

**Lexicon Plus® drug codes used to determine gabapentin utilization**

<b>Drugs included and excluded for gabapentin utilization</b>	<b>Drug codes and names</b>
Drugs included for gabapentin utilization	94114 – gabapentin (generic) 94099 – Neurontin® (gabapentin) 11078 – Gralise® (gabapentin)
Drugs excluded for gabapentin utilization	11151 – Horizant® (gabapentin enacarbil) 14129 – amitriptyline-baclofen-gabapentin 08542 – gabapentin-ketoprofen-lidocaine topical 12242 – KBCGL cream (ketamine, baclofen, cyclobenzaprine, gabapentin, lidocaine)

**ICD-9-CM and ICD-10-CM codes to identify on-label and off-label indications**

<b>Disease/Condition</b>	<b>ICD-9-CM</b>	<b>ICD-10-CM</b>
<b>On-label indications</b>		
Partial onset seizures	345.40, 345.41, 345.70 345.50, 345.51	G40.20x, G40.10, G40.101, G40.109, G40.111, G40.119, G40.209, G40.201
Postherpetic neuralgia	053.10, 053.11, 053.12, 053.13, 053.14, 053.19	B02.21, B02.22, B02.23, B02.24, B02.29
<b>Off-label psychiatric indications of interest</b>		
<b>Anxiety disorders</b>		
Anxiety states	300.01-300.02, 300.10, 300.20-300.23, 300.29	F41.0, F41.1, F44.9, F40.9, F40.01, F40.02, F40.10, F40.8
Other psychiatric disorders	300.00, 300.09, 300.5	F41.9, F41.8, F48.8
Other developmental disability	313.0 313.21, 323.22	F93.8, F93.8
Anxiety disorder in conditions classified elsewhere	293.84	F06.4
<b>Depression/depressive disorders</b>		
Major depressive disorders	296.20-296.26, 296.30- 296.36	F32.0, F32.1, F32.2, F32.3, F32.4, F32.5, F32.9, F33.0, F33.1, F33.2, F33.3, F33.41, F33.42, F33.8, F33.9

Depressive disorder not elsewhere classified and dysthymic disorder	311, 300.4	F32.9, F34.1
Minor symptoms, signs and findings	V62.84	R45.851
<b>Bipolar disorders</b>		
Bipolar I and II disorders	296.00-296.06, 296.10-296.16, 296.40-296.46, 296.50-296.56, 296.60-296.66, 296.7, 296.80-296.82, 296.89, 296.90, 296.99	F30.10, F30.11, F30.12, F30.13, F30.2, F30.3, F30.4, F31.10, F31.2, F31.73, F31.74, F31.30, F31.31, F31.32, F31.4, F31.5, F31.75, F31.76, F31.60, F31.61, F31.62, F31.63, F31.64, F31.77, F31.78, F31.9, F30.8, F32.89, F31.81, F39, F34.81, F34.89
<b>Alcohol use disorders</b>		
Alcohol dependence and alcohol withdrawal	303.0x, 303.9x, 305.00-305.03, 648.31-648.32, 648.34, 655.51, 648.30, 648.33, 655.50, 655.53 980.0, 760.71, 779.5	F10.229, F10.20, F10.21, F10.10, F10.11, 026.819, 099.89, 099.320, 099.321, 099.322, 099.323, 099.324, 099.325, 035.5XX0, T51.0X1A, T51.0X2A, T51.0X3A, T51.0X4A, T51.91XA, T51.92XA, T51.93XA, T51.94XA P40.3, P96.1, P96.2
<b>Other psychiatric conditions</b>		
Posttraumatic stress disorder (PTSD)	309.81	F43.10, F43.12
Schizophrenia spectrum/psychoses disorders	295.00-295.05, 295.10-295.15, 295.20-295.25, 295.30-295.35, 295.40-295.45, 295.50-295.55, 295.60-295.65, 295.70-295.75, 295.80-295.85, 295.90-295.95, 297.0-297.3, 297.8-297.9, 298.2, 298.3, 298.8, 298.9	F20.89, F20.0, F20.1, F20.2, F20.3, F20.5, F20.81, F20.89, F20.9, F25.0, F25.1, F25.8, F25.9, F22, F24, F23, F28, F29, F44.89
Obsessive compulsive disorders (OCD)	300.3	F42.2, F42.3, F42.8, F42.9



