









ANTIEPILEPTICS (Antiseizure)

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Generic/ TRADE / form	g=generic	SIDE EFFECTS 10-40% of pts thru self report; 60-90% with screening	MONITOR Annually/lf indicated	USES ✓ COMMENTS/ DRUG LEVEL	DRUG INTERACTIONS (DI)	INITIAL & MAX DOSE	USUAL SEIZURE DOSE RANGE	\$  /100day
Carbamazepine TEGRETOL/g CBZ (100 ² , 200 ² mg chew tab; 200 ² mg tab) (200 ² , 400 ² mg CR tab) -avoid humid storage conditions (20mg/ml susp; used in loading dose adult protocol at 8mg/kg Purcell ¹⁰⁷)		Common: GI ^{n/v} , drowsy, dizzy, unsteady , pruritic rash <10% may cross react with phenytoin & phenobarb; ↓WBC ² dose related CR tab; less SE GI/CNS Rare: aplastic anemia , ↑ liver enzymes (GGT/ALT some ↑ normally), cardiac abnormalities; ↓serum Na ² (SIADH) mild often, but <125 important; SLE, exfoliative dermatitis , alopecia, ocular effects, ↓ WBC persistent ~2% ↓ T3/T4 & Vit K, osteomalacia & neural tube defects (<1%). Asian & HLA-B*1502 ; Caucasian & HLA-A*3101 ; ↑ risk skin rx. WEIGHT GAIN = minimal	CBC q3-6months. Platelets, TSH, LFT, Lytes, Level ? ECG for pts >45yrs  Malformation <5% eg. spina bifida OR=2.6, base 1:1000 ↑ risk with DVA.	✓ 2 ^o Generalized tonic-clonic Sz , Partial (1-18yr) . Not myoclonic Sz; may worsen absence Sz. ✓ BPAD -acute mania, rapid cycle, mixed & prophylaxis ✓ trigeminal neuralgia Option: for aggressive patients & neurologic dx & cognitive impaired CI: hepatic ² /porphyria dx; safe in renal dx Level 17-54 umol/l -trough	↑ Carbamazepine level by: cimetidine, clarithro/erythromycin, danazol, diltiazem, felodipine, fluoxetine, fluvoxamine, grapefruit juice, isoniazid, ketoconazole, lamotrigine, metronidazole, nefazodone, phenobarbital, propoxyphene , ritonavir, verapamil & valproate ↓ Carbamazepine level by: phenytoin, phenobarb, St. Johns Wort, theophylline Carbamazepine ↓'s levels of: BCP's ~40%, lamotrigine, phenytoin, theophylline, topiramate, valproate & warfarin . INDUCES P450 3A4 System	100mg bid ↑ 200mg/d q5-7day (to ↓SE) ~2800mg/day (autoinduction of P450 system complete in 4 weeks)	200mg po tid 400mg po tid 600mg po bid (some clinicians give regular release bid in select situations) 400mg CR bid (600-1800mg/d) Peds: 10-20→35mg/kg/d Mainly an enzyme inducer	33 59 59 64
Clobazam FRISIUM/g (10 ² mg tab) [In USA: Onfi -for LGS]		B Common: Drowsiness (tolerance develops), dizziness, ↓ concentration, anterograde amnesia, ↑ traffic accidents. n Rare: skin rash, paradoxical anger, thrombocytopenia & depression. z o	? Platelets  Stiripentol Diacomit *	Alt: generalized tonic-clonic, myoclonic & atonic, partial & absence Sz; LGS ~2yr add on tx: FDA ¹¹ Broad spectrum→tolerance develops	Few drug interactions ↓ clobazam level by: carbamazepine ↑ clobazam level: fluconazole, omeprazole clobazam ↑ level of: fluoxetine, phenytoin	5-10mg od 80mg/day	10mg po bid 30mg po hs (20-30mg/d) Peds: 0.5-1.5mg/kg/d	41 58
