

DRUG PRESCRIPTION ANALYSIS

BNF chemical name	Drug/device name	Drug formulation	Drug strength	Item description	BNF sub-section	BNF sub-section.1	Number of dispensed items	Dispensed quantity	Gross ingredient cost (£)	Cost per item (£)	Quantity per item	
0	ABACAVIR	ABACAVIR	TABS	300 MG	NaN	HIV INFECTION	50301	23	1232.0	4290.44	186.540870	53.565217
1	ABACAVIR AND LAMIVUDINE	ABACAVIR AND LAMIVUDINE	TABS	NaN	600MG/300MG	HIV INFECTION	50301	24	678.0	6171.05	257.127083	28.250000
2	ABACAVIR AND LAMIVUDINE	KIVEXA	TABS	NaN	NaN	HIV INFECTION	50301	2	58.0	681.02	340.510000	29.000000
3	ABACAVIR, LAMIVUDINE AND DOLUTEGRAVIR	TRIUMEQ	TABS	NaN	NaN	HIV INFECTION	50301	663	21120.0	561106.48	846.314449	31.855204
4	ABATACEPT	ABATACEPT	INJ	125 MG/1ML	SOLUTION FOR INJECTION PREFILLED SYRINGE	RHEUMATIC DISEASE SUPPRESSANT DRUGS	100103	1	4.0	1209.60	1209.600000	4.000000

The shape of the dataset is: (10244, 12)
After dropping cells with empty cells n both drug strength and item description the total entries is 10244

Removing the non-drug rows using the drug formulation columns.

We realized that there are some drugs that has no drug strength in both the drug strength column and item description column (to put it simple there are some names in the BNF chemical name column that are not drug for example: cotton), so we need to drop them for better result.

To do that we need to know the types of drug in the drug formulation column.

The unique data in the Drug Formulation Columns:

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array(['TABS', 'INJ', nan, 'CAPS', 'SPRAY', 'DROPS', 'CREAM', 'OINT',  
      'SUSP', 'INHAL', 'GEL', 'SOLN', 'LOT', 'APPL', 'SYRUP', 'SACH',  
      'SOL', 'LOZ', 'OIL', 'TINCT', 'INF', 'LIQ', 'SUPPS', 'FOAM',  
      'ENEMA', 'PATCH', 'PDR', 'VACC', 'LINCT', 'SHAMP', 'EMULS',  
      'GRANS', 'MIXT', 'ELIX', 'TUBES', 'PESS', 'FILM', 'CRYST', 'AMPS',  
      'RUB', 'GUM', 'WATER', 'SCRUB', 'PAINT', 'RINSE'], dtype=object)
```

Merge the drug strength column with the item description column

After dropping the non-drugs we have the total of 6515 enteries in the dataset.

Merging the drug strength columns with the item description columns and drop unnecessary cells in the item description column.

To further simplify the dataset, drugs that appear to be drug mixtures will be splitted and placed in a new column while the non-drug mixtures will be in their existing columns

BNF chemical name quantity	Drug/device name		Drug formulation		Drug strength	Item description	BNF sub-section	BNF sub-section.1	Number of dispensed items		Dispensed	
	Gross ingredient cost (£)		Cost per item (£)	Quantity per item	merged_info	BNF_chemical_name(1)		BNF_chemical_name(2)	drug_strength(1)	drug_strength(2)		
0	ABACAVIR 53.565217	ABACAVIR 300 MG	TABS ABACAVIR	300 MG None	NaN 300 MG	HIV INFECTION None		50301	23	1232.0	4290.44	186.540870
1	ABACAVIR AND LAMIVUDINE 6171.05	ABACAVIR AND LAMIVUDINE 257.127083	TABS ABACAVIR	600MG/300MG ABACAVIR	NaN 600MG	HIV INFECTION LAMIVUDINE	600MG/300MG 600MG	50301	24	678.0		
4	ABATACEPT 1	ABATACEPT 4.0	INJ 1209.60	125 MG/1ML 1209.600000	SOLUTION FOR INJECTION PREFILLED SYRINGE 4.000000	125 MG/1ML ABATACEPT		RHEUMATIC DISEASE SUPPRESSANT DRUGS None	100103	1ML		
5	ABATACEPT 1.0	ORENCIA 302.40	INJ 302.400000	125 MG/1ML 1.000000	SOLUTION FOR INJECTION PREFILLED PEN 125 MG/1ML	ABATACEPT None		RHEUMATIC DISEASE SUPPRESSANT DRUGS 125 MG	100103	1ML	1	
6	ABIRATERONE 55.428030	ABIRATERONE 500 MG	TABS ABIRATERONE	500 MG None	NaN 500 MG	HORMONE ANTAGONISTS None		80304	7920	438990.0	21389480.55	2700.691989
7	ABIRATERONE ZYTIGA 55.642045	ABIRATERONE 500 MG	TABS ABIRATERONE	500 MG None	NaN 500 MG	HORMONE ANTAGONISTS None		80304	176	9793.0	478283.13	2717.517784
10	ACAMPROSATE CALCIUM 730319.86	ACAMPROSATE CALCIUM 36.547058	TABS ACAMPROSATE CALCIUM	333 MG 333 MG	333 MG ACAMPROSATE CALCIUM	EC None		ALCOHOL DEPENDENCE 333 MG	41001	19983	3252506.0	
11	ACAMPROSATE CALCIUM 27.900024	CAMPRAL 164.740625	TABS ACAMPROSATE CALCIUM	333 MG 333 MG	333 MG ACAMPROSATE CALCIUM	EC None		ALCOHOL DEPENDENCE 333 MG	41001	14720	2424982.0	410688.35

We create new columns in the dataset, bnf chemical name(1), bnf chemical name(2), drug strength(1) and drug strength (2). for the splitted drugs with there drug strength respectively. Conversion of drug strength measured in grams to grams.