**Specific drugs classes included as central nervous system depressant (CNS-D) prescription drugs**

Drug Class included as CNS-D	Generic and trade names included
Antihistamines (first generation)	Azatadine (Optimine), chlorpheniramine (Chlor-trimeton), diphenhydramine (Benadryl), doxylamine (Unisom), hydroxyzine (Vistaril), promethazine (Phenergan), triprolidine (Actidil)
Antidepressants (SNRIs, SSRIs and TCAs)	Citalopram (Celexa), escitalopram (Lexapro), fluoxetine HCL (Sarafem, Seronil, Prodin, Prozac), fluvoxamine maleate (Depromel, Luvox, Luvox CR), paroxetine HCL (Paxil, Paxil CR), paroxetine mesylate (Brisdelle, Pexeva), sertraline HCL (Zoloft); amitriptyline (Elavil), clomipramine (Anafranil), Mirtazapine (Remeron), Duloxetine (Cymbalta), desvenlafaxine (Pristiq, Khedezla), venlafaxine (Effexor), venlafaxine ER (Effexor ER), levomilnacipran (Fetzima)
Antipsychotics	Aripirazole (Abilify, Abilify Maintena, Aristada), asenapine (Saphris), cariprazine (Vraylar), chlorpromazine, clozapine (Clozaril), fluphenazine, haloperidol (Haldol), iloperidone (Fanapt), loxapine, lurasidone (Latuda), molindone, olanzapine (Zyprexa, Zyprexa Zydis), olanzapine-fluoxetine (Symbyax), paliperidone (Invega, Invega Sustenna, Invega Trinza), perphenazine, pimavanserin (Nuplazid), quetiapine (Seroquel, Seroquel XR), risperidone (Risperdal, Risperdal Consta), thioridazine, thiothixne (Navane), trifluoperazine, ziprasidone (Geodon)
Benzodiazepines	Alprazolam (Xanax, Xanax XR), chlordiazepoxide (Librium, Librax), clobazam (Onfi), clonazepam (Klonopin), clorazepate (Gen-Xene, Tranxene), diazepam (Diastat, Diastat Acudial, Valium), estazolam, flurazepam, lorazepam (Ativan), oxazepam, quazepam (Doral), teazepam (Restoril), triazolam (Halcion)
Sedatives and hypnotics	Butabarbital sodum (Butisol), eszopiclone (Lunesta), pentobarbital (Nembutal), ramelteon (Rozerem), secobarbital sodium (Seconal sodium), suvorexant (Belsomra), zaleplon (Sonata), zolpidem (Ambien, Ambien CR, Edluar, Intermezzo, Zolpimist)
Opioids and opioid-combination products	apomoprphine, atropine-morphine, bupivacaine-morphine, buprenorphine (Buprenex, Butrans), butorphanol (Stadol), codeine (Fioricet, Fiorinal), acetaminophen-codeine (apap w/ codeine, Capital w/ codeine, Empracet w/ codeine, Phenaphen w/ codine, Tylenol w/ codeine, Panadol w/ codeine, hydrocodone bitartrate w/ apap), dihydrocodeine (Synalgos-DC), fentanyl (Abstral, Actiq, Duragesic, Fentora, Onsolis, Subsys, Sublimaze), fentanyl-droperidol, hydrocodone (Hysingla, Lortab, Norco, Vicodin, Vicoprofen, Zohydro), hydrocodone-acetaminophen (Panlor), hydrocodone-aspirin, hydrocodone- chlorpheniramine, hydrocodone-ibuprofen, hydrocodone-homatropine, hydromorphone (Dilaudid, Exalgo, Palladone), hydromorphone-bupivicane, levorphanol (Levo-Dromoran), meperidine (Demerol, Meperitab), meperidine-

	acetaminophen (Demerol-apap), meperidine-promethazine, methadone (Dolophine), morphine/morphine ER (Avinza, Kadian, MS Contin, Oramorph, Roxanol), nalbuphine (Nubain), opium, opium-belladonna, oxycodone (Dazidox, Oxycontin, Roxicodone, Oxy IR, Oxyfast), oxycodone-acetaminophen (Magnacet, Narvox, Oxycet, Percocet), oxymorphone (Numorphan, Opana, Opana ER), pentazocine (Talwin), pentazocine-acetaminophen (Talacen), propoxyphene, propoxyphene-acetaminophen, remifentanil (Ultiva), sufentanil (Sufenta), tapentadol (Nucynta, Nucynta ER), tramadol (Conzip, Ryzolt, Ultracet, Ultram, Ultram ER), tramadol-acetaminophen, tramadol-aspirin, tramadol-carisoprodol
Skeletal muscle relaxants	Baclofen (Lioresal), carisoprodol (Soma), carisoprodol-aspirin, carisoprodol-aspirin-codeine, chlorzoxazone, chlorzoxazone-acetaminophen, cyclobenzaprine (Amrix, Flexeril), dantrolene (Dantrium), metaxalone (Skelaxin), methocarbamol (Robaxin, Robaxin-750), orphenadrine (Norflex), tizanidine (Zanaflex)

