PHENobarbital (fee-noe-bar-bi-tal)

**Classifications**
- Anticonvulsants, sedative/hypnotics
- Barbiturates

**Schedule IV**

**Pregnancy Category D**

**Indications**
- Anticonvulsant in tonic-clonic (grand mal), partial, and febrile seizures in children.
- Preoperative sedative and in other situations in which sedation may be required.
- Hypnotic (short-term).
- Unlabeled Use: Prevention/treatment of hyperbilirubinemia in neonates.

**Action**
- Produces all levels of CNS depression. Depresses the sensory cortex, decreases motor activity, and alters cerebellar function. Inhibits transmission in the nervous system and raises the seizure threshold. Capable of inducing (speeding up) enzymes in the liver that metabolize drugs, bilirubin, and other compounds.

**Therapeutic Effects:**
- Anticonvulsant activity.
- Sedation.

**Pharmacokinetics**
- **Absorption:** Absorption is slow but relatively complete (70–90%).
- **Distribution:** Unknown.
- **Metabolism and Excretion:** 75% metabolized by the liver, 25% excreted unchanged by the kidneys.
- **Half-life:** Neonates: 1.8–8.3 days; Infants: 0.8–5.5 days; Children: 1.5–3 days; Adults: 2–6 days.
- **TIME/ACTION PROFILE (sedation†)**

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
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<tbody>
<tr>
<td>PO</td>
<td>30–60 min</td>
<td>—</td>
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<tr>
<td>IV</td>
<td>5 min</td>
<td>30 min</td>
<td>4–6 hr</td>
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<tr>
<td>IM, subcut</td>
<td>10–30 min</td>
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†Full anticonvulsant effects occur after 2–3 wk of chronic dosing unless a loading dose has been used.

**Contraindications/Precautions**
- **Contraindicated in:** Hypersensitivity. Examine patients with pre-existing CNS depression. Severe respiratory disease with dyspnea or obstruction. Uncontrolled severe pain. Known alcohol intolerance (elixir only).
- **Lactation:** Discontinue drug or bottle feed.

**Use Cautiously in:**
- Hepatic dysfunction.
- Severe renal impairment.
- History of suicide attempt or drug abuse.
- Seizures: Chronic use may lead to dependence.
- OB: Chronic use during pregnancy results in drug dependency in the infant, may result in coagulation defects, and fetal malformation; acute use at term may result in respiratory depression in the newborn; avoid initial dose; recommend.

**Adverse Reactions/Side Effects**
- **CNS:** hangover, delirium, depression, drowsiness, excitation, lethargy, vertigo.
- **Resp:** respiratory depression, laryngospasm, bronchospasm.
- **CV:** hypotension.
- **GI:** constipation, diarrhea, nausea, vomiting.
- **Derm:** photosensitivity, rashes, urticaria.
- **Local:** phlebitis at IV site.
- **MS:** arthralgia, myalgia, neuralgia.
- **Misc:** hypersensitivity reactions including angioedema and serum sickness, psychological dependence.

**Drug Interactions**
- **Drug-Drug:** Additive CNS depression with other CNS depressants, including alcohol, antihistamines, opioid analgesics, and other sedative/hypnotics. May induce hepatic enzymes that metabolize other drugs. Jitteriness. Other effects include: increased anticoagulant effects of warfarin and oral contraceptives; serotonin syndrome; elevated levels of digoxin, cyclosporine, carbamazepine, vardenafil, theophylline, metronidazole, and warfarin. May inhibit hepatic metabolism of valproic acid, carbamazepine.
- **Drug-Natural Products:** Concomitant use of kava-kava, valerian, chamomile, or hops can cause CNS depression. St. John’s wort may reduce effects.

**Route/Dosage**

**Status Epilepticus**
- **IV (Adults and Children 3 mo):** 15–18 mg/kg in a single or divided dose, maximum loading dose 20 mg/kg.
- **IV (Neonates):** 15–20 mg/kg in a single or divided dose.
**Maintenance Anticonvulsant**

IV, PO (Adults and Children >12 yr): 1–3 mg/kg/day as a single dose or 2 divided doses.