Clonazepam RIVOTRIL/g (0.5 ² , 1.2 ² mg tab 0.25 ² mg tab)		Other Benzo's: status epilepticus etc... SE: ↓BP, ↓resp rate & sedation Diazepam VALIUM 2 ² , 5 ² , 10 ² mg tab; 10mg/2ml amp IV at 2mg/min; 5, 10, 15mg rectal gel DIASITAT ; 10mg/2ml emulsion DIAZEMULS . Lorazepam ATIVAN 0.5, 1 ² , 2 ² mg po/sl ^x tab; rectal & buccal option, 4mg/ml amp IV at 2mg/min, but IV may precipitate & burn during administration; intranasal option Midazolam VERSED 1 & 5mg/ml vial, buccal/IV/IM/nasal/MAD device; propofol	? Platelets 	✓ Myoclonic Sz; Alt→tonic & atonic, absence & infantile spasms; LGS, panic attack Option: sedative, social phobia, akathisia, acute mania, restless leg syndrome & neuralgic pain	Few drug interactions. ↓ clonazepam level by: CBZ, phenytoin Tolerance in 1/3 pts in 6 months. ? ↑ Generalized tonic clonic Sz. Level clonazepam 40-230nmol/l -useful for compliance, not efficacy	0.5mg po tid ↑ 0.5-1mg/d q3d 20mg/day	0.5mg po tid 1mg po tid 2mg po tid (1.5-8mg/d) Peds: 0.01-0.3mg/kg/d	30 56 46
Divalproex (DVA) EPIVAL/g (125, 250, 500mg EC tab); 1000mg/10 ml vial x 125mg sprinkle capsules (SAP) -prodrug of VPA; see valproic acid below		Common: nausea, diarrhea, dizziness, sedation, somnia, tremor essential >20%, dose related, ataxia, fatigue, confusion, headache, abd cramps, hair loss often temp, hyperammonemia, enuresis, menstrual disturbances & ↑ osteoporosis. Rare: ↓ platelets (↓ dose helps) & WBC, hepatotoxic esp <2yr, pancreatitis, ↑ blood insulin, neural tube defects→spina bifida 1-2%. Caution: polycystic ovaries WEIGHT GAIN = ++ (up to 59%, more common in ♀; mean ↑ of 8-14kg), ↑ serum androgen levels in men.	CBC , Platelets, LFT Valproic level Correct levels up for ↓albumin  Pregnancy registry: heart defect & spina bifida 10.7 vs 9.2% in control ↑ malformation with valproate esp >1g/d 61. eg. neural tube defect, cleft, Pharyngeal or if in combo used May ↓ IQ in newborns. Add folic acid 5mg if tx. Concern 1 st trimester	✓ 1 ^o Generalized tonic-clonic , Partial , Absence , Myoclonic & Atonic , LGS , myoclonic Juvenile, photosensitive; 2 ^o generalized ✓ BPAD acute mania, rapid cycle , mixed, prophylaxis & depression ✓ migraine prophylaxis; Option: for aggression; acute mania -Oral LD20mg/kg CI in hepatic/ mitochondrial dx ADV: safe in renal dx, ↓ rash Less cognitive impairment. Level 350-830 umol/l -trough	↑ Valproic acid level by: aspirin, cimetidine, erythromycin, felbamate, fluoxetine, isoniazid & salicylates ↓ Valproic acid level by: carbamazepine, carbapenems meropenem, chitosan, cholestryramine, lamotrigine, phenobarbital, phenytoin, primidone, rifampin, ritonavir & topiramate Valproic acid ↑'s levels of: amitriptyline, carbamazepine ^{epoxide} (ie. ↑ SE), clonazepam, diazepam, ethosuximide, lamotrigine lorazepam , phenobarbital , rufinamide, TCAs, warfarin, zidovudine. Does not ↓ effect of BCP's	250-500mg bid ↑ 250mg/d q1 week 3-5g/day	250mg po tid cc 500mg po bid cc 500mg po tid cc (1-3g/day) cc= with food Peds: 10-15→60mg/kg/d but if <2yr can ↑ LFT's Mainly an enzyme inhibitor	64 83 120
Ethosuximide ZARONTIN (250mg cap; 50mg/ml syrup)		Common: nausea, diarrhea, anorexia, drowsiness, hiccups & headache. Rare: skin rash Stevens-Johnson, blood dyscrasias, lupus & behavioral changes esp. kids; ↓.	CBC , Platelets, Level 	✓ Uncomplicated Absence Sz . Not protect for generalized tonic clonic or partial Sz; ↑ breast milk levels Ethosuximide more effective & less AEs vs DVA & lamotrigine for Absence Sz in Peds. ¹⁹⁷	↓ ethosuximide levels by: carbamazepine ↑ ethosuximide levels by: ritonavir & valproic acid Level 280-710 umol/l -trough	250mg od/bid ↑ 250mg/d q1 week 2000mg/day	250mg po bid 500mg po bid (750-1500mg/d) Peds: 10-15→20-40mg/kg/d	82 157