**Sensitivity analysis for proportions of on-label and off-label gabapentin utilization including all available diagnosis and medication variables, 2011-2016**

	2011 <sup>a</sup>		2012 <sup>b</sup>		2013 <sup>c</sup>		2014 <sup>d</sup>		2015 <sup>e</sup>		2016 <sup>f</sup>		Total	
Characteristic	N	%	N	%	N	%	N	%	N	%	N	%	N	%
<b>Gabapentin visits</b>	626	9.7	1,469	22.8	1,393	21.6	1,591	24.7	953	14.8	412	6.4	6,444	100
<b>Weighted visits<sup>g</sup> (in millions)</b>	16.2	9.7	16.8	22.8	23.9	21.6	29.7	24.7	34.8	14.8	28.7	6.4	150.2	100
<b>Proportion of on-label and off-label utilization<sup>h</sup></b>														
Any on-label indications	---	0.8	---	0.7	---	0.4	---	0.4	---	0.6	---	1.2	40	0.6
Any off-label indications	621	99.2	1,458	99.3	1,387	99.6	1,584	99.6	947	99.4	407	98.8	6,404	99.4

a. No changes from main analysis; 8 medication variables and 3 diagnosis variables included

b. 10 medication variables and 3 diagnosis variables included

c. 10 medication variables and 3 diagnosis variables included

d. 30 medication variables and 5 diagnosis variables included

e. 30 medication variables and 5 diagnosis variables included

f. 30 medication variables and 5 diagnosis variables included

g. Nationally representative weighted estimates

h. Cells with low sample size are suppressed per NAMCS reporting requirements

**Frequency of other provider specialties for U.S. ambulatory care visits involving on-label and off-label gabapentin by year, 2011-2016**

	2011		2012		2013		2014		2015		2016	
Characteristic	N	%	N	%	N	%	N	%	N	%	N	%
<b>Gabapentin visits</b>	626	10.9	1,382	24.1	1,275	22.2	1,320	23.0	788	13.7	341	6.0
<b>Weighted visits<sup>a</sup> (in millions)</b>	16.2	10.9	15.8	10.9	22.0	22.2	24.4	23.0	27.4	13.7	23.8	6.0
<b>Provider specialty</b>												
Primary care <sup>b</sup>	210	33.6	500	36.2	462	36.2	517	39.2	178	22.6	132	38.7
Neurology	171	27.2	138	10.0	131	10.3	75	5.7	139	17.6	48	14.1
Psychiatry	38	6.1	77	5.6	58	4.6	48	3.6	46	5.8	17	5.0
Other specialty	207	33.1	667	48.3	624	48.9	680	51.5	425	53.9	144	42.2
<b>Other provider specialty</b>												
General surgery	13	2.1	26	1.9	27	2.1	22	1.7	27	2.4	13	3.8
Orthopedic surgery	12	1.9	57	4.1	92	7.2	76	5.8	88	11.2	18	5.3
Cardiovascular diseases	31	5.0	78	5.6	70	5.5	77	5.8	54	6.9	17	5.0
Dermatology	3	0.5	8	0.6	5	0.4	12	0.9	35	4.4	9	2.6
Urology	18	2.9	19	1.4	15	1.2	29	2.2	67	8.5	13	3.8
Ophthalmology	17	2.7	21	1.5	37	2.9	26	2.0	60	7.6	22	6.2
Otolaryngology	14	2.2	15	1.1	12	0.9	14	1.1	39	5.0	12	3.5
Oncology (2011 only)	37	5.9	---	---	---	---	---	---	---	---	---	---
All others	62	9.9	443	32.1	366	28.7	424	32.1	55	7.0	41	12.0

a. Nationally representative weighted estimates

b. Primary care physicians are defined by NAMCS as general and family practice, internal medicine, pediatrics, obstetrics and gynecology