IV, PO (Children 5–12 yr): 4–6 mg/kg/day in 1–2 divided doses.

IV, PO (Children >5 yr): 4–6 mg/kg/day in 1–2 divided doses.

IV, PO (Infants): 5–6 mg/kg/day in 1–2 divided doses.

IV, PO (Newborn): 6–8 mg/kg/day once daily, may need to increase up to 5 mg/kg/day by 2nd week of therapy.

**Sedation**

PO, IM (Adults): 30–120 mg/day in 2–3 divided doses. Preoperative sedation — 100–200 mg IM 1–1.5 hours before the procedure.

PO (Children): 3–8 mg/kg/day in 2–3 divided doses, doses up to 12 mg/kg/day may be used.

**Hypnotic**

PO, Subcut, IV (Adults): 100–320 mg at bedtime.

PO, Subcut (Children): 5–6 mg/kg at bedtime.

**Hyperlactaturia**

PO (Adults): 90–180 mg/day in 2–3 divided doses.

PO (Children >12 yr): 5–8 mg/kg/day in 2–3 divided doses, doses up to 12 mg/kg/day may be used.

**NURSING IMPLICATIONS**

**Assessment**

- Monitor respiratory status, pulse, and BP and signs and symptoms of anaphylaxis (swelling of lips, face, throat, dyspnea) frequently in patients receiving phenobarbital IV. Equipment for resuscitation and artificial ventilation should be readily available. Respiratory depression is dose-dependent.

- Prolonged therapy may lead to psychological or physical dependence. Restrict amounts of drug available to patient, especially if depressed, suicidal, or with a history of addiction.

- Geri: Elderly patients may react to phenobarbital with marked excitement, depression, and confusion. Monitor for these adverse reactions.

- Insomnia: Assess location, duration, and characteristics of insomnia activity.

- Sedation: Assess level of consciousness and sedation when used as a preoperative sedative.

- Assess preoperative patients for pain with a pain scale. Phenobarbital may increase sensitivity to painful stimuli.

- Lab Test Considerations: Patients on prolonged therapy should have hepatic and renal function and CBC evaluated periodically.

- Monitor serum folate concentrations periodically during therapy because of increased folate requirements of patients on long-term anticonvulsant therapy with phenobarbital.

- Hypertensive adolescents: Serum phenobarbital levels in neonates, to patients with congenital nonhemolytic unconjugated hyperbilirubinemia, and in erythroblastosis fetalis can be increased when used as an anticonvulsant. Therapeutic blood levels are 10–40 mcg/mL. Symptons of toxicity include confusion, drowsiness, diplopia, slurred speech, and staggering.

**Potential Nursing Diagnoses**

- Risk for injury (Indications) (Side Effects)

- Acute confusion (Side Effects)

**Implementation**

- Do not confuse phenobarbital with pentobarbital.

- Immerse amputations and transfer of patients following administration. Two side rails should be raised and call bell within reach at all times. Keep bed in low position, institute seizure and fall precautions.

- When changing from phenobarbital to another anticonvulsant, gradually decrease phenobarbital dose while concurrently increasing dose of replacement medication to maintain anticonvulsant effect.

- PO: Tablets may be crushed and mixed with food or fluids (do not administer dry) for patients with difficulty swallowing. Oral solution may be taken undiluted or mixed with water, milk, or fruit juice. Use calibrated measuring devices for accurate measurement of liquid doses.