Gabapentin NEURONTIN/g (100, 300, 400mg cap) (600 ² , 800 ² mg tab x , ↑ cost)		Common: somnolence, dizzy, ataxia, headache, nystagmus, n/v, blurred vision, tremor, slurred speech, edema, rash ~1% behavioral changes in kids emotional lability, hostility & aggression; {↓WBC<1%}, euphoria; ?akathisia WEIGHT GAIN = + (appears dose related)	Scr  Teratogenic at tx dosages	Alt: partial & 2 ^o generalized Sz. ~3yr -not for generalized Sz such as juvenile myoclonic etc. Option: neuropathic pain & anxiolytic in severe panic dx & social phobia, & restless leg Sx Well tolerated in the elderly 39 ADV: ↓ rash & safe in liver failure DIS: Myoclonus may be ↑ 3-25 umol/l for compliance, not efficacy	Antacids ↓ by 20% absorption (space by 2hr) NO other signif. interactions With doses >600mg less is absorbed since mechanism is saturated Does not ↓ effect of BCP's	100-300mg tid (↑ 300mg q1 day) 3.6-4.8g/d (up to 6.4g)	400mg po tid 600mg po tid 800mg po tid ↓ dose in renal dysfx (900-3600mg/d) Peds: 10-15→25-40mg/kg/d	146 240 280
Pregabalin LYRICA g 75-300mg bid 25, 50, 75, 150, & 300mg caps SE: dizzy, ataxia, edema, ↑ weight; Rare: euphoria, angioedema, gynecomastia DI: glitazones		partial Sz adult, diabetic neuropathy, neuralgia post herpetic SCI, fibromyalgia						
Lamotrigine LAMICTAL/g (25 ² , 100 ² , 150 ² mg tab; 5 ² mg chewable tab) (2mg chewable tab x) [In new adult partial sz's: Pregabalin ~75-150mg bid had inferior efficacy to lamotrigine ~50-100mg bid] 276		Common: dizzy, nausea, vomiting, ataxia, asthenia, headache, somnolence, fatigue, ↑ alertness, diplopia, abd pain, rash (1 st month→gen. red morbilliform) & ↓ hair. Rare: Stevens-Johnson syndrome ^{1st 2months} & toxic epidermal necrolysis , ? hepatotoxic, tics in kids & leukopenia, ?? cardiomyopathy & ? aseptic meningitis. WEIGHT Gain =neutral effect Broad spectrum of Sz activity	CBC , LFT, Scr to ↓ dose if necessary  Not teratogenic in animals ³⁵ , but ↑ risk of fetal death. ↑ non- syndromal oral clefts. ⁸⁹ Pregnancy: ↓ levels considered one of the most safe; ↑ levels in breast milk. ↑ ↑ risk if combined with DVA.	✓ Mono→ partial age≥2yr ¹²⁸ & LGS . ADJ: 2 ^o , 1 ^o generalized tonic-clonic ~2yr, Alt: absence, myoclonic ^{7worse} & atonic Option: BPAD I acute depression & Bipolar II rapid cycling FDA Jun03 Option in new onset geriatric Sz ³⁹ Rash 5-10%→life threatening 0.3%# ³³ (If drug related→D/C at first sign of rash) ADV: ↓ hormonal dysfx & more alert for compliance, not efficacy Level: 4-39 umol/l	↑ Lamotrigine level by: sertraline & valproate ↓ Lamotrigine level by: BCP's, carbamazepine, oxcarbazepine, phenytoin, phenobarb., primidone, rifampin, ritonavir/atazanavir & topiramate NO EFFECT ON P450 enzyme system With carbamazepine: ↑ dizziness. Rarely ↓ effect of BCP's ⁵⁹ & folic acid	12.5-50mg bid ↑ by 50mg/day every 1-2weeks (to ↓ rash rate) Peds: 0.15-0.6 mg/kg/d start 500-800mg/d	100mg po bid 150mg po bid (100-500mg/d) Peds: 0.6-15mg/kg/d If with valproate: 25mg hs ^{12.5mg/wk} → 100mg po hs (50-200mg/d) Peds: 0.15-5mg/kg/d	122 177 22 65

