningism, focal deficit, significant trauma, pregnancy/eclampsia, poisoning, serious metabolic cause, or unsafe social factor requiring admission.
- ☐ Working diagnosis and uncertainty explained; no unsupported label of epilepsy.
- ☐ Medicine plan and missed-dose guidance reconciled; long-term therapy decision assigned to specialist when appropriate.
- ☐ No-driving and safety restrictions discussed according to local law.
- ☐ Written seizure first aid and emergency-return triggers provided.
- ☐ Responsible adult, transport, communication ability, and medicine access confirmed.
- ☐ First-seizure/epilepsy specialist appointment within 2 weeks confirmed; pending results have a named owner.

## ANNEX O. Transfer and handover minimum dataset

Category	Required information
Identity and contacts	Patient identifiers, family/decision-maker, witness, referring/receiving clinicians, callback numbers.
Timeline	Onset, all seizures, baseline recovery, medicine times, cessation, EEG/imaging, acceptance and departure.

Category	Required information
Clinical state	Airway/ventilation, GCS, pupils, focal findings, recurrence, trauma, pregnancy, paediatric weight, current observations.
Medicines	All home/EMS/ED doses and routes; cumulative benzodiazepine; second-line drug/load; infusions; allergies; maintenance due.
Cause / results	Glucose/electrolytes, infection, toxin, imaging, LP, EEG, drug levels, pregnancy/eclampsia, outstanding tests.
Transport risk	Recurrence and airway risk, rescue medicines, pumps, oxygen/suction, escort level, monitoring and contingency.
Next actions	Next observation, medicine, EEG/CT/LP, specialist review, pending-result owner, family update, treatment limits.

## ANNEX P. Audit tool

Case review item	Yes / No / N/A / notes
Seizure onset / first-found time documented	
Status recognized at 5 minutes or on arrival	
First full benzodiazepine dose timely	
Cumulative home/EMS/ED doses documented	
No more than two adequate benzodiazepine doses before second-line	
Second-line load started promptly and completely	
Weight and maximum doses double-checked	
Glucose checked without treatment delay	
Persistent altered state triggered EEG / transfer plan	
Refractory status triggered neurology + critical-care escalation	
Cause-directed treatment documented	
Imaging/LP decisions and reasons documented	
Baseline recovery and serial neurological observations documented	
Safe discharge advice, driving restriction, and follow-up completed	
Delay, equity, dignity, or system issue identified and reviewed	

## ANNEX Q. Local configuration checklist

- ☐ Approved adult and paediatric status algorithm with exact concentrations, routes, doses, maximums, and infusion times.
- ☐ Agreed rule for counting home/EMS benzodiazepine doses and moving to second-line treatment.
- ☐ Immediately available rescue medicines, atomizers, IO equipment, airway cart, and weight-estimation tool.
- ☐ Approved second-line formulary and selection guide; fosphenytoin PE safeguards; phenytoin compatibility and cardiac-monitoring standard.
- ☐ Refractory-status intubation, anaesthetic-infusion, continuous-EEG, ICU, and transfer pathway.
- ☐ 24-hour neurology, paediatric, obstetric, anaesthesia/critical-care, poison-centre, EEG, radiology, and receiving-centre contacts.
- ☐ Eclampsia magnesium sulfate and severe-hypertension protocol with toxicity monitoring and calcium antidote.
- ☐ Toxicological antidote access, including pyridoxine and sodium-bicarbonate pathway.
- ☐ First-seizure imaging, ECG, specialist referral within 2 weeks, driving-law, safety, and discharge materials.
- ☐ Febrile-seizure, neonatal/infant, safeguarding, and paediatric-transfer pathways.
- ☐ Dissociative-seizure de-escalation and respectful referral process.
- ☐ Named audit lead, data definitions, simulation schedule, and serious-incident review process.

## ANNEX R. References and source tools

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10. Local source tools to attach before approval: adult and paediatric status algorithms; medicine monographs; eclampsia protocol; electrolyte and toxicology pathways; EEG activation guide; first-seizure referral form; driving-law and safety leaflet; transfer checklist; audit form.