SEIZURE DISORDER

INTRODUCTION:

1. Definitions:

A "convulsion" is an involuntary spasm or series of muscle jerks. This term, however, falls short of fully describing the alterations in motor, sensory or psychic function that may occur in a patient experiencing a seizure. A "seizure" is an attack or the sudden onset of certain symptoms of a disease. "Seizures" are brief, episodic and involuntary, have a beginning and an end and may produce post-seizure impairment. Patients with seizures may present with a variety of symptoms including convulsions, attention loss, confusion, agitation and abnormal body movements.

"Epilepsy" is a chronic disorder that is diagnosed after two or more seizure episodes characterized by paroxysmal disturbances of brain function. These disturbances may manifest as impairment or loss of consciousness, abnormal motor phenomena, psychic or sensory disturbances, perturbation of the autonomic nervous system or a combination thereof. The term "ictal" refers to symptoms characterized by, pertaining to, or caused by an acute epileptic seizure. An "aura" is a subjective sensation or motor phenomenon that precedes and may mark the onset of an epileptic seizure.

The key to the diagnosis and management of seizures lies in recognizing seizure activity. The recognition of seizure activity can be challenging in patients with simple or complex partial seizures, but straightforward in patients with generalized seizures (e.g., tonic/clonic seizures). Classification of seizure types is based on the clinical and electrophysiologic manifestations of seizure, as described below.

Throughout the document, the term "patient" refers to a person who is receiving medical care. The term "resident" refers to a person who is residing in the nursing facility.

These guidelines are designed to be used in consultation with members of the care team and in consideration of the resident's advance care directives. It is important to be aware at all times of state laws such as those regarding living wills, power of attorney and durable health care power of attorney. Although the following guidelines provide a recommended approach to managing seizures, the patient's wishes should be respected and should take precedent when they conflict with the guidelines. Documentation of the resident's advance care directives as a counter to what may seem to be indicated is an appropriate measure. Documentation of all decisions and actions should be carefully detailed in the resident's medical record. Advance care directives may be reviewed, reevaluated and changed at any time according to the wishes of the resident or the resident's designee.

Glossary of Terms Used In This Document:

AED – Anti-epileptic Drug

ADR – Adverse Drug Reaction

CNS – Central Nervous System

NF – Nursing Facility

SIADH – Syndrome of inappropriate anti-diuretic hormone. SIADH results from excessive secretion of anti-diuretic hormone which causes retention of water and subsequent reduced serum sodium concentrations.

Steven-Johnson Syndrome – Severe painful lesions on the skin, oral mucosa, conjuctiva, pharynx or anogenital region. This condition can be fatal and requires immediate attention.

Agranulocytosis – Reduction in the neutropohil count that increases susceptibility to infection.

SEIZURE TYPES:

1. Generalized Seizures: A generalized seizure has no detectable focal point of origin in the brain. The seizure occurs simultaneously in both cerebral hemispheres. Consciousness is impaired and motor manifestations are bilateral. The characteristics of a general seizure are outlined in Table Intro-A at the end of this section.

2. Generalized Tonic-Clonic Seizures: A generalized tonic-clonic seizure (formerly known as a "grand mal") is the type most easily recognized by the general population. The typical presentation involves the patient losing consciousness and falling to the ground. A tonic phase occurs that is characterized by rigidity or stiffening of the muscles of the arms and legs. Simultaneous contractions of the diaphragm and chest muscles may produce a characteristic cry or choke at the beginning of the tonic phase. This rigidity is followed by a clonic phase in which muscles relax intermittently, resulting in noticeable jerking. Incontinence of bowel and bladder may occur and the patient may bite or chew the tongue. Each seizure can last a few minutes or longer and the patient is often confused, disoriented and somnolent for up to several hours after the seizure subsides.

3. Absence Seizures: An absence seizure (formerly known as a "petit mal") consists of brief periods of loss of consciousness as though the patient is day dreaming. Characteristic objective symptoms include a blank stare, upward rolling of the eyes and cessation of activity. The patient may be unaware of the seizure, which can last three to 30 seconds and can occur over 100 times daily. Following the event, the patient may immediately continue a preictal sentence or activity may be slightly confused by the time lapse.

4. Myoclonic Seizures: A myoclonic seizure is characterized by a brief involuntary jerking or muscle contraction of the body or extremities. These symptoms may occur singly or in groups. There is no aura and consciousness is impaired. In order adults, myoclonic seizures may be associated with "Creulzfeldt-Jakob Syndrome" or "Alzheimer's Disease," and they occasionally accompany sleep disorders.