Health Canada's **Seizure Action Program (SAP)** 1-613-941-3101: divalproex 125mg sprinkle can felbamate 600mg tab, stiripentol 750 & 500mg cap/pdw, clobazam 50 & 700mg tab, tiagabine tab, valproic 500mg ini, & zonisamide 100mg
General: During lifetime about 3% of people dx with epilepsy, but about 70% will eventually go into remission. After a first Sz, most may delay or prevent subsequent Sz, but they can cause SE & long-term benefit is unknown. Tx after a single Sz does not reduce risk of drug refractory epilepsy in the long term.
Initial workup: Physical exam, time line of events, medication history (OTC, herbal, drugs of abuse, prescription), & may include labs (CBC, glucose, sodium, calcium, magnesium, urea, creatinine, lactate, ammonia), ABG, blood cultures, serum anticonvulsant levels, & urine drug/alcohol screen.
 Mono Tx if possible. If ↑ Sz or ↑ SE: switch. Combo last resort. If stop Sz meds taper ≥2-3month, to ↓ Sz relapse risk. Consider stop Sz meds if: Kid Sz free for 1-2yr OR Adult Sz free for 3-5yr. New onset Sz³⁸: delaying tx not ↑ chronic Sz risk. ^{SZ free} ~68% Consider surgery if refractory Sz. ²⁶⁶

