

Medications and conditions association analysis

A total of 17,924 GCAT participants were asked for their diagnosed conditions and their medication use. The participants could select their diagnosed conditions from a closed list of 27 frequent diseases or on a free text input if they couldn't find them on the list. A total of 26,966 conditions were reported, and 23,855 were manually codified as ICD-9 diagnosis codes. The remaining 3,111 didn't correspond to an unambiguous diagnosis and were discarded from the analysis. Medication use was also reported from a closed list of the most usual medications and in a free text input. A total of 18,333 medications were reported from the closed list and 3,147 were reported in the free text input. To correct the errors from the free text input, string similarity with the Levenshtein distance metric from the closed list of medications was applied with a conservative threshold to avoid misclassification and 925 medications were corrected. A total of 19,247 medications were transformed into Anatomical Therapeutic Chemical (ATC) codes.

An association analysis between medications and conditions was performed to assess the quality of the autoreported data. A wider level of specificity than the ICD-9 and the ATC codes was defined to group similar diagnosis and medications respectively. The ICD-9 codes were condensed into a common three-digit code. The 2nd level of the ATC codes, or therapeutic subgroup, was used. The odds ratio (OR) was calculated for every combination of medications and diagnosis, and the combinations with an OR greater than 2 were reported.

ICD9	Diagnosis	ATC	Medication	OR	Count	Interaction
274	Gout	M04	Antigout preparations	1805.06	68	59
365	Glaucoma	S01	Ophthalmologicals	1766.43	71	63
250	Diabetes mellitus	A10	Drugs used in diabetes	1003.43	603	333
558	Other and unspecified noninfectious gastroenteritis and colitis	A07	Antidiarrheals	802.78	52	25
530	Diseases of esophagus	A02	Drugs for acid related disorders	734.02	57	55
244	Acquired hypothyroidism	H03	Thyroid therapy	621.13	439	407
696	Psoriasis and similar disorders	D05	Antipsoriatics	496.11	674	51
285	Other and unspecified anemias	B03	Antianemic preparations	450.18	75	56
733	Other disorders of bone and cartilage	M05	Drugs for treatment of bone diseases	372.31	617	87
199	Malignant neoplasms, without specification of site	L02	Endocrine therapy	335.70	402	46
602	Other disorders of prostate	G04	Urologicals	322.13	69	57
401	Essential hypertension	C09	Agents acting on the renin-angiotensin system	310.06	2726	1489
246	Other disorders of thyroid	H03	Thyroid therapy	187.45	241	206
553	Other hernia of abdominal cavity without mention of obstruction or gangrene	A02	Drugs for acid related disorders	159.84	174	146
493	Asthma	R03	Anti-asthmatics	156.03	969	396
272	Disorders of lipid metabolism	C10	Lipid modifying agents	149.41	3404	1263
410	Acute myocardial infarction	B01	Antithrombotic agents	133.82	64	32
733	Other disorders of bone and cartilage	A12	Mineral supplements	112.59	617	176
401	Essential hypertension	C08	Calcium channel blockers	109.89	2726	171
780	General symptoms	N05	Psycholeptics	85.02	392	290
714	Rheumatoid arthritis and other inflammatory polyarthropathies	L01	Antineoplastic agents	53.57	543	20
401	Essential hypertension	C03	Diuretics	48.18	2726	288
242	Thyrotoxicosis with or without goiter	H03	Thyroid therapy	46.84	55	36
995	Certain adverse effects not elsewhere classified	R06	Antihistamines for systemic use	44.41	3084	616
472	Chronic pharyngitis and nasopharyngitis	R01	Nasal preparations	41.29	1396	207
401	Essential hypertension	C02	Antihypertensives	38.31	2726	34
530	Diseases of esophagus	A03	Drugs for functional gastrointestinal disorders	36.17	57	3
300	Anxiety, dissociative and somatoform disorders	N06	Psychoanaleptics	35.51	447	298
338	Pain, not elsewhere classified	N02	Analgesics	34.44	160	96
410	Acute myocardial infarction	C07	Beta blocking agents	34.25	64	24
311	Depressive disorder, not elsewhere classified	N06	Psychoanaleptics	34.19	1163	652
692	Contact dermatitis and other eczema	D07	Corticosteroids dermatological preparations	32.77	862	83
496	Chronic airway obstruction, not elsewhere classified	R03	Anti-asthmatics	25.98	88	34
339	Other headache syndromes	N02	Analgesics	24.68	155	81
401	Essential hypertension	C07	Beta blocking agents	22.46	2726	259
339	Other headache syndromes	M01	Antiinflammatory and antirheumatic products	22.19	155	83
300	Anxiety, dissociative and somatoform disorders	N05	Psycholeptics	21.83	447	203
338	Pain, not elsewhere classified	M01	Antiinflammatory and antirheumatic products	20.75	160	83
733	Other disorders of bone and cartilage	A11	Vitamins	20.54	617	71
530	Diseases of esophagus	L02	Endocrine therapy	20.25	57	3
995	Certain adverse effects not elsewhere classified	R01	Nasal preparations	19.47	3084	214
724	Other and unspecified disorders of back	M01	Antiinflammatory and antirheumatic products	19.46	70	36
602	Other disorders of prostate	A06	Laxatives	19.43	69	2
696	Psoriasis and similar disorders	D07	Corticosteroids dermatological preparations	19.15	674	56
722	Intervertebral disc disorders	N03	Antiepileptics	19.11	65	15
729	Other disorders of soft tissues	N02	Analgesics	17.28	153	67
715	Osteoarthritis and allied disorders	M01	Antiinflammatory and antirheumatic products	16.61	211	97
724	Other and unspecified disorders of back	N03	Antiepileptics	15.87	70	14
714	Rheumatoid arthritis and other inflammatory polyarthropathies	H02	Corticosteroids for systemic use	15.84	543	12
692	Contact dermatitis and other eczema	D11	Other dermatological preparations	15.70	862	11



Figure 1: Supplementary Figure 1