5. Partial Seizures: A partial seizure (also termed a "focal" or "local seizure") is the most common type of seizure in the elderly. A partial seizure often goes undiagnosed because the clinical manifestations of seizure activity can be limited and subtle. A partial seizure typically represents unilateral hemispheric involvement. Irrespective of sub-type, a period of confusion usually follows a partial seizure. Classification of partial seizures is based on the presence or absence of impaired consciousness (i.e., the inability to respond normally to stimuli in the environment) and the progression of the ictal event. Table Into-B below lists the characteristics of partial seizures.

6. Simple Partial Seizures: Although a transient period of attention deficit may accompany a simple partial seizure, patients do not lose consciousness. A simple partial seizure may terminate after a limited neuronal discharge, progress to further alterations in behavior or consciousness (e.g., complex partial seizures) or progress to a secondarily generalized tonic-clonic seizure. Patients with simple partial seizures usually experience an aberration in sensory, motor or language function; they may experience abnormal sensations (e.g., tingling, a rising feeling in the stomach, a strange odor or taste, a feeling of fear or a visual disturbance such as bright or flashing lights). If a simple partial seizure progresses to a complex partial seizure, it is accompanied by an alteration in consciousness.

7. Complex Partial Seizures: Patients experiencing a complex partial seizure, the most common presentation in adults, have an altered or complete loss of consciousness and may display involuntary motor movements (e.g., lip smacking or picking movements). A typical manifestation of complex partial seizure activity is a motionless stare with the absence of verbal or motor behavior. However, abnormal behavior and/or confused language can also be a presentation of complex partial seizures. Thus, many partial seizure events in elderly individuals go unnoticed by untrained health care personnel, caregivers and family members.

GUIDE TO SEIZURE IDENTIFICATION AND MANAGEMENT

BASIC FIRST AID POINTS:

If you see signs of a seizure:

- ☐ Stay calm;
- ☐ Move objects out of the resident's way;
- ☐ **Don't** hold down and **don't** try to stop the person's movements;
- ☐ Never put anything in the person's mouth;
- ☐ Stay with the person until the person is completely alert; and,
- ☐ Have someone tell the Unit nurse right away.

More Information on Seizures and What to Do:

TYPE OF SEIZURE	SIGNS AND SYMPTOMS (What the Person Might Do)	FIRST AID TIPE (Things You Should Do)
Tonic-Clonic	• Make a sudden noise. • Fall down and become stiff. • Jerk arms and legs. • Arch up, as if bending backwards. • Take short or irregular breaths. • Have extra saliva (drool). • Wet or soil themselves. • May be confused or sleepy toward the end of seizure. • Won't remember what happened.	• Time the seizure. • For the person standing, gently help them to the floor. • Put something under the head. • For the person in wheelchair, stand behind and put your arms under the person to stop slipping. • As soon as possible, turn person on side to keep airways open. • Don't give food or drink until fully alert. • Reassure, talk gently, give emotional support. • **Also see Basic First Aid Points, above.**
Complex Partial	• Act in a strange (unusual) way. • Mumble, pick at clothes, smack lips. • Seem dazed, stare as if day dreaming. • Be clumsy, wander without purpose. • Act afraid, be aggressive. • Be drowsy or confused after seizure. • Won't remember what happened. • May become a tonic-clonic seizure.	• Time the seizure. • Gently guide the person to a safe place. • Gently stop the person from wandering into danger. • Don't hold person unless threat of danger. • Reassure, talk gently, give emotional support. • Watch carefully; note different movements or behaviors. • **Also see Basic First Aid Points, above.**
Simple Partial	• Jerk one part of the body. • Twitch an eye, jerk an arm or leg. • See, hear or smell things not there. • Is awake and alert. • May become a tonic-clonic seizure.	• Gently guide the person to a safe place. • Watch carefully; note different movements or behavior. • Reassure, talk gently, give emotional support. • **Also see Basic First Aid Points, above.**

TYPE OF SEIZURE	SIGNS AND SYMPTOMS (What the Person Might Do)	FIRST AID TIPE (Things You Should Do)
Myoclonic	• Jerk part of the body such as arm or leg one time or many times. • May drop things or fall.	• Protect the person from injury. • Reassure, talk gently, give emotional support. • **Also see Basic First Aid Points, above.**
Absence	• Seem to freeze. • Stare blankly into space. • Usually of short duration (few seconds). • Won't remember what happened.	• Reassure, talk gently, give emotional support. • **Also see Basic First Aid Points, above.**
Status Epilepticus	• Continuous or repeats seizure for 30 minutes or more.	• **Follow First Aid for Type of Seizure.** • Tell Unit nurse right away.

MANAGEMENT OF ACUTE SEIZURE ACTIVITY:

Seizures are usually episodic and brief, typically lasting from two to five minutes. Management of an acute seizure event is usually targeted at protecting the resident from injury. For example, the resident's airway should be protected and furniture and other objects should be moved away from the resident during the seizure. Acute seizure events should be managed according to the nursing facility's protocol. Development of a protocol for the management of acute seizure events is recommended for nursing facilities currently without one. For an example of an acute seizure protocol, please refer to Section III-D of the Seizure Management Program Implementation Guide.