Levetiracetam KEPPRA g 250, 500, 750 mg tabs	Common: drowsy, dizzy, asthenia, fatigue, depression, psychosis, & rarely SJS/TENS, ↓WBC/Hg. (?abuse potential)	CBC Scr	ADJ: partial Sz→age≥1 ^{month} , JME ≥12 ^{yr} FDA ADJ: 1° GTC ≥6 ^{yr} ; option if LGS & absence ADV: ↓ rash. Dose ↓ if renal dysfx.	Few drug interactions Does not ↓ effect of BCP's	500mg bid ↑ 1g/d q2wk 3g/day	500mg po bid 1000mg po bid (1-3g/d) Ped: 10-60 mg/kg/d	440 860 222 g 417 g
Methsuximide CELONTIN D/C by co (300mg cap)	Common: nausea, diarrhea, drowsiness, hiccups & headache. Rare: skin rash, blood dyscrasias, lupus & behavioral changes esp. kids; p ↓ porphyria concern.	CBC, Platelets, Level	✓ Only for absence Sz. Does not protect for generalized tonic clonic Sz. Level 53-212 umol/l -trough	methsuximide ↑s levels of: phenobarbital, phenytoin & primidone methsuximide ↓s levels of: CBZ, lamotrigine ↓ methsuximide levels by: carbamazepine, phenobarbital & phenytoin	300mg od ↑ 300mg/d q1 week 1200mg/day	300mg po tid 300mg po qid (300-1200mg/d) Peds: 10-30mg/kg/d	350 460
Oxcarbazepine TRILEPTAL g active MHD met 150 ^o , 300 ^o , 600 ^o mg tab; 60mg/ml susp	Common: GI upset, sedation, diplopia, ↓sodium >3% & rash. A relative of CBZ Rare: skin SJS & TEN, p ↓ concern, angioedema Convert CBZ → this drug by 1.5x CBZ	See CBZ	✓ Mono→partial Sz adult & ≥4 ^{yr} FDA ✓ 2° Generalized, not myoclonic/absence ADV: ? ↓ CNS SE & rash vs CBZ	Similar DI's as per CBZ but less. (BCP's levels ↓; phenytoin levels ↑) Cross sensitivity with CBZ of 25%	150mg bid ↑ 300-600mg/d q1 week	600mg po bid 900mg po bid (600-2400mg/d) Peds: 8→10-50 mg/kg/d	690 g, 1020 g, 390 570
Nitrazepam MOGADON g (5, 10mg tab)	Common: Drowsiness (tolerance develops), dizziness, amnesia, ↑ traffic accidents, dependence, drooling & paradoxical anger. Rare: skin rash & thrombocytopenia.	? Platelets	✓ myoclonic & infantile spasms + & sedative/hypnotic	Few drug interactions. Tolerance in 1/3 pts in 6 months. ? ↑ Generalized tonic clonic Sz.	5mg po hs 60mg	2.5mg po tid 5mg po tid Peds: 0.25-1.2mg/kg/d	16 24
Phenobarbital g (15, 30 ^o , 60, 100mg tab; 5mg/ml soln; 30 ^o , 120mg/ml ^o amp PG) Special access: 60mg/ml inj	Common: sedation, rash 5-10%, ataxia, ↓ concentration & cognition, sleep problems, nystagmus, hyperactive. ↓ Vit D & K, & behavioral changes esp. in kids. Rare: blood dyscrasias, SJS & liver toxic; p; ? ↓ fertility	CBC, LFT Level	✓ partial seizures (1-12-24 months) Neonatal Sz Drug of choice, ↑ breast milk levels 2° generalized tonic-clonic (1mo-6yr) LD 20mg/kg IV @ 50-100mg/min Level 65-150 umol/l -trough	↑ phenobarbital level by: cimetidine, felbamate & valproate phenobarbital ↓s levels of: acetaminophen, BCP's, carbamazepine, cyclosporin, dasatinib, estrogen, lamotrigine, rifampin, theophylline, verapamil & warfarin	60-90mg hs ↑ 30mg/d q1 month 240mg/day	60mg po hs 90mg po hs (90-180mg/d) Peds: 2-8mg/kg/d	23 30
Phenytoin DILANTIN g (30, 100mg cap; 50 ^o mg chew tab; 6 & 25mg/ml susp; 100mg/2ml vial ^o) (92% phenytoin → cap & inj; 100% phenytoin → tab & susp)	Common: nausea, diarrhea, dizzy, ataxia, ↓ coordination & concentration, sedation, somnolence, tremor, rash 5-10% rarely serious, ↑ LFT GGT et al., blood dyscrasias, gingival hyperplasia 50% ↓ with folic acid, nystagmus, ↑ body hair, acne; ↓ folic/T4/Vit D & K level; lupus like rx & osteomalacia. Fosphenytoin (CEREBYX) IV friendly at 150mg/min 150mg Fosphenytoin (IV/IM)=100mg Phenytoin Asians with HLA-B* 1502, ? ↑ risk of skin rx; p concern.	CBC, LFT, Level Folate level	✓ 2° generalized tonic-clonic & Partial (not for absence Sz) LD 15-20mg/kg IV @ 50mg/min (LD option 400mg po stat, then 300mg po q2h x2 doses) Saturable kinetics ↑ dose → ↑ level IV → Purple glove syndrome occurs Correct level up for low albumin (Aib=20g/l → 100%; 30g/l → 40%; >36g/l → none) Level 40-80 umol/l -trough steady state >7days	↑ phenytoin level by: amiodarone, Bactrim, cimetidine, cipro, clobazam, disulfiram, felbamate, fluconazole, fluorouracil, isoniazid, methsuximide, oxcarbazepine, propoxyphene, rifampin, SSRIs & topiramate ↓ phenytoin level by: antacid, CBZ, folic acid, nasogastric feeds (caps daily in slurry an option, space 2hr), ritonavir, valproate & vigabatrin phenytoin ↓s levels of: amiodarone, BCP, CBZ, clobazam, dasatinib, delavirdine, dexamethasone, erlotinib, folate, irinotecan, itra-vori-conazole, lamotrigine, lopinavir/ritonavir, methadone, mexiletine, nevirapine, quinidine, rifampin, theophylline, tiagabine, topiramate, Vit D & warfarin	300mg hs ↑ 50- 100mg/d q1 month 400-600mg/d	300mg po hs 200mg po bid (300-400mg/d) Peds: 4→8 mg/kg/d IM → crystallization Caps → like CR product Susp → shake very well	33 41