BNF chemical name quantity	Drug/device name		Drug formulation		Drug strength	Item description	BNF sub-section	BNF sub-section.1	Number of dispensed items		Dispensed	
	Gross ingredient cost (£)	Cost per item (£)	Quantity per item	merged_info	BNF_chemical_name(1)	BNF_chemical_name(2)			drug_strength(1)	drug_strength(2)		
0	ABACAVIR 53.565217	ABACAVIR 300 MG	TABS ABACAVIR	300 MG None	NaN 300 MG	HIV INFECTION None	0.300	50301 NaN	23	1232.0	4290.44	186.540870
1	ABACAVIR AND LAMIVUDINE ABACAVIR AND LAMIVUDINE					TABS	NaN	600MG/300MG	HIV INFECTION	50301	24	678.0
	6171.05	257.127083	28.250000	600MG/300MG	ABACAVIR	LAMIVUDINE	600MG	300MG	0.600	0.3		
4	ABATACEPT 1	ABATACEPT 4.0	INJ 1209.60	125 MG/1ML 1209.600000	SOLUTION FOR INJECTION PREFILLED SYRINGE 4.000000	125 MG/1ML ABATACEPT		RHEUMATIC DISEASE SUPPRESSANT DRUGS None	125 MG	1ML	0.125	100103 NaN
5	ABATACEPT 1.0	ORENCIA 302.40	INJ 302.400000	125 MG/1ML 1.000000	SOLUTION FOR INJECTION PREFILLED PEN 125 MG/1ML	ABATACEPT	None	RHEUMATIC DISEASE SUPPRESSANT DRUGS 125 MG	100103	1ML	0.125	1 NaN
6	ABIRATERONE 55.428030	ABIRATERONE 500 MG	TABS ABIRATERONE	500 MG None	NaN 500 MG	HORMONE ANTAGONISTS None	0.500	80304 NaN	7920	438990.0	21389480.55	2700.691989

Calculate the consumed drug by multiplying drug strength with dispensed quantities

BNF chemical name quantity	Drug/device name			Drug formulation Drug strength		Item description	BNF sub-section	BNF sub-section.1	Number of dispensed items		Dispensed	
	Gross ingredient cost (£)	...	BNF_chemical_name(1)	BNF_chemical_name(2)	drug_strength(1)				drug_strength(2)	Drug_strength(1)(g)		
		Drug_strength(2)(g)										Drug_strength(1)(kg)
0	ABACAVIR ABACAVIR	ABACAVIR None	TABS 300 MG	300 MG None	NaN 0.3	HIV INFECTION NaN	0.0003	50301 NaN	23 0.3696	1232.0 NaN	4290.44	...
1	ABACAVIR AND LAMIVUDINE 6171.05	...	ABACAVIR LAMIVUDINE	ABACAVIR AND LAMIVUDINE 600MG	NaN 300MG	600MG/300MG 300MG	0.6	HIV INFECTION 0.3	0.0006	50301 0.0003	24 0.4068	678.0 0.2034

Drop the unwanted columns: BNF chemical name, drug strength, drug formulaton, item description, device name, drug strength(g).

BNF sub-section	Number of dispensed items		Dispensed quantity		Gross ingredient cost (£)		Cost per item (£)	Quantity per item	BNF_chemical_name(1)		BNF_chemical_name(2)	
	drug_strength(1)	drug_strength(2)	Drug_strength(1)(kg)	Drug_strength(2)(kg)	Drug_strength(2)(kg)	Drug_strength(2)(kg)	consumed_drug_1(kg)	consumed_drug_2(kg)	consumed_drug_1(kg)	consumed_drug_2(kg)	consumed_drug_1(kg)	consumed_drug_2(kg)
0	HIV INFECTION	23	1232.0	4290.44	186.540870	53.565217	ABACAVIR	None	300 MG	None	0.000300	
	NaN	0.369600	NaN									
1	HIV INFECTION	24	678.0	6171.05	257.127083	28.250000	ABACAVIR	LAMIVUDINE	600MG	300MG	0.000600	
	0.0003	0.406800	0.2034									
4	RHEUMATIC DISEASE SUPPRESSANT DRUGS	1	4.0	1209.60	1209.600000	4.000000	ABATACEPT	None	125 MG	1ML		
	0.000125	NaN	0.000500	NaN								
5	RHEUMATIC DISEASE SUPPRESSANT DRUGS	1	1.0	302.40	302.400000	1.000000	ABATACEPT	None	125 MG	1ML		
	0.000125	NaN	0.000125	NaN								

Exploratory Data Analysis

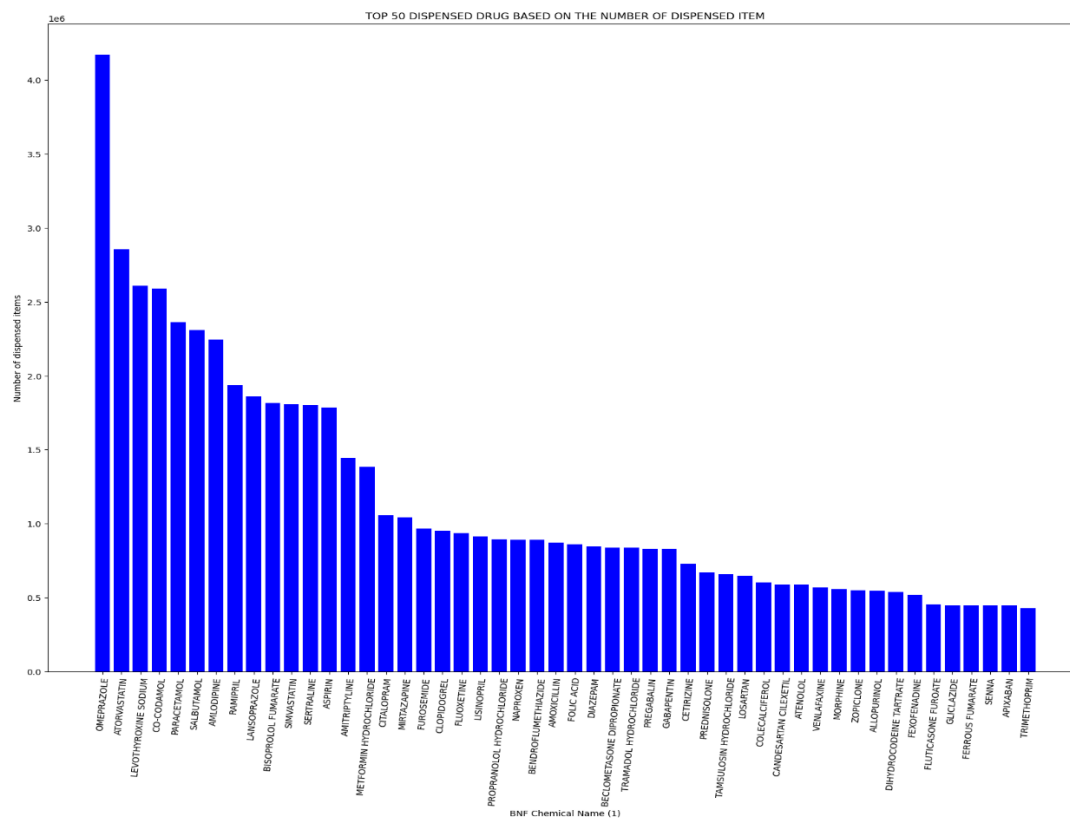
****Research Questions ****

What are the most commonly dispensed drugs based on the number of dispensed items?