Once the seizure is over, the event should be documented in the patient's medical record. The Known or Suspected Seizure Event Form introduced in Section 1.2 should be used to document seizure activity even if the patient has a known seizure disorder. The form should be completed after the seizure event and the information collected should be used when notifying the physician of the event. The form can be faxed to the physician as follow-up to the event and then placed in the medical record.

Status Epilepticus:

"Status epilepticus" is defined as more than 30 minutes of continuous seizure activity or two or more seizures without regaining consciousness. Between 0.5% to 6.6% of patients with epilepsy will experience "status epilepticus." "Status epilepticus" is a medical emergency that requires immediate intervention. The leading causes of "status epilepticus" are non-compliance with anti-epileptic drug (AED) therapy and withdrawal of AED therapy. Patients who have experienced a neurological insult, such as stroke, tumor, trauma or infection, appear to be at greater risk for "status epilepticus."

"Convulsive status epilepticus" is considered a life-threatening situation and the resident should be transported to an acute care facility. There are several different approaches to treatment. However, the goal of therapy is to stop seizure activity and stabilize the patient. As with "acute episodic seizures," "status epilepticus" should be managed according to the nursing facility's protocol.

Seizure Precipitants:

The development of any seizure is associated with a lowered seizure threshold. Conditions that can produce a seizure by directly reducing the seizure threshold include head trauma, sleep deprivation, stress, neuro-endocrine abnormalities, electrolyte disorders, anatomic abnormalities and genetic traits. A seizure, due to any of these conditions, is referred to as a "provoked" seizure. A seizure is unprovoked when the cause cannot be readily identified. Approximately 49% of seizures in the elderly are considered to be "unprovoked," or "idiopathic," in origin.

Factors that cause a "provoked" seizure may be reversible. For example, seizures that result from hyponatremia may be resolved by correcting the sodium deficit. Determining whether the seizure's cause is reversible is important because this determination directs the choice of therapy. If the cause of the seizure can be treated or avoided, AED therapy may not be necessary.

It should be noted that care giver behavior and quality of care can significantly contribute to several risk factors (e.g., malnutrition leading to metabolic abnormalities). Even when the cause of the present seizure is treatable, the resident may still be at risk for additional seizures. Every effort should be made to correct a reversible cause, while simultaneously reevaluating the risk for recurrence.

Some common precipitants of seizures in the elderly include:

1. Metabolic disorders (e.g., hypoglycemia);
2. Infections processes;
3. Alcohol withdrawal; and,
4. Drugs.

1. Metabolic Disorders:

a) **Hypoglycemia:** Although not well-studies, patients with symptomatic hypoglycemia can experience seizures. A seizure is most likely to occur when the serum glucose concentration falls below 30mg%. This severe drop in glucose is usually associated with the use of insulin and is less frequently associated with oral hypoglycemic agents. Correction of the hypoglycemia is required before seizure control can be established.

b) **Serum Sodium Abnormalities.** Acute changes (i.e., within 24 hours) in serum sodium concentration to below 115mEq/L or to greater than 160mEq/L can provoke a seizure. The rapidity with which the serum sodium concentration changes is a stronger risk factor for seizures than the absolute change.

c) **Hypocalcaemia.** A seizure can occur if the ionized calcium is less than 2.5mg%. Although hypocalcaemia is a rare cause of seizures in the elderly, institutionalized elderly patients with renal failure and severe Vitamin D deficiency may be at risk for hypocalcaemia-induced seizures. Treatment of the hypocalcaemia with intravenous calcium chloride is required before seizures can be controlled.

2. Infectious Processes: An acute infection can precipitate a seizure. In particular, the risk of seizure is ten times greater in patients with a central nervous system infection compared with non-infected, case-matched controls. Fever can also cause a seizure, even when it is not associated with a central nervous system infection. However, febrile seizures seem to be unique to childhood and rarely occur in the adult population.

3. Alcohol Withdrawal: Although the occurrence of alcoholism peaks in the third and fourth decades of life, the occurrence of the first withdrawal seizure peaks in the fifth and sixth decades of life. Unfortunately, documentation of alcohol history is poor in the nursing facility's medical record and additional effort may be needed when ruling out alcohol-related seizures.

4. Drugs: Drugs can precipitate seizures in susceptible individuals through a number of mechanisms. For example, the use of cocaine or amphetamines can cause a seizure, as can overdoses of theophyilline or psycho-therapeutic agents. In addition, withdrawal of sedative and anxiolytic medications, such as benzodiazepines, may be a prominent cause of seizures in the elderly population, especially since the OBRA 87 Regulations established strict criteria for the use of these agents. Table 2.2-A of this section lists drugs that can precipitate seizures in pre-disposed patients.