Primidone MYSOLINE g (125 ^o , 250 ^o mg tab; 125mg chew tab ^o)	Common: sedation, rash ~5%, depression, nausea, dizzy, ↓ Vit D & K level & ↓ libido. {potential 1 st dose reaction ∴ start low dose} -metabolized to phenobarbital & PEMA	CBC, LFT Level	✓ partial & 2° generalized tonic clonic (less effective vs partial Sz than phenobarbital) ✓ essential tremor CI: porphyria P, Caution: ↑ breast milk levels Level 28-55 umol/l -trough	↑ primidone level by: isoniazid & valproate ↓ primidone level by: acetazolamide, carbamazepine, phenobarbital (but ↑ phenob. conversion) & phenytoin primidone ↓ levels of BCP's, chlorpromazine, furosemide, lamotrigine, quinidine, steroids, TCA	62.5mg hs ↑ by 62.5 - 125mg/d q3d 2000mg/day	125mg po tid 250mg po tid (500-1250mg/d) Peds: 50mg start, 10-25mg/kg/d	25 36
Topiramate TOPAMAX g (25, 50, 100, 200mg tab; 15, 25mg sprinkle cap)	Common: nausea, dizzy, tremor, ataxia, somnolence, cognitive dysfunction, headache, paresthesias -fingers & toes, fatigue, behavioral change, diarrhea, ↓ word finding, ↑ LFT's rare, nephrolithiasis & glaucoma. WEIGHT GAIN= loss possible (seems dose & duration dependent & > in ♀) Renal stones 1.5% thus ↑ fluid intake.	CNS SE ↑ with agents such as DVA. Adjust dose for Scr Infant Hypospadias -Teratogenic at tx dosage; ? concern	✓ mono→partial & 1° GTC ≥2yrs Alt: 1° generalized tonic-clonic & partial ≥2yr, atonic & adjunct for Lennox-Gastaut (LGS) → Age 2-16 ? ✓ myoclonic & absence Sz ✓ migraine prophylaxis; ✓ ↓ EtOH 126 Weight loss ~4kg ? dose related Broad spectrum of Sz activity	↓ topiramate level by: carbamazepine & phenytoin (~40%), valproate (~15%) ↑ renal stones with topiramate & : Aceta, dor & metho-zolamide; & ketogenic diet ? topiramate ↓s level of : BCP's ~30% esp >200mg/d, lamotrigine & dva. + dva → ↓ platelet & ↓ encephalopathy Lithium: may ↓ level, or at high dose	25mg bid ↑ 25-50mg/d q1 week 400-1000mg/d	100mg po bid 200mg po bid (200-600mg/d) Peds: 0.5 mg/kg/d start → 5-9 mg/kg/d	190/510 275/750 generic/Trade
Valproic acid -VPA DEPAKENE g (250mg cap; 500mg EC cap; 250mg/5ml syrup ^o given PR; injection SAP	As per DVA above but more GI side effects; most likely Sz med to cause serious hepatic & pancreatic toxicities	CBC, Platelets, LFT Level	divalproex & valproic acid are therapeutically, but not technically, interchangeable meds since they are distinct generic products. Syrup contains sorbitol, which may lead to diarrhea. As per divalproex above			500mg po bid 500mg po tid (1-3g/d)	120 180
Vigabatrin SABRIL (500 ^o mg tab, 500mg sachet)	Common: drowsy, dizzy, weight gain, fatigue, tremor, psychosis & depression ≤2%, ↑ behavioral changes in kids, tremor & peripheral vision Δ's.	Adjust dose for Scr Visual field	Alt: complex partial & mono tx for infantile spasm ≥100mg/kg/d may be needed May worsen absence & myoclonus. ADV: No skin, blood or liver SE.	vigabatrin ↓s levels of: phenytoin ~30% Does not ↓ effect of BCP's	500mg bid ↑ 1g/d q1 week 4000mg/d	1000mg po bid 1500mg po bid (2-3g/d) Peds: 30-150 mg/kg/d	390 575
Tiagabine GABITRIL 2,4,12, 16mg tab (SAP)	Common: ↓ coordination, drowsy, dizzy, headache, fatigue, asthenia, tremor, stupor nausea & depression. Rare new onset Sz's.		ADJ: partial Sz (≥ 12yr) May ↑ generalized & absence Sx ADV: low incidence of rash	↓ tiagabine levels by: carbamazepine, phenobarbital & phenytoin Does not ↓ effect of BCP's	2mg bid ↑ 4-8mg/d q1 week	16mg po bid cc 16mg po tid cc (32-56mg/d) Peds: 0.1→0.4-0.7 mg/kg/d	
Zonisamide ZONEGRAN 100mg tab (SAP)	Common: drowsy, ataxia, anorexia, fatigue, rash → sulfa med, hyperthermia, psychosis, renal stones ~4% ↓ weight, ↓ WBC, SJS & ↑ LFT	CBC, LFT, -harm animal	ADJ: partial Sz (≥ 16yr) ?/ generalized, infantile spasms, atypical absence & myoclonic Sz.	↓ zonisamide levels by: carbamazepine, phenobarbital & phenytoin ↑ renal stones with topiramate	100mg od/bid ↑ 100mg/d q2week	200mg po bid cc (100-600mg/d) 300mg po bid cc (od/bid) Peds: 1-2→6-8mg/kg/d	