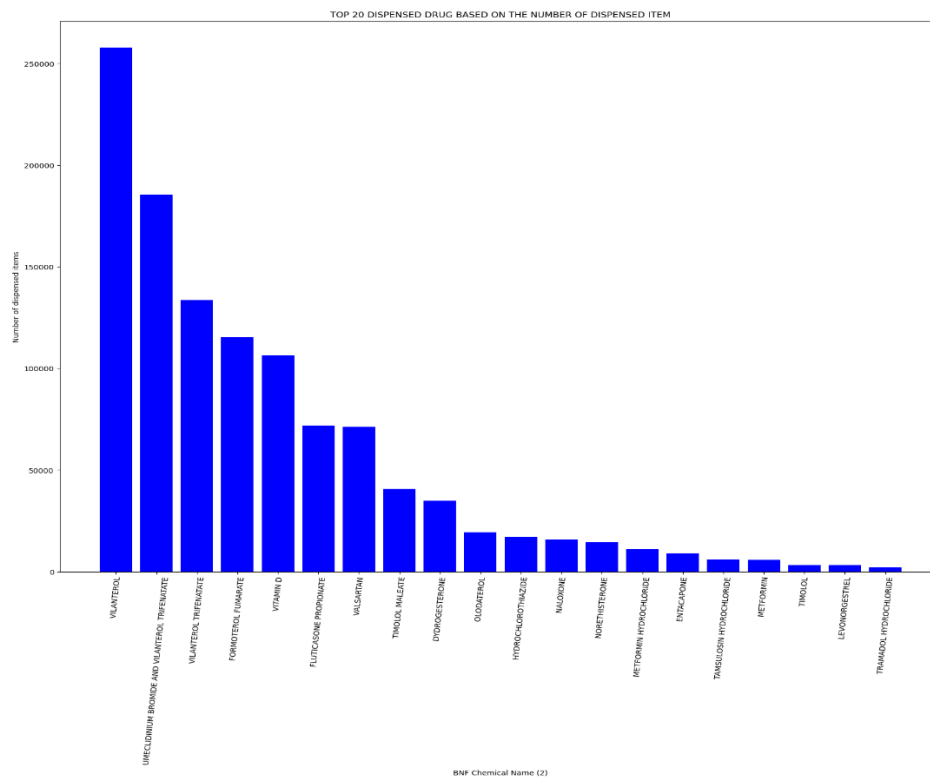
We checked for the most commonly dispensed drugs based on the number of dispensed items in the non-drug mixture that did not get splitted.

BNF_chemical_name(1)	Number of dispensed items	
777	OMEPRAZOLE	4172092
80	ATORVASTATIN	2855330
240	CO-CODAMOL	2630563
610	LEVOTHYROXINE SODIUM	2610046
796	PARACETAMOL	2362586

Omeprazole has the highest number of dispensed item with the total number of 4172092 in the BNF chemical name 1. It is used to treat certain stomach and esophagus problems (such as acid reflux, ulcers).



Next we check for same in the new column for the splitted drugs that came in drug mixtures



Are there any associations between disease groups and specific drugs or medication types?

This section we grouped the data by disease group and lists the unique drugs associated with each disease group. To identify which drugs or medication types are commonly prescribed for specific disease groups.

BNF sub-section: ADRENOCEPTOR AGONISTS

Chemical names or medication types: ['BAMBUTEROL HYDROCHLORIDE' 'EPHEDRINE HYDROCHLORIDE' 'FORMOTEROL FUMARATE' 'INDACATEROL' 'OLODATEROL' 'SALBUTAMOL' 'SALMETEROL' 'TERBUTALINE SULFATE']

BNF sub-section: ALCOHOL DEPENDENCE

Chemical names or medication types: ['ACAMPROSATE CALCIUM' 'DISULFIRAM' 'NALMEFENE']

BNF sub-section: ALKYLATING DRUGS

Chemical names or medication types: ['BUSULFAN' 'CYCLOPHOSPHAMIDE']

BNF sub-section: ALLERGEN IMMUNOTHERAPY

Chemical names or medication types: ['BENRALIZUMAB' 'MEPOLIZUMAB' 'OMALIZUMAB']

BNF sub-section: ALLERGIC EMERGENCIES

Chemical names or medication types: ['EPINEPHRINE']

BNF sub-section: ALPHA-ADRENOCEPTOR BLOCKING DRUGS

Chemical names or medication types: ['DOXAZOSIN' 'PHENOXYBENZAMINE HYDROCHLORIDE' 'PRAZOSIN HYDROCHLORIDE' 'TERAZOSIN']

BNF sub-section: AMINOGLYCOSIDES

Chemical names or medication types: ['AMIKACIN' 'GENTAMICIN' 'NEOMYCIN SULFATE' 'TOBRAMYCIN']

BNF sub-section: AMINOSALICYLATES

Chemical names or medication types: ['BALSALAZIDE SODIUM' 'MESALAZINE' 'OLSALAZINE SODIUM' 'SULFASALAZINE']

BNF sub-section: ANTACIDS AND SIMETICONE

Chemical names or medication types: ['ACTIVATED SIMETICONE' 'CO-MAGALDROX' 'CO-SIMALCITE' 'SODIUM BICARBONATE']

BNF sub-section: ANTI-LYMPHOCYTE MONOCLONAL ANTIBODIES

Chemical names or medication types: ['RITUXIMAB']

BNF sub-section: ANTIBACTERIALS

Chemical names or medication types: ['AZITHROMYCIN' 'HYDROCORTISONE' 'LEVOFLOXACIN' 'OFLOXACIN']

BNF sub-section: ANTIDIABETIC DRUGS

Chemical names or medication types: ['ACARBOSE' 'ALOGLIPTIN' 'CANAGLIFLOZIN' 'CANAGLIFLOZIN ' 'DAPAGLIFLOZIN' 'DULAGLUTIDE' 'EMPAGLIFLOZIN' 'EMPAGLIFLOZIN ' 'ERTUGLIFLOZIN' 'EXENATIDE' 'GLIBENCLAMIDE' 'GLICLAZIDE' 'GLIMEPIRIDE' 'GLIPIZIDE' 'LINAGLIPTIN' 'LIRAGLUTIDE' 'LIXISENATIDE' 'METFORMIN HYDROCHLORIDE' 'PIOGLITAZONE' 'REPAGLINIDE' 'SAXAGLIPTIN' 'SAXAGLIPTIN ' 'SEMAGLUTIDE' 'SITAGLIPTIN' 'TOLBUTAMIDE' 'VILDAGLIPTIN']

BNF sub-section: ANTIFIBRINOLYTIC DRUGS AND HAEMOSTATICS

Chemical names or medication types: ['TRANEXAMIC ACID']

BNF sub-section: ANTIFIBROTICS

Chemical names or medication types: ['PIRFENIDONE']

BNF sub-section: ANTIHISTAMINES

Chemical names or medication types: ['ACRIVASTINE' 'ALIMEMAZINE TARTRATE' 'CETIRIZINE' 'CHLORPHENAMINE MALEATE' 'CLEMASTINE' 'CYPROHEPTADINE HYDROCHLORIDE' 'DESLOMATADINE' 'DIPHENHYDRAMINE HYDROCHLORIDE' 'FEXOFENADINE' 'HYDROXYZINE HYDROCHLORIDE' 'KETOTIFEN' 'LEVOCETIRIZINE DIHYDROCHLORIDE' 'LORATADINE' 'MIZOLASTINE' 'PROMETHAZINE HYDROCHLORIDE' 'RUPATADINE']

BNF sub-section: ANTILEPROTIC DRUGS

Chemical names or medication types: ['DAPSONE']

BNF sub-section: ANTIMALARIALS