Medications That May Be Associated With Seizures:

a) Prescription Medications:

- Bupropion (Wellbutrin*)
- Clozapine (Clozaril*)
- Haloperidol (Haldol*)
- Imipenam/Cilastatin (Primaxin*)
- Isoniazid (Hyzyd*)
- Lithium (Eskalith*)
- Loxapine (Loxitane*)
- Maprotiline (Ludiomil*)
- Meperidine (Demerol*)
- Metronidazole (Flagyl*)
- Molindone (Moban*)
- Monoamine Oxidase Inhibitors (e.g., Nardil*)
- Penicillin
- Phenothiazines (e.g., Mellaril*)
- Theophylline (Theo-dur,* Theobid*)
- Thioxanthines (e.g., Navane*)
- Tramadol (Ultram*)
- Tricyclic Anti-Depressants (e.g., Elavil*)

b) Non-Prescription Medications:

- Diphenhydranine (Benadryl*)
- Pseudoephedrine (Sudafed*)

c) Illicit Medications:

- Amphetamines
- Cocaine

*In patients with renal insufficiency.

NURSE'S QUICK REFERENCE GUIDE TO ORAL ANTI-EPILEPTIC DRUGS (AEDs)

GENERIC NAME (BRAND NAME)	RECOMMENDED DOSE	FORMULATION	ADVERSE REACTIONS	NURSING CONSIDERATIONS
Carbamazepine (Tegretol) (Tegretol XR)	Initiate a 2 to 3mg/kg/day in two to four divided doses, increasing the daily dose by 200mg/day every three to five days to 10mg/kg/day. After two to three months, the dose may be increased to 15 to 20mg/kg/day because of hepatic auto induction. After auto induction has completed and the target dose has been reached, consider whether the resident is a candidate for extended-release product.	Tablet: 200mg Tablet (chewable): 100mg Oral Suspension: 100mg/ml Extended-Release (XR): 100, 200, 400mg	Nausea, vomiting, diarrhea, rash, pruritus, drowsiness, dizziness, visual disturbance, blood dyscrasias, SIADH,* Steven-Johnson Syndrome*, hepatic failure.	• Shake suspension well before dispensing. • Give with meals. • Humidity affects medication. Keep containers tightly sealed and store away from moisture. • Administration via nasogastric tube; mix with an equal volume of dilutent (dextrose 5% in water or 0.9% sodium chloride) and administer. Flush with 100ml of dilutent. • Decrease dose and increase frequency of administrating when changing from tablet or XR to suspension. • Do not crash or chew extended-release tablet. • Extended-release tablet may be visible in the stool.
Clonzapen (Klonopin)	Initiate at 1.5mg/day in three divided doses, increasing by 0.5 to 1mg/day every three days.	Tablet: 0.5, 1, 2mg	Drowsiness, ataxia, dizziness, memory impairment, behavioral changes, psychosis, delirium, respiratory depression, bradycardia.	• Contraindicated in glaucoma.
Ethosixumide (Zarontin)	Administer 20 to 40mg/kg/day in one to three divided doses. Increase by 250/mg/day at four- to seven-day intervals, as needed.	Capsule: 250mg Suspension: 250mg/5ml	Nausea, vomiting, drowsiness, sleep disturbance, hyperactivity, Stevens-Johnson Syndrome, agranulocytosis, hepatic failure.	• If gastrointestinal upset occurs, take with food or milk.
Felbamate (Felbatol)	**If added to existing AED regimen,** reduce the dose of the current AED by 20% to 30%. **If substituting for an AED,** discontinue current AED per product labeling. **Initiate** at 1200mg in three or four divided doses. Increase by 600 to 1200mg/day every two weeks.	Tablet: 400, 600mg Suspension: 600mg/5ml	Nausea, vomiting, anorexia, insomnia, dizziness, headache, ataxia, aplastic anemia, hepatic failure.	• Photosensitization may occur. Therefore, caution patients to wear protective clothing or sun screens when exposed to ultra-violet or sun light until tolerance has been reached.