Carbamazepine Level of: alprazolam, bendamustine, bupropion, clobazepam, cyclosporine, dexamethasone, diazepam, diliazem, doxycycline, ethosuximide, fentanyl, haloperidol, irinotecan, l-thyroxine, nevirapine, phenobarb, phenothiazines, pregnancy, rifampin, steroid, theophylline, triazolam, tricyclics, verapamil, voriconazole & warfarin.

PREGNANCY: Registry NA, Pregnancy Registry 1-888-233-2334 Risk ↑ if on multiple agents & ↑ dose; try for mono tx, split doses & ↓ serum level Check level each trimester. Try to avoid in 1st trimester. Vit K 210mg/day in last month. **Breastfeeding:** encourage if monotherapy. Monitor baby for sedation, feeding difficulties, adequate weight gain & developmental milestones; if present, limit exposure by introducing formula or wean off breastmilk. Avoid abrupt discontinuation of breastfeeding → withdrawal.

Rash: ↑ dose, ↑ too quick, if with valproic or in kids → ↑ rash. **Absence Sz:** ethosuximide, valproate, clobazepam, lamotrigine, levetira, clobazam, myoclonus, valproate, lamotrigine, levetira, clobazepam, clobazam & topiramate. **1° Generalized tonic-clonic:** valproate, carbamazepine, lamotrigine, levetira, oxcarb., phenytoin & topiramate. **Partial & 2° Sz:** CBZ, lamotrigine, oxcarb., levetiracetam, valproate, gabapentin, topiramate, pregabalin, phenytoin, clobazam, phenobarb., primidone & vigabatrin. **Young female:** use ↑ BCP 50ug dose/alternate contraception; give folic acid ≤5mg/d.

Drug induced Sz: alcohol, amoxapine, amphetamines, antipsychotics, benzo withdrawal, bupropion, cocaine, dalfampridine, ginkgo, imipenem & other carbapenems, lithium, maprotiline, mepredine, quinolones & theophylline. **Febrile Sz** fever provokes Sz ~5% of kids, often benign & no Tx acetaminophen/buprofen → comfort, phenobarb & DVA but ↑ SE. p-porphyria concern ✓ Useful for in ADJ=adjunctive ADV=adventive Alt=alternate BCP=birth control pill CI=contraindication CNS=central nervous sx CR=contraindication DX=disorder EC=enteric coated fct=f-function GTC=generalized tonic clonic LD=loading dose LFT=liver function test LGS=Lennox-Gastaut N/A=not applicable Peds=pediatric dose SE=side effect FDA Warning Jan 08, 2013, 211: trials with 11 antiepileptics had baseline ↑ 0.2%-0.4% risk for suicidal behavior or ideation. (Also new: **↑ drowning** risk) =-exception drug Sz =prior NIHB x=Non formulary SK =not NIHB ▼=covered NIHB =↓ dose for renal dysfx =scored tab SAP=Special Access Program Sz=seizure Consider ACTH or ketogenic diet.