Chemical names or medication types: ['ATOVAQUONE' 'CHLOROQUINE' 'MEFLOQUINE' 'PYRIMETHAMINE' 'QUININE']

BNF sub-section: ANTIMETABOLITES

Chemical names or medication types: ['MERCAPTOPURINE' 'METHOTREXATE' 'RALTITREXED']

BNF sub-section: ANTIMIGRAINE DRUGS

Chemical names or medication types: ['ALMOTRIPTAN' 'CLONIDINE HYDROCHLORIDE' 'ELETRIPTAN' 'ERENUMAB' 'FREMANEZUMAB' 'FROVATRIPTAN' 'GALCANEZUMAB' 'NARATRIPTAN' 'PIZOTIFEN' 'RIZATRIPTAN' 'SUMATRIPTAN' 'TOLFENAMIC ACID' 'ZOLMITRIPTAN']

BNF sub-section: ANTIMOTILITY DRUGS

Chemical names or medication types: ['LOPERAMIDE HYDROCHLORIDE']

BNF sub-section: ANTIMUSCARINIC BRONCHODILATORS

Chemical names or medication types: ['ACLIDINIUM BROMIDE' 'GLYCOPYRRONIUM BROMIDE' 'IPRATROPIUM BROMIDE' 'TIOTROPIUM' 'UMECLIDINIUM BROMIDE']

BNF sub-section: ANTIMUSCARINIC DRUGS

Chemical names or medication types: ['ATROPINE SULFATE' 'GLYCOPYRRONIUM BROMIDE' 'HYOSCINE HYDROBROMIDE']

BNF sub-section: ANTIMUSCARINIC DRUGS USED IN PARKINSONIS

Chemical names or medication types: ['ORPHENADRINE HYDROCHLORIDE' 'PROCYCLIDINE HYDROCHLORIDE' 'TRIHEXYPHENIDYL HYDROCHLORIDE']

BNF sub-section: ANTIPLATELET DRUGS

Chemical names or medication types: ['ASPIRIN' 'CLOPIDOGREL' 'DIPYRIDAMOLE' 'PRASUGREL' 'TICAGRELOR']

BNF sub-section: ANTIPROLIFERATIVE IMMUNOSUPPRESSANTS

Chemical names or medication types: ['AZATHIOPRINE' 'MYCOPHENOLATE']

BNF sub-section: ANTIPSYCHOTIC DEPOT INJECTIONS

Chemical names or medication types: ['ARIPIRAZOLE' 'FLUPENTIXOL DECANOATE' 'FLUPHENAZINE DECANOATE' 'HALOPERIDOL DECANOATE' 'OLANZAPINE' 'PALIPERIDONE' 'RISPERIDONE' 'ZUCLOPENTHIXOL']

BNF sub-section: ANTIPSYCHOTIC DRUGS

Chemical names or medication types: ['AMISULPRIDE' 'ARIPIRAZOLE' 'BENPERIDOL' 'CHLORPROMAZINE HYDROCHLORIDE' 'CLOZAPINE' 'FLUPENTIXOL' 'FLUPENTIXOL DECANOATE' 'HALOPERIDOL' 'LEVOMEPROMAZINE' 'LURASIDONE HYDROCHLORIDE' 'OLANZAPINE' 'PALIPERIDONE' 'PERICHAZINE' 'PROMAZINE HYDROCHLORIDE' 'QUETIAPINE' 'RISPERIDONE' 'SULPIRIDE' 'TRIFLUOPERAZINE' 'ZOTEPINE' 'ZUCLOPENTHIXOL']

BNF sub-section: ANTISECRETORY DRUGS AND MUCOSAL PROTECTA

Chemical names or medication types: ['HELICOBACTER PYLORI TEST']

BNF sub-section: ANTISPASMODICS AND OTHER DRUGS ALTERING

Chemical names or medication types: ['ALVERINE CITRATE' 'DICYCLOVERINE HYDROCHLORIDE' 'GLYCOPYRRONIUM BROMIDE' 'HYOSCINE BUTYLBROMIDE' 'MEBEVERINE HYDROCHLORIDE' 'PROPANTHELINE BROMIDE']

BNF sub-section: ANTITHYROID DRUGS

Chemical names or medication types: ['CARBIMAZOLE' 'PROPYLTHIOURACIL']

BNF sub-section: ANTITUBERCULOSIS DRUGS

Chemical names or medication types: ['CAPREOMYCIN' 'CYCLOSERINE' 'ETHAMBUTOL HYDROCHLORIDE' 'ISONIAZID' 'PYRAZINAMIDE' 'RIFABUTIN' 'RIFAMPICIN' 'RIFAMPICIN']

BNF sub-section: ANXIOLYTICS

Chemical names or medication types: ['BUSPIRONE HYDROCHLORIDE' 'CHLORDIAZEPOXIDE' 'DIAZEPAM' 'LORAZEPAM' 'OXAZEPAM']

BNF sub-section: BETA-ADRENOCEPTOR BLOCKING DRUGS

Chemical names or medication types: ['ACEBUTOLOL' 'ATENOLOL' 'BISOPROLOL FUMARATE' 'CARVEDILOL' 'CELIPROLOL HYDROCHLORIDE' 'CO-TENIDONE' 'LABETALOL HYDROCHLORIDE' 'METOPROLOL TARTRATE' 'NADOLOL' 'NEBIVOLOL' 'PINDOLOL' 'PROPRANOLOL HYDROCHLORIDE' 'SOTALOL HYDROCHLORIDE' 'TIMOLOL MALEATE' 'TIMOLOL MALEATE ']

BNF sub-section: BISPHOSPHONATES AND OTHER DRUGS

Chemical names or medication types: ['ALENDRONIC ACID' 'ALENDRONIC ACID ' 'DENOSUMAB' 'DISODIUM ETIDRONATE' 'IBANDRONIC ACID' 'RISEDRONATE SODIUM' 'SODIUM CLODRONATE' 'ZOLEDRONIC ACID']

BNF sub-section: BROMOCRIPTINE AND OTHER DOPAMINERGIC DRUGS

Chemical names or medication types: ['BROMOCRIPTINE' 'CABERGOLINE' 'QUINAGOLIDE']

BNF sub-section: BULK-FORMING LAXATIVES