- IM injections should be given deep into the gluteal muscle to minimize tissue irritation. Do not inject >5 mL into any one site, because of tissue irritation.
PHENobarbital

IV Administration

- IV: Doses may require 15–30 min to reach peak concentrations in the brain.
- Direct IV: Diluent: Reconstitute sterile powder for IV dose with a minimum of 3 mL of sterile water for injection. Do not use solution that is not absolutely clear within 5 min after reconstitution or that contains a precipitate. Discard powder or solution that has been exposed to air for longer than 10 min.
- Solution is highly alkaline; avoid extravasation, which may cause tissue damage and necrosis. If extravasation occurs, injection of 5% procaine solution into affected area and application of moist heat may be ordered.
- Concentration: 130 mg/mL (undiluted).
- Rate: Do not inject IV faster than 1 mg/kg/min with a maximum of 30 mg over 1 min in infants and children and 60 mg over 1 min in adults. Titrate slowly for desired response. Rapid administration may result in respiratory depression.
- Y-Site Compatibility: acyclovir, alfentanil, amikacin, aminocaproic acid, amsacrine, amphotericin B lipid complex, amphotericin B liposome, anidulafungin, argatroban, ascorbic acid, atropine, aztreonam, bleomycin, bumetanide, butorphanol, calcium chloride, calcium gluconate, carboplatin, cefazolin, cefoperazone, ceftriaxone, chloramphenicol, cyclophosphamide, cytarabine, dactinomycin, daptomycin, dexamethasone, dexmedetomidine, digoxin, doce taxel, dopamine, doripenem, doxacurium, doxapram, enalaprilat, ephedrine, epinephrine, erythromycin, esmolol, haloperidol, hydroxyzine, idarubicin, iso academia, lidocaine, mechlorethamine, meperidine, methadone, methotrexate, methoxamine, methylprednisolone, metoclopramide, metoprolol, meropenem, methoxamine, methylprednisolone, metronidazole, methylphenidate, mitoxantrone, nasal decongestants, nafcillin, naloxone, nesiritide, nitroglycerin, nitroprusside, octreotide, oxacillin, oxytocin, paclitaxel, palonosetron, pamidronate, pancuronium, pantoprazole, pemetrexed, pentobarbital, phenyl ephrine, phytonadione, piperacillin/tazobactam, potassium acetate, potassium chloride, propofol, propranolol, ranitidine, rocuronium, sodium acetate, sodium bicarbonate, streptokinase, sufentanil, teniposide, theophylline, thiotepa, ticarcillin/clavulanate, tizanidine, tizanidine, toxidromed, vancomycin, vasopressin, vecuronium, vincristine, voriconazole, zoledronic acid.

Patient/Family Teaching

- Advise patient to take medication as directed. Take missed doses as soon as remembered or at next dose, do not double doses.
- Advise patients on prolonged therapy not to discontinue medication without consulting health care professional. Abrupt withdrawal may precipitate seizures or status epilepticus.
- Medication may cause daytime drowsiness. Caution patient to avoid driving and other activities requiring alertness until response to medication is known. Do not resume driving until physician gives clearance based on control of seizure disorder.
- Caution patient to avoid taking alcohol or other CNS depressants concurrently with this medication.
- Advise patient to notify health care professional if signs and symptoms of angioedema, fever, sore throat, mouth sores, unusual bleeding or bruising, nosebleeds, or petechiae occur.
- Teach sleep hygiene techniques (dark room, quiet, bedtime ritual, limit daytime napping, avoid nicotine and caffeine).
Advise female patients using oral contraceptives to use an additional nonhormonal contraceptive during therapy and until next menstrual period. Instruct patient to contact health care professional immediately if pregnancy is planned or suspected.

Pedi:
Advise parents or caregivers that child may experience irritability, hyperactivity, and/or sleep disturbances, which may diminish in a few days to a few weeks or may persist until drug is stopped. An alternative medication can be considered. Instruct parents to monitor for skin rash occurring 7–20 days after treatment begins and to contact a health care provider if rash occurs. Teach family about symptoms of toxicity (staggering, drowsiness, slurred speech).

**Evaluation/Desired Outcomes**
- Decrease in seizure activity without excessive sedation. Several weeks may be required to achieve maximum anticonvulsant effects.
- Preoperative sedation.
- Improvement in sleep patterns.
- Decrease in serum bilirubin levels.

**Why was this drug prescribed for your patient?**