GENERIC NAME (BRAND NAME)	RECOMMENDED DOSE	FORMULATION	ADVERSE REACTIONS	NURSING CONSIDERATIONS
Gebapentin (Neurontin)	Initiate as follows: DAY 1 = 300mg; DAY 2 = 300mg BID; DAY 3 = 300mg TID. Increase as needed to 1800mg/day in three divided doses.	Capsule: 100, 300, 400mg	Somnolence, dizziness, weight gain.	• Do not use Amer-N-Multisuix SG dipstick to test for urine protein; false-positive results can occur. • Can be taken without regard to meals.
Lamotrigline (Lamictal)	**For residents taking an enzyme-inducing AED,** initiate at 50mg/day in one to two divided doses and titrate up by 50mg increments every one to two weeks. **For residents taking Valproate,** initiate at 25mg QOD for two weeks and titrate up with 25 to 50mg every two weeks, as needed.	Tablet: 25, 100, 150, 200mg	Rash, nausea, dizziness, somnolence, insomnia, Stevens-Johnson Syndrome, hyper-sensitivity syndrome.	• Photosensitization may occur. Therefore, caution patients to wear protective clothing or sun screens when exposed to ultra-violet or sun light until tolerance has been reached.
Phenobarbital	1 to 5mg/kg/day at bedtime or in two to four divided doses and titrate to resident response. Doses up to 20mg/day have been well-studied and have demonstrated safety.	Tablet: 8, 15, 16, 30, 32, 60, 65, 100mg Capsule: 16mg Oral Solution: 15mg/5ml, 20mg/5ml Elixir: 20mg/5ml Injection: 30, 60, 65, 130mg/ml Powder for injection: 120mg/ampule	Nausea, rash, sedation, behavioral change, hyperactivity, ataxia, dependence, alteration of sleep cycle, Stevens-Johnson Syndrome, agranulocytosis, hepatic failure.	• Oral solution can be mixed with water or juice. • Observe for respiratory distress, if given intravenously. • Reconstitute powder for injection with .5 to 5ml sterile water for injection. Roll vial in hands; do not shake.
Phenytoin (Dilantin)	Initiate at 15 to 20mg/kg in three to four divided doses over 24 hours, followed by 5mg/kg/day titrated to resident response.	Chewable tablet: 50mg Suspension: 30mg/5ml and 125mg/5ml Extended-Release Capsule: 30 and 100mg Parenteral Solution: 50mg/5ml	Gingival hyperplasia, rash, confusion, ataxia, visual disturbance, nystogmus, hirsutism, peripheral neuropathy, osteomalacia, Stevens-Johnson Syndrome, agranulocytosis, hepatic failure.	• Do not substitute tablet or suspension for capsule or vice versa without physician authorization. • Draw trough concentrations before the next dose. • For enteral feedings, the physician has two options: 1. Turn off feeding two hours before and two hours after phenytoin administration. Thus, give a calculated 24-hour volume of enteral feeding over a 16-hour volume of enteral period with two four-hour breaks for twice/day drug administration.

GENERIC NAME (BRAND NAME)	RECOMMENDED DOSE	FORMULATION	ADVERSE REACTIONS	NURSING CONSIDERATIONS
Phenytoin (Dilantin) (cont'd.)				2. Instead of stopping enteral feeding, increase phenytoin doses while maintaining continuous feedings. ***Dental evaluations are recommended periodically.**
Primidone (Mysoline)	**DAYS 1 to 3** -- 100 to 125mg at bedtime; **DAYS 4 to 6** -- 100 to 125mg twice daily; **DAYS 7 to 9** -- 100 to 125mg three times daily; and, **DAY 10 to maintenance** – 125 to 250mg three times daily.	Tablet: 50mg, 250 mg Suspension: 250mg/5ml	Nausea, rash, sedation, behavioral change, ataxia, dependence, hyperactivity, alteration of sleep cycle, Stevens-Johnson Syndrome, agranulocytosis, hepatic failure.	None to consider.
Topiramate (Topamax)	50mg initially and titrate to effective dose (100 to 400mg orally twice daily).	Tablet: 25mg, 100mg, 200mg	Dizziness, fatigue, diplopia, nystogmus, confusion, somnolence, headache, paresthesia, nervousness	Observe for dehydration and mental status change.
Valproate (Depakene) (Depakote)	5 to 30mg/kg in three divided doses. Increase by 5 to 10mg/kg/day every week, as needed. Daily doses > 250mg should be given every 12 hours.	Capsule: 250mg Syrup: 250mg/5ml Tablet (delayed-release): 125, 250, 500mg Capsule (sprinkle): 125	Weight gain, nausea, vomiting, hair loss, easy bruising, tremor, dizziness, Stevens-Johnson Syndrome, agranulocytosis, thrombocytopenia, hepatic failure.	• Administer with food to reduce gastrointestinal irritation. • To avoid irrigation of mouth, throat and gastrointestinal tract, do not chew tablet or capsule. • May sprinkle open capsule on small amount (teaspoon) of soft food (e.g., apple sauce, pudding).

