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Appendix 1. Current Procedural Terminology (CPT), International Disease Classification (ICD)-10, ICD-9, and Hospital International Classification of Diseases Adapted (HICDA) codes as well as natural language processing (NLP) terms used for patient comorbidity classification.

CPT	ICD-10	ICD-9	HICDA	NLP Terms
22102	0QB00ZZ	3.02	2990111	Lumbar surgery, lumbar procedure, thoracic surgery, thoracic procedure, cervical surgery, cervical procedure, sacral surgery, sacral procedure, spine surgery, spine procedure, spine fusion, spine arthrodesis, laminectomy, laminotomy, discectomy, diskectomy, microdiscectomy, microdiskectomy, spine decompression, lumbar decompression, thoracic decompression, cervical decompression, kyphoplasty, vertebroplasty, vertebrectomy, corpectomy, Spondylolysis, spondylolisthesis, ankylosing spondylitis, diffuse idiopathic spinal hyperostosis, DISH, spinal stenosis, radiculopathy, lumbar radiculopathy, thoracic radiculopathy, cervical radiculopathy, sacral radiculopathy, spine radiculopathy, stiff spine, spine stiffness, flat back, degenerative disc disease, degenerative disk disease, disk herniation, disc herniation, increased kyphosis, increased lordosis, decreased kyphosis, decreased lordosis, Parkinson's disease, Parkinson's, Parkinsons, Parkinson, normal pressure hydrocephalus, dementia, alzheimer's, alzheimers, alzheimer, multiple sclerosis, supranuclear palsy, ataxia, spastic, spasticity, peripheral neuropathy, alcoholism, alcoholic, fibromyalgia
22114	0RG6071	3.09	2998112	
22116	0RG607J	80.5	2998113	
22207	0RG60A0	80.51	3020110	
22212	0RG60A1	80.54	3022110	
22214	0RG7070	80.99	3023110	
22216	0RG7071	81.04	3025112	
22305	0RG70A0	81.05	3025120	
22310	0RG70A1	81.06	3059110	
22315	0RG70K1	81.07	3059113	
22318	0RG8071	81.08	3131110	
22325	0RGA071	81.09	3132110	
22327	0RGA0A0	81.34	3132111	
22328	0SB00ZZ	81.35	3132113	
22505	0SB20ZZ	81.36	3132114	
22511	0SB40ZZ	81.37	3132115	
22512	0SB70ZZ	81.38	3139110	
22513	0SG0071	81.39	3139111	
22514	0SG007J	81.61	3139210	
22520	0SG00A0	81.62	3139211	
22521	0SG00A1	81.63	3420110	

22522	0SG00AJ	81.64	3420114	
22523	0SG03Z1	81.65	3420120	
22524	0SG1070	81.66	3420121	
22525	0SG1071	84.59	3420122	
22556	0SG107J	290	3420123	
22558	0SG10A0	290.1	3420210	
22585	0SG10A1	290.2	3420430	
22610	0SG10AJ	290.3	3420810	
22612	0SG10Z1	290.4	3420811	
22614	0SG3070	290.41	3471210	
22630	0SG3071	290.9	3496112	
22632	0SG307J	291	3579223	
22633	0SG30A0	291.1	4251111	
22634	0SG30A1	291.2	5350430	
22800	0SG30AJ	291.3	5710110	
22802	0SG33Z1	291.8	5710111	
22804	0SG507Z	291.81	5710113	
22808	0SG707Z	291.82	5710115	
22810	0SG734Z	291.89	5710120	
22812	0SG737Z	291.9	5710410	
22830	0SG73JZ	294.1	5770110	
22841	0SG73KZ	294.1	5771112	
22842	0SG834Z	294.11	7124110	
22843	0SG837Z	294.2	7124111	
22844	0SG83JZ	294.21	7131110	

22845	0SG83KZ	294.8	7131112
22846	0SH008Z	294.9	7131114
22848	0SH00CZ	303	7131115
22849	0SH03CZ	303.01	7131119
22850	0SH30CZ	303.02	7131121
22851	0SH33CZ	303.03	7131122
22852	0SH704Z	303.9	7131130
22853	0SH734Z	303.91	7131220
22854	0SH804Z	303.92	7131230
63003	0SN00ZZ	303.93	7131240
63005	0SN40ZZ	305	7150410
63011	0SP004Z	305.01	7240120
63012	0SP00JZ	305.02	7250160
63016	0SP304Z	305.03	7251150
63017	0SR30KZ	331	7253150
63030	0ST20ZZ	331.11	7260150
63035	0ST40ZZ	331.19	7260151
63042	0RG7071	331.2	7270110
63044	0RGA071	331.3	7359121
63046	0SG1071	331.4	7561111
63047	0SG3071	331.5	7561120
63048	0SG30A0	331.7	7561131
63050	0SP004Z	331.82	7561230
63051	0ST40ZZ	331.83	7598110
63055	F01.50	331.89	7598210

63057	F01.51	331.9	7731110	
63077	F02.80	332	7731111	
63078	F02.81	332.1	7731112	
63085	F03.90	357.5	7731120	
63086	F03.91	425.5	7732110	
63087	F05	535.3	7732120	
63088	F10.10	535.3	7732130	
63090	F10.11	571	7732132	
63091	F10.120	571.1	7732140	
63101	F10.129	571.2	7732150	
63172	F10.14	571.3	7732151	
63200	F10.150	720	7732160	
63251	F10.151	720.2	7732210	
63252	F10.188	720.81	7732211	
63266	F10.19	720.89	7732220	
63267	F10.20	720.9	7732310	
63272	F10.21	721.1	7732311	
63276	F10.220	721.2	7732330	
63277	F10.229	721.3	7732341	
63278	F10.230	721.41	7732450	
63281	F10.231	721.42	7734110	
63282	F10.232	721.5	7734111	
63303	F10.239	721.6	7734210	
22214	F10.24	721.7	7734310	
22216	F10.280	721.9	7734320	

22558	F10.288	721.91	7734410
22612	F10.94	722.1	7734411
22614	F10.959	722.51	7734412
22843	F10.982	722.52	7734414
22845	F10.99	722.6	7734510
22848	G20	722.7	7886110
63005	G21.11	722.71	7886210
63047	G21.8	722.72	7886211
63048	G21.9	722.73	7886212
	G30.8	722.83	7886214
	G30.9	723	7886215
	G31.09	724	7886220
	G31.2	724.01	7893213
	G31.83	724.02	7893214
	G62.1	724.03	7893215
	I42.6	724.09	7901230
	K70.0	724.4	34632110
	K70.10	729.1	34632111
	K70.11	733.3	
	K70.30	738.4	
	K70.31	756.12	
	K70.40	756.83	
	K70.9	759.82	
	K85.2	790.3	
	M43.14	980.9	

M43.15	V11.3		
M43.16	V79.1		
M43.17			
M43.19			
M45.0			
M45.2			
M45.4			
M45.6			
M45.7			
M45.8			
M45.9			
M46.1			
M46.80			
M46.86			
M46.88			
M46.89			
M46.90			
M46.95			
M46.96			
M46.97			
M46.98			
M47.12			
M47.13			
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M47.24			
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M47.814			
M47.815			
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M48.10			
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M51.44			
M51.45			
M51.46			
M51.84			
M51.86			
M51.87			
M51.9			
M54.15			
M79.7			
M85.2			
M96.1			
Q76.2			
Q79.6			
Q87.40			
Q87.410			
Q87.418			
R78.0			

	Y90.1			
	Y90.3			
	Y90.5			
	Y90.7			
	Y90.8			
	Y90.9			