Chemical names or medication types: ['ISPAGHULA HUSK' 'METHYLCELLULOSE']

BNF sub-section: CALCITONIN AND PARATHYROID HORMONE

Chemical names or medication types: ['TERIPARATIDE']

BNF sub-section: CALCIUM AND MAGNESIUM

Chemical names or medication types: ['CALCIUM CARBONATE' 'CALCIUM GLUCONATE' 'CALCIUM LACTATE' 'CALCIUM INACALCET' 'MAGNESIUM ASPARTATE' 'MAGNESIUM GLYCEROPHOSPHATE']

BNF sub-section: CALCIUM-CHANNEL BLOCKERS

Chemical names or medication types: ['AMLODIPINE' 'DILTIAZEM HYDROCHLORIDE' 'FELODIPINE' 'LACIDIPINE' 'LERCANIDIPINE' 'NICARDIPINE HYDROCHLORIDE' 'NIFEDIPINE' 'NIMODIPINE' 'VERAPAMIL HYDROCHLORIDE']

BNF sub-section: CARDIAC GLYCOSIDES

Chemical names or medication types: ['DIGOXIN']

BNF sub-section: CENTRALLY-ACTING ANTIHYPERTENSIVE DRUGS

Chemical names or medication types: ['CLONIDINE HYDROCHLORIDE' 'METHYLDOPA' 'MOXONIDINE']

BNF sub-section: CEPHALOSPORINS AND OTHER BETA-LACTAMS

Chemical names or medication types: ['AZTREONAM' 'CEFACLOR' 'CEFADROXIL' 'CEFALEXIN' 'CEFIXIME' 'CEFOTAXIME' 'CEFRADINE' 'CEFTAZIDIME' 'CEFTRIAZONE SODIUM' 'CEFUROXIME' 'ERTAPENEM' 'MEROPENEM']

BNF sub-section: CHELATES AND COMPLEXES

Chemical names or medication types: ['SUCRALFATE']

BNF sub-section: CLINDAMYCIN AND LINCOMYCIN

Chemical names or medication types: ['CLINDAMYCIN']

BNF sub-section: CNS STIMULANTS AND DRUGS USED FOR ADHD

Chemical names or medication types: ['ATOMOXETINE' 'CAFFEINE CITRATE' 'DEXAMFETAMINE SULFATE' 'GUANFACINE HYDROCHLORIDE' 'LISDEXAMFETAMINE DIMESYLATE' 'METHYLPHENIDATE HYDROCHLORIDE' 'MODAFINIL']

BNF sub-section: COMBINED HORMONAL CONTRACEPTIVES AND SYSTEMIC

Chemical names or medication types: ['DROSPIRENONE' 'ETHINYLESTRADIOL']

BNF sub-section: COMPOUND BRONCHODILATOR PREPARATIONS

Chemical names or medication types: ['ACLDINIUM BROMIDE' 'GLYCOPYRRONIUM' 'TIOTROPIUM' 'UMECLIDIUM BROMIDE']

BNF sub-section: CONTROL OF EPILEPSY

Chemical names or medication types: ['BRIVARACETAM' 'CANNABIDIOL' 'CARBAMAZEPINE' 'CLOBAZAM' 'CLOBAZEPAM' 'ESLICARBAZEPINE' 'ETHOSUXIMIDE' 'GABAPENTIN' 'LACOSAMIDE' 'LAMOTRIGINE' 'LEVETIRACETAM' 'OXCARBAZEPINE' 'PERAMPANEL' 'PHENOBARBITAL' 'PHENYTOIN' 'PREGABALIN' 'PRIMIDONE' 'RUFINAMIDE' 'SODIUM VALPROATE' 'STIRIPENTOL' 'TIAGABINE' 'TOPIRAMATE' 'VIGABATRIN' 'ZONISAMIDE']

BNF sub-section: CORONAVIRUS

Chemical names or medication types: ['MOLNUPIRAVIR' 'PF-07321332 ']

BNF sub-section: CORTICOSTEROIDS

Chemical names or medication types: ['BECLOMETASONE DIPROPIONATE' 'BUDESONIDE' 'METHYLPREDNISOLONE'
'PREDNISOLONE' 'TRIAMCINOLONE ACETONIDE' 'TRIAMCINOLONE HEXACETONIDE']

BNF sub-section: CORTICOSTEROIDS (RESPIRATORY)

Chemical names or medication types: ['BECLOMETASONE DIPROPIONATE' 'BUDESONIDE' 'BUDESONIDE ' 'CICLESONIDE'
'FLUTICASONE FUROATE' 'FLUTICASONE FUROATE ' 'FLUTICASONE PROPIONATE'
'FORMOTEROL' 'INDACATEROL ' 'MOMETASONE FUROATE' 'SALMETEROL ']

BNF sub-section: CORTICOSTEROIDS AND OTHER IMMUNOSUPPRESS

Chemical names or medication types: ['CICLOSPORIN' 'SIROLIMUS' 'TACROLIMUS']

BNF sub-section: COUGH SUPPRESSANTS

Chemical names or medication types: ['CODEINE PHOSPHATE' 'DEXTROMETHORPHAN HYDROBROMIDE' 'PHOLCODINE']

BNF sub-section: CROMOGLYCATE AND RELATED THERAPY

Chemical names or medication types: ['SODIUM CROMOGLICATE']

BNF sub-section: CYTOTOXIC DRUGS

Chemical names or medication types: ['CALCIUM FOLINATE' 'MESNA']

BNF sub-section: DOPAMINERGIC DRUGS USED IN PARKINSONISM

Chemical names or medication types: ['AMANTADINE HYDROCHLORIDE' 'APOMORPHINE HYDROCHLORIDE' 'CABERGOLINE'
'CO-BENELDOPA' 'CO-CARELDOPA' 'CO-CARELDOPA ' 'ENTACAPONE' 'OPICAPONE'
'PRAMIPEXOLE' 'RASAGILINE' 'ROPINIROLE' 'ROTIGOTINE' 'SAFINAMIDE'
'SELEGILINE' 'TOLCAPONE']