GUIDE TO DOSING ORAL ANTI-EPILEPTIC DRUGS (AEDs)

ANTI-EPILEPTIC DRUG	INITIAL DOSE	DOSAGE TITRATION	ADULT & GERIATRIC MAINTENANCE DOSE
Carbamazepine (Tegretol)	Tablets: 200mg twice daily Suspension: 100mg four times daily Typical Range: 2 to 3mg/kg/day	Increase up to 200mg/day at weekly intervals	600 to 1600mg/day in two to four divided doses. Typical range: 7 to 15mg/kg/day. Consider extended-release (XR) formulation for BID therapy.
Clonazepan (Klonopin)	1.5mg/day in three divided doses.	Increase by 0.5 to 1mg/day every three days.	Typical range: 0.05 to 2mg/kg/day. Doses up to 20mg/day have been well-studied and have demonstrated safety.
Ethosixumide (Zarontin)	250mg twice daily	Increase by 250mg/day at four to seven day intervals, as needed.	Doses up to 1500mg/day have been well-studied and have demonstrated safety.
Felbamate (Felbatol)	Monotherapy: 1200mg/day in three or four divided doses Conversion to monotherapy and adjunctive therapy: **Week 1:** Felbamate: 1200mg/day in three or four divided doses. Concomitant AEDs: Reduce original dose by 20% to 33%.	Monotherapy: Increase the dose in 600mg increments every two weeks. Conversion to monotherapy and adjunctive therapy: **Week 2:** Felbamate: 2400mg/day in three or four divided doses. Concomitant AEDs: Reduce original dose by up to an additional 33%. **Week 3:** Felbamate: Increase to 3600mg/day in divided doses, if clinically indicated. Concomitant AEDs: Reduce dose, as clinically indicated.	2400mg/day in three or four divided doses.
Gabapentin (Neuontin)	Initiate as follows: DAY 1 = 300mg; DAY 2 = 300mg BID; DAY 3 = 300mg TID.	Increase gradually based on clinical response.	900 to 1800mg/day in three divided doses. Adjustment required for renal insufficiency; doses up to 3600mg/day have been well-studied and demonstrated safety with short-term administration. Hemodialysis: Administer 200 to 300mg following each four mg/day in two divided doses.
Lamotrine (Lamictal)	For patients also on Valproate: 25mg QOD for two weeks; then 25mg QD for two weeks. For patients on other enzyme-inducing AEDs: 50mg in one to two divided doses for two weeks; then 100mg/day in two divided doses for two weeks.	Base on clinical effect. Typically increase dose by increments of 25 to 50mg every one to two weeks.	For patients also on Valproate: up to 100 to 150mg/day in two divided doses. For patients on other enzyme-inducing AEDs: 300 to 500mg/day in two divided doses.

ANTI-EPILEPTIC DRUG	INITIAL DOSE	DOSAGE TITRATION	ADULT & GERIATRIC MAINTENANCE DOSE
Phenobarbital	2 to 4mg/kg/day at bedtime or in divided doses.	Adjust dose until a therapeutic serum concentration is achieved.	60 to 100mg/day
Phenytoin (Dilantin)	**Loading dose:** 15 to 20mg/kg/day in three or four divided doses at two-hour intervals; **or** a 1gm loading-dose administered as follows: 400mg, 300mg, and 300mg at two-hour intervals. Administering a loading dose in patients with renal or hepatic dysfunction is not recommended. **Initial dose:** 100mg three times a day (typically 5mg/kg/day titrated to resident response). Begin daily dosing 24 hours after loading dose.	Adjust at seven- to 10-day intervals, as needed and tolerated.	Adults: 300mg/day or 5 to 6mg/kg/day in three divided doses. Geriatrics: Initially, 3mg/kg/day in divided doses, the dosage being adjusted in weekly intervals to serum concentration and patient response. All patients: Total daily dose may be given once daily at bedtime with extended-release capsules only. Doses > 400mg/day should be divided to minimize gastric irritation and promote absorption.
Topiraxate (Topamax)	50mg/day in the evening	Increase the dose by 50mg/day at weekly intervals to an effective dose. Divide into two doses when > 50mg/day.	400mg/day in two divided doses. Doses up to 1600mg/day have been well-studied and demonstrated safety.
Valproate (Depakane, Depakote)	Monotherapy: 5 to 15mg/kg/day Polytherapy: 10 to 30mg/kg/day Doses > 250mg/day should be divided, usually given every 12 hours.	Increase at weekly intervals by 5 to 10mg/kg/day, as needed and tolerated.	Adults: 15 to 60mg/kg/day in two or three divided doses. Geriatrics: Due to a decrease in the clearance of unbound Valproate, the required dosage may be decreased based on clinical response.