New CDN: Lacosamide **Vimpat** = ≥4 yr old on partial onset sz, slow sodium channel inactivation; 50-100-150-200mg tabs po bid \$480-1090. = 200mg inj^o SE: dizzy, fatigue, ataxia, vision Δ's, headache, nausea, tremor, ↑PR interval (caution: beta-blocker & calcium channel blocker), euphoria, TENS, =, ? cognition, ? WBC, 2C19 metabolism to inactivate metabolite.

Rufinamide **Banzel** = ≥4 yr old & adults with LGS, atonic Sz; 100^o, 200^o, 400mg^o tabs; 40mg/ml susp; 100-200-400mg po bid with food \$150-315-650, Max 3200mg/day. May work on sodium channels. SE: vomiting, drowsy, irritable, ↓ appetite, tremor, diplopia. DI 344: carbamazepine, oral contraceptives, valproate, dig short QT.

Perampanel **Fycompa** = ≥12yr partial sz adj, ampa antagonist; 2-4-6-8-10-12mg tab hs; SE: ataxia, dizzy, drowsy, falls, ↑ wt, aggression, mood Δ's, DI 3A USA: Ezogabine **Potiga** ≥18yr partial sz adj, open K⁺ channel; 50,200,300,400mg tab tid; SE: dizzy, fatigue, ↑ wt/QT, hallucinate, urinary retention, Δ color eye skin, euphoria; DI: alcohol, CBZ, dig, phenytoin.

Antiepileptics- References:

Useful websites: www.epilepsy.org.uk , www.epilepsyfoundation.org , www.epilepsy.com , www.ibe-epilepsy.org , www.sign.ac.uk , www.nice.org.uk , & www.aana.com .

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Primidone and levetiracetam probably transfer into breast milk in clinically important amounts. Valproate, phenobarbital, phenytoin, and carbamazepine probably are not transferred into breast milk in clinically important amounts. Pregnancy probably causes an increase in the clearance and a decrease in the concentrations of lamotrigine, phenytoin, and, to a lesser extent carbamazepine, and possibly decreases the level of levetiracetam and the active oxcarbazepine metabolite, the monohydroxy derivative (MHD). Supplementing WVE with at least 0.4 mg of folic acid before pregnancy may be considered. Monitoring of lamotrigine, carbamazepine, and phenytoin levels during pregnancy should be considered, and monitoring of levetiracetam and oxcarbazepine (as MHD) levels may be considered.
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Adverse Effect on:		Most; and Least Likely Agents
Brain	Cognition	Barbs, Benzos
	Coordination	Barbs, Benzos, CBZ Phenytoin; 2 nd gen less so and least with Levetiracetam, Gabapentin
	Language	Topiramate
	Behavior, Personality	Barbs, Levetiracetam, Topiramate, Vigabatrin (+ psychiatric history increase risk)
Blood		CBZ, Phenytoin, Valproate
Bone		CBZ, Valproate
Liver, Pancreas		Valproate
Skin		CBZ, OxyCarb, Lamotrigine, Phenytoin (also related to Asian/genetics, age – Peds and Geriatrics, prior hx of skin rx, high initial dose or rapid dose escalation, immune system disorders, Herpes virus reactivation)
Weight (gain also associated with ↑ risk of CVD)		↑: Gabapentin, Pregabalin, Vigabatrin, Valproate, CBZ (moderate); ↓: Topiramate
Pregnancy		Barbs, Topiramate, Valproate; CBZ, Phenytoin, Lamotrigine
Female Hormones		Valproate (↑ Polycystic Ovarian Syndrome and Hirsutism in ♀); Levetiracetam least effect on OCs
Metabolic Enzyme Induction (Increased metabolic clearance of other substrates and reduced efficacy)		Barbs, CBZ, Phenytoin (reduce levels of antimicrobials, immunosuppressants, OCs, cardiovascular meds, psychotropics, antineoplastics, antiepileptics)
Metabolic Enzyme Inhibition (Decreased metabolic clearance of other substrates and increased/prolonged effects)		Valproate (TCAs, Barbs, Benzos, CBZ, lamotrigine, warfarin, zidovudine)

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