BNF sub-section: DRUGS AFFECTING BILIARY COMPOSITION & FLOW

Chemical names or medication types: ['CHENODEOXYCHOLIC ACID' 'OBETICHOLIC ACID' 'URSODEOXYCHOLIC ACID']

BNF sub-section: DRUGS AFFECTING GONADOTROPHINS

Chemical names or medication types: ['BUSERELIN' 'CETRORELIX' 'DANAZOL' 'NAFARELIN']

BNF sub-section: DRUGS AFFECTING THE IMMUNE RESPONSE

Chemical names or medication types: ['PIMECROLIMUS']

BNF sub-section: DRUGS FOR ARRHYTHMIAS

Chemical names or medication types: ['AMIODARONE HYDROCHLORIDE' 'DISOPYRAMIDE' 'DRONEDARONE HYDROCHLORIDE'
'FLECAINIDE ACETATE' 'MEXILETINE HYDROCHLORIDE'
'PROPafenone HYDROCHLORIDE']

BNF sub-section: DRUGS FOR DEMENTIA

Chemical names or medication types: ['DONEPEZIL HYDROCHLORIDE' 'GALANTAMINE' 'MEMANTINE' 'RIVASTIGMINE']

BNF sub-section: DRUGS FOR ERECTILE DYSFUNCTION

Chemical names or medication types: ['ALPROSTADIL' 'AVANAFIL' 'SILDENAFIL' 'TADALAFIL' 'VARDENAFIL']

BNF sub-section: DRUGS FOR ORAL ULCERATION AND INFLAMMATI

Chemical names or medication types: ['DOXYCYCLINE' 'FLURBIPROFEN' 'HYDROCORTISONE']

BNF sub-section: DRUGS FOR PNEUMOCYSTIS PNEUMONIA

Chemical names or medication types: ['ATOVAQUONE' 'PENTAMIDINE ISETIONATE']

BNF sub-section: DRUGS FOR PREMATURE EJACULATION

Chemical names or medication types: ['DAPOXETINE']

BNF sub-section: DRUGS FOR THREADWORMS

Chemical names or medication types: ['MEBENDAZOLE']

BNF sub-section: DRUGS FOR URINARY FREQUENCY ENURESIS AND

Chemical names or medication types: ['DARIFENACIN' 'DULOXETINE' 'FESOTERODINE' 'FLAVOXATE HYDROCHLORIDE']

'MIRABEGRON' 'OXYBUTYNIN HYDROCHLORIDE' 'PROPIVERINE HYDROCHLORIDE'
'SOLIFENACIN' 'TOLTERODINE' 'TROSPIMUM CHLORIDE']

BNF sub-section: DRUGS FOR URINARY RETENTION

Chemical names or medication types: ['ALFUZOSIN HYDROCHLORIDE' 'BETHANECHOL CHLORIDE' 'DUTASTERIDE']

'INDORAMIN' 'TAMSULOSIN HYDROCHLORIDE']

BNF sub-section: DRUGS USED FOR MANIA AND HYPOMANIA

Chemical names or medication types: ['ASENAPINE' 'LITHIUM CARBONATE' 'LITHIUM CITRATE' 'SODIUM VALPROATE']

BNF sub-section: DRUGS USED IN MEGALOBLASTIC ANAEMIAS

Chemical names or medication types: ['CYANOCOBALAMIN' 'FOLIC ACID' 'HYDROXOCOBALAMIN']

BNF sub-section: DRUGS USED IN METABOLIC DISORDERS

Chemical names or medication types: ['GLYCEROL PHENYL BUTYRATE' 'LEVOCARNITINE' 'MERCAPTAMINE BITARTRATE']

'SODIUM PHENYL BUTYRATE' 'TRIENTINE DIHYDROCHLORIDE'
'TRIENTINE TETRAHYDROCHLORIDE' 'ZINC ACETATE']

BNF sub-section: DRUGS USED IN NASAL ALLERGY

Chemical names or medication types: ['AZECLASTINE HYDROCHLORIDE' 'AZECLASTINE HYDROCHLORIDE'
'BECLOMETASONE DIPROPIONATE' 'BUDESONIDE' 'FLUTICASONE FUROATE'
'FLUTICASONE PROPIONATE' 'MOMETASONE' 'MOMETASONE FUROATE']

BNF sub-section: DRUGS USED IN NAUSEA AND VERTIGO

Chemical names or medication types: ['APREPITANT' 'BETAHISTINE DIHYDROCHLORIDE' 'CINNARIZINE' 'CINNARIZINE']

'CYCLIZINE' 'DOMPERIDONE' 'DOXYLAMINE SUCCINATE'
'GRANISETRON HYDROCHLORIDE' 'HYOSCINE HYDROBROMIDE'
'HYOSCINE HYDROBROMIDE 1.5MG' 'KETAMINE' 'METOCLOPRAMIDE HYDROCHLORIDE'
'NABILON' 'ONDANSETRON' 'PROCHLORPERAZINE' 'PROMETHAZINE THEOCATE']

BNF sub-section: DRUGS USED IN NEUTROPENIA

Chemical names or medication types: ['FILGRASTIM' 'LENOGRASTIM']

BNF sub-section: DRUGS USED IN PLATELET DISORDERS

Chemical names or medication types: ['ANAGRELIDE' 'ELTROMBOPAG']

BNF sub-section: DRUGS USED IN STATUS EPILEPTICUS

Chemical names or medication types: ['MIDAZOLAM HYDROCHLORIDE' 'PHENYTOIN']

BNF sub-section: DRUGS WHICH ENHANCE NEUROMUSCULAR TRANSM

Chemical names or medication types: ['AMIFAMPRIDINE' 'FAMPRIDINE' 'PYRIDOSTIGMINE BROMIDE']

BNF sub-section: EMERGENCY CONTRACEPTION