MONITORING GUIDE FOR ORAL ANTI-EPILEPTIC DRUGS (AEDs)

ANTI-EPILEPTIC DRUG	TARGET RANGE (mg/ml)	MONITORING PARAMETERS	CLINICAL SIGNS AND SYMPTOMS OF TOXICITY
Carbamazepine (Tegretol)	4 to 12	Perform baseline and periodic LFTs and CBCs	Dizziness, ataxia, drowsiness, nausea, vomiting, tremor, agitation, nystogmus, urinary retention, shock, hypotension, hypertension, dysrhythmia, coma, seizures, twitches, respiratory depression, neuro-muscular disturbances.
Clonazepam (Klonopin)	20 to 80	Perform baseline and periodic examinations for cognitive function and vital signs. During prolonged therapy, perform periodic CBCs and LFTs.	Somnolence, confusion, ataxia, diminished reflexes, coma
Ethosixumide (Zarontin)	40 to 100	Perform baseline and periodic CBCs, LFTs, platelet counts.	**Acute:** CNS depression, ataxia, stupor, coma, hypotension. **Chronic:** Skin rash, confusion, ataxia, proteinuria, hepatic dysfunction, hematuria
Felbamate (Felbatol)	32 to 137	Perform CBC, platelet count and reticulocyte count before, during and after therapy; also, perform LFTs weekly.	Fever, gait abnormalities, purpura, CNS toxicity, agitation, aggression, mental status change, tremor, skin rash.
Gabapentin (Neurontin)	Not established	Perform baseline and periodic serum creatinines (renal function)	Ataxia, ptosis, sedation, excitation, dyspnea, diplopia, lethargy, diarrhea, slurred speech
Lamotrigine (Lamictal)	Not established	Monitor serum concentrations of concomitant AEDs	Coma, dizziness, headache, somnolence
Phenobarbital	15 to 40	Perform baseline and periodic mental status examinations, CBCs, serum creatinines and LFTs	CNS depression, respiratory depression, hypotension, tachycardia, areflexia
Phenytoin (Dilantin)	10 to 20	Perform baseline and monthly CBC and U/A. Also, perform baseline and periodic physical assessment of gait and speech (i.e., CNS effects). Dental referral may be needed to monitor for gingival hyperplasia	Unsteady gait, slurred speech, confusion, nystogmus, nausea, hypothermia, fever, hypotension, seizures, respiratory depression, coma
Primidone (Mysoline)	5 to 12	Perform baseline and periodic mental status examinations, CBC and chem. 12 (creatinines and electrolytes)	Unsteady gait, slurred speech, confusion, jaundice, hypothermia, fever, hypotension
Topiramate (Topamax)	Not established	Periodic assessment of cognitive function and periodic U/A for patients who are pre-disposed to or have a history of kidney stones	Fatigue, nervousness, difficulty with concentration or attention, confusion, depression, anorexia, speech problem, anxiety, mood problem, cognitive problem, decrease in weight, tremor, paresthesia
Valproate (Depakene, Depakote)	50 to 150	Perform baseline and periodic platelet counts, bleeding times, LFTs and CBCs, as needed, especially during the first six months of therapy.	Coma, deep sleep, motor restlessness, tremors, asterixis, visual hallucinations.

SELECTED ADVERSE DRUG EFFECTS OF ANTI-EPILEPTIC DRUGS (AEDs)

ANTI-EPILEPTIC DRUG	NON-LIFE-THREATENING ADVERSE EFFECTS	LIFE-THREATENING ADVERSE EFFECTS
Carbamazepine (Tegretol)	Nausea, vomiting, diarrhea, rash, pruritus, drowsiness, dizziness, visual disturbances	Blood dyscrasias, SIADH, Stevens-Johnson Syndrome, hepatic failure
Clonazepam (Klonopin)	Drowsiness, ataxia, dizziness, memory impairment, behavioral changes, psychosis, delirium	Respiratory depression, bradycardia
Ethosixumide (Zarontin)	Nausea, vomiting, drowsiness, sleep disturbance, hyperactivity	Stevens-Johnson Syndrome, agranulocytosis, hepatic failure
Felbamate (Felbatol)	Nausea, vomiting, anorexia, insomnia, dizziness, headache, ataxia	Aplastic anemia, hepatic failure
Gabapentin (Neurontin)	Somnolence, dizziness, weight gain	Unknown
Lamotrigine (Lamictal)	Rash, nausea, dizziness, somnolence, insomnia	Stevens-Johnson Syndrome, hypersensitivity syndrome
Phenobarbital (Various)	Nausea, rash, sedation, behavioral changes, hyperactivity, ataxia, dependence, alteration of sleep cycles	Stevens-Johnson Syndrome, agranulocytosis, hepatic failure
Phenytoin (Dilantin)	Gingival hyperplasia, rash, confusion, ataxia, visual disturbances, nystogmus, hirsutism, peripheral neuropathy, osteomalacia	Stevens-Johnson Syndrome, agranulocytosis, hepatic failure
Primidone (Mysoline)	Nausea, rash, sedation, behavioral changes, ataxia, dependence, hyperactivity, alteration of sleep cycle	Stevens-Johnson Syndrome, agranulocytosis, hepatic failure
Topiramate (Topamax)	Dizziness, fatigue, diplopia, nystogmus, confusion, somnolence, headache, paresthesia, nervousness	Unknown
Valproate (Depakene, Depakote)	Weight gain, nausea, vomiting, hair loss, easy bruising, tremor, dizziness, rash	Stevens-Johnson Syndrome, agranulocytosis, thrombocytlopnia, hepatic failure