Chemical names or medication types: ['LEVONORGESTREL' 'ULIPRISTAL']

BNF sub-section: ESSENTIAL TREMOR, CHOREA, TICS AND RELATED

Chemical names or medication types: ['PIRACETAM' 'RILUZOLE' 'TETRABENAZINE']

BNF sub-section: FEMALE SEX HORMONES AND THEIR MODULATORS

Chemical names or medication types: ['ESTRADIOL' 'ESTRADIOL VALERATE' 'ESTRADIOL' 'ETHINYLESTRADIOL']

'MEDROXYPROGESTERONE ACETATE' 'NORETHISTERONE' 'OESTROGENS CONJUGATED'
'PROGESTERONE' 'RALOXIFENE HYDROCHLORIDE' 'TIBOLONE' 'ULIPRISTAL']

BNF sub-section: FLUORIDE

Chemical names or medication types: ['SODIUM FLUORIDE']

BNF sub-section: FOOD ALLERGY

Chemical names or medication types: ['SODIUM CROMOGLICATE']

BNF sub-section: FOODS FOR SPECIAL DIETS

Chemical names or medication types: ['FOODS FOR SPECIAL DIETS' 'FOSTAMATINIB']

BNF sub-section: GASTRO-INTESTINAL ANTI-OBESITY DRUGS

Chemical names or medication types: ['ORLISTAT']

BNF sub-section: GLUCOCORTICOID THERAPY

Chemical names or medication types: ['BETAMETHASONE' 'DEFLAZACORT' 'DEXAMETHASONE' 'HYDROCORTISON
E'
'METHYLPREDNISOLONE' 'PREDNISOLONE' 'PREDNISONE']

BNF sub-section: GOUT AND CYTOTOXIC INDUCED HYPERURICAEMIA

Chemical names or medication types: ['ALLOPURINOL' 'COLCHICINE' 'FEBUXOSTAT' 'SULFINPYRAZONE']

BNF sub-section: H2-RECEPTOR ANTAGONISTS

Chemical names or medication types: ['CIMETIDINE' 'FAMOTIDINE' 'NIZATIDINE' 'RANITIDINE']

BNF sub-section: HERPESVIRUS INFECTIONS

Chemical names or medication types: ['ACICLOVIR' 'FAMCICLOVIR' 'GANCICLOVIR' 'INOSINE ACEDOBEN DI
MEPRANOL'
'VALACICLOVIR' 'VALGANCICLOVIR']

BNF sub-section: HIV INFECTION

Chemical names or medication types: ['ABACAVIR' 'ATAZANAVIR' 'BICTEGRAVIR' 'DARUNAVIR' 'DARUNAVI
R'
'DOLUTEGRAVIR' 'DORAVIRINE' 'DORAVIRINE, LAMIVUDINE' 'EMTRICITABINE'
'EMTRICITABINE' 'ETRAVIRINE' 'LAMIVUDINE' 'NEVIRAPINE' 'RALTEGRAVIR'
'RITONAVIR' 'TENOFVIR DISOPROXIL']

BNF sub-section: HORMONE ANTAGONISTS

Chemical names or medication types: ['ABIRATERONE' 'ANASTROZOLE' 'BICALUTAMIDE' 'BUSERELIN'
'CYPROTERONE ACETATE' 'DEGARELIX' 'ENZALUTAMIDE' 'EXEMESTANE' 'FLUTAMIDE'
'FULVESTRANT' 'GOSERELIN' 'LANREOTIDE' 'LETROZOLE' 'LEUPRORELIN ACETATE'
'OCTREOTIDE' 'PASIREOTIDE' 'TAMOXIFEN' 'TOREMIFENE' 'TRIPTORELIN']

BNF sub-section: HYPNOTICS

Chemical names or medication types: ['CHLORAL HYDRATE' 'CLOMETHIAZOLE' 'CLORAL BETAINE' 'LOPRAZOL
AM'
'LORMETAZEPAM' 'MELATONIN' 'NITRAZEPAM' 'SODIUM OXYBATE' 'TEMAZEPAM'
'ZOLPIDEM' 'ZOPICLONE']

BNF sub-section: HYPOPLASTIC, HAEMOLYTIC AND RENAL ANAEMIA

Chemical names or medication types: ['DARBEPOETIN ALFA' 'DEFERASIROX' 'DEFERIPRONE' 'HYDROXYCARBA
MIDE'
'METHOXY POLYETHYLENE GLYCOL-EPOETIN BETA' 'OXYMETHOLONE']

BNF sub-section: HYPOTHALAMIC & ANTERIOR PITUITARY HORMON

Chemical names or medication types: ['CHORIOGONADOTROPIN ALFA' 'CLOMIFENE CITRATE' 'PEGVISOMANT'
'SOMATROPIN']

BNF sub-section: INFLUENZA

Chemical names or medication types: ['OSELTAMIVIR']

BNF sub-section: INTRAVENOUS ANAESTHETICS

Chemical names or medication types: ['KETAMINE']

BNF sub-section: IRON-DEFICIENCY ANAEMIAS

Chemical names or medication types: ['FERROUS FUMARATE' 'FERROUS GLUCONATE' 'FERROUS SULFATE' 'IR
ON DEXTRAN'
'IRON SUCROSE' 'SODIUM FEREDETATE']

BNF sub-section: LEUKOTRIENE RECEPTOR ANTAGONISTS

Chemical names or medication types: ['MONTELUKAST']

BNF sub-section: LIPID-REGULATING DRUGS

Chemical names or medication types: ['ACIPIMOX' 'ALIROCUMAB' 'ATORVASTATIN' 'BEMPEDOIC ACID' 'BEZ
AFIBRATE'
'CIPROFIBRATE' 'COLESEVELAM HYDROCHLORIDE' 'COLESTIPOL HYDROCHLORIDE'
'COLESTYRAMINE' 'EVOLOCUMAB' 'EZETIMIBE' 'FENOFIBRATE' 'FLUVASTATIN'
'GEMFIBROZIL' 'INCLISIRAN' 'OMEGA 3-ACID ETHYL ESTERS' 'PRAVASTATIN'