ASSESSMENT OF KNOWN OR SUSPECTED SEIZURE EVENT
(NF NAME)

Resident Name: _____ Room Number: _____ Physician Name: _____
Date of Event: _____ Time of Event: _____ Duration of Event: _____
Reason for Completing the Form: _____

CONCURRENT DIAGNOSES (CHECK ALL THAT APPLY)

☐ Alzheimer's Disease	☐ Dementia (Other)	☐ Multi-Infarct Dementia	☐ Other (e.g., renal or hepatic insufficiency)
☐ Behavior Disorder	☐ Head Trauma	☐ Stroke	☐ None

SUBJECTIVE FINDINGS: INTERVIEW QUESTIONS (TIME OF INTERVIEW: _____)

After a known or suspected seizure event, the nurse should ask the following questions of the resident, if appropriate, and any family members, care givers or other individuals who may have observed the event:

1. Is this the first unexplained event? ☐ NO ☐ YES Explain: _____
2. Can you describe the event? ☐ NO ☐ YES Explain: _____
3. Did you have a warning sign before this event occurred? ☐ NO ☐ YES Explain: _____
4. Do you experience any unusually frequent or severe headaches? ☐ NO ☐ YES Explain: _____
5. Do you have a history of head injury? ☐ NO ☐ YES Explain: _____
6. Do you have a history of light-headedness, dizziness or "spinning"? ☐ NO ☐ YES Explain: _____
7. Have you experienced difficulty in swallowing or speaking? ☐ NO ☐ YES Explain: _____
8. Does anything seem to cause the event (e.g., activity, fatigue, stress, watching TV)? ☐ NO ☐ YES Explain: _____
9. Do you know when you are having an episode? ☐ NO ☐ YES Explain: _____
10. Did you see or hear anything before the event? ☐ NO ☐ YES Explain: _____

OBSERVATIONAL FINDINGS

First Clinical Signs (check all that apply):

- ☐ Cry
- ☐ Inappropriate behavior _____
- ☐ Patient reported something wrong
- ☐ Saw or heard sudden fall
- ☐ Other _____
- ☐ None

Eye Position (check and circle all that apply):

- ☐ Blank stare
- ☐ Deviation at onset of seizure (left, right, both)
- ☐ Eyelids fluttered
- ☐ Eyes rolled/jerked
- ☐ Other _____
- ☐ None

First Body Parts Involved (check and circle all that apply):

- ☐ Head
- ☐ Arms (left, right, both)
- ☐ Legs (left, right, both)
- ☐ Other _____
- ☐ None

Pupil Size and Light Reactivity (check all that apply):

- ☐ Absent or unequal response
- ☐ Constricted
- ☐ Dilated
- ☐ Pinhole
- ☐ Other _____
- ☐ No change

OBSERVATIONAL FINDINGS (cont'd.)

Movements (check and circle all that apply):

- ☐ Body limp (left, right, entire)
- ☐ Body rigid (left, right, entire)
- ☐ Head turned (left, right, both)
- ☐ Irregular/sudden flinging (what?) _____
- ☐ Regular/repetitive (where?) _____
- ☐ Purposeless/involuntary actions (e.g., lip-smacking, pacing.
  Describe: _____
- ☐ None

Other Observations (check and circle all that apply):

- ☐ Abnormal breathing (describe) _____
- ☐ Apnea
- ☐ Cyanosis
- ☐ Diaphoresis
- ☐ Flushing
- ☐ Febrile (record temp) _____
- ☐ Incontinence (bowel, bladder, both?) _____
- ☐ Other _____
- ☐ None
- ☐ Lacrimation
- ☐ Pallor
- ☐ Salivation
- ☐ Tongue biting/bleeding
- ☐ Vomiting

POSTICTAL ASSESSMENT

Behavior (check all that apply and note time of event):

- ☐ Unarousable (Time: _____)
- ☐ Responsive only to deep pain (Time: _____)
- ☐ Drowsy, but arousable (Time: _____)
- ☐ Confused (Time: _____)
- ☐ Alert and oriented (Time: _____)

Findings:

- ☐ Complaint (e.g., headache): _____
- ☐ Temperature: _____ (oral, rectal, tympanic, axillary)

Change from baseline: ☐ NO ☐ YES

How long before return to baseline? _____

Physician notified: ☐ NO ☐ YES Time of notification: _____

Signature: _____ Date of Report: _____