'ROSUVASTATIN' 'SIMVASTATIN']

BNF sub-section: LOCAL ANAESTHETICS

Chemical names or medication types: ['LIDOCAINE' 'LIDOCAINE HYDROCHLORIDE' 'PRILOCAINE HYDROCHLOR
IDE']

BNF sub-section: LOOP DIURETICS

Chemical names or medication types: ['BUMETANIDE' 'FUROSEMIDE' 'TORASEMIDE']

BNF sub-section: LOZENGES AND SPRAYS

Chemical names or medication types: ['DEQUALINIUM CHLORIDE']

BNF sub-section: MACROLIDES

Chemical names or medication types: ['AZITHROMYCIN' 'CLARITHROMYCIN' 'ERYTHROMYCIN']

BNF sub-section: MALE SEX HORMONES AND ANTAGONISTS

Chemical names or medication types: ['CYPROTERONE ACETATE' 'DUTASTERIDE' 'FINASTERIDE' 'TESTOSTERONE']

'TESTOSTERONE ENANTATE' 'TESTOSTERONE PROPIONATE'

'TESTOSTERONE UNDECANOATE']

BNF sub-section: METRONIDAZOLE, TINIDAZOLE AND ORNIDAZOLE

Chemical names or medication types: ['METRONIDAZOLE' 'TINIDAZOLE']

BNF sub-section: METYRAPONE

Chemical names or medication types: ['METYRAPONE']

BNF sub-section: MONOAMINE-OXIDASE INHIBITORS (MAOIS)

Chemical names or medication types: ['ISOCARBOXAZID' 'MOCLOBEMIDE' 'PHENELZINE' 'TRANLYCYPROMINE']

BNF sub-section: MUCOLYTICS

Chemical names or medication types: ['ACETYLCYSTEINE' 'CARBOCISTEINE' 'DORNASE ALFA' 'ERDOSTEINE' 'MANNITOL']

'MECYSTEINE HYDROCHLORIDE']

BNF sub-section: NICOTINE DEPENDENCE

Chemical names or medication types: ['AMFEBUTAMONE' 'NICOTINE' 'VARENICLINE TARTRATE']

BNF sub-section: NITRATES

Chemical names or medication types: ['GLYCERYL TRINITRATE' 'ISOSORBIDE DINITRATE' 'ISOSORBIDE MONONITRATE']

BNF sub-section: NON-OPIOID ANALGESICS AND COMPOUND PREPA

Chemical names or medication types: ['ASPIRIN' 'CO-CODAMOL' 'CO-CODAPRIN' 'CO-DYDRAMOL' 'NEFOPAM HYDROCHLORIDE' 'PARACETAMOL']

BNF sub-section: NON-STEROIDAL ANTI-INFLAMMATORY DRUGS

Chemical names or medication types: ['ACECLOFENAC' 'CELECOXIB' 'DEXIBUPROFEN' 'DEXKETOPROFEN' 'DICLOFENAC']

'DICLOFENAC' 'ETODOLAC' 'ETORICOXIB' 'FLURBIPROFEN' 'IBUPROFEN'

'INDOMETACIN' 'KETOPROFEN' 'MEFENAMIC ACID' 'MELOXICAM' 'NABUMETONE'

'NAPROXEN' 'PHENYLBUTAZONE' 'PIROXICAM' 'SULINDAC' 'TENOXICAM'

'TIAPROFENIC ACID']

BNF sub-section: OCULAR DIAGNOSTIC & PERI-OPERATIVE PREPN

Chemical names or medication types: ['BROMFENAC' 'NEPAFENAC']

BNF sub-section: OESTROGENS

Chemical names or medication types: ['DIETHYLSTILBESTROL']

BNF sub-section: OPIOID ANALGESICS

Chemical names or medication types: ['BUPRENORPHINE' 'CODEINE PHOSPHATE' 'DIAMORPHINE HYDROCHLORIDE']

'DIHYDROCODEINE TARTRATE' 'DIPIANONE' 'FENTANYL'

'HYDROMORPHONE HYDROCHLORIDE' 'MEPTAZINOL' 'METHADONE HYDROCHLORIDE'

'MORPHINE' 'OXYBUTYNIN HYDROCHLORIDE' 'OXYCODONE' 'PARACETAMOL'

'PENTAZOCINE' 'PETHIDINE HYDROCHLORIDE' 'TAPENTADOL'

'TRAMADOL HYDROCHLORIDE']

BNF sub-section: OPIOID DEPENDENCE

Chemical names or medication types: ['BUPRENORPHINE' 'METHADONE HYDROCHLORIDE' 'NALTREXONE HYDROCHLORIDE']

BNF sub-section: ORAL ANTICOAGULANTS

Chemical names or medication types: ['ACENOCOUMAROL' 'APIXABAN' 'DABIGATRAN ETEXILATE' 'EDOXABAN']

'PENTOSAN POLYSULFATE SODIUM' 'PHENINDIONE' 'RIVAROXABAN'
'WARFARIN SODIUM']

BNF sub-section: ORAL PREPARATION FOR FLUID AND ELECTROLY

Chemical names or medication types: ['POTASSIUM BICARBONATE' 'SODIUM BICARBONATE' 'SODIUM CHLORIDE'
'SODIUM ZIRCONIUM CYCLOSILICATE']

BNF sub-section: ORAL PREPARATIONS FOR ACNE

Chemical names or medication types: ['CO-CYPRINDIOL' 'ISOTRETINOIN']

BNF sub-section: OROPHARYNGEAL ANTI-INFECTIVE DRUGS

Chemical names or medication types: ['MICONAZOLE']

BNF sub-section: OSMOTIC LAXATIVES

Chemical names or medication types: ['LACTULOSE' 'MACROGOLS']

BNF sub-section: OTHER ANTI-INFLAMMATORY PREPARATIONS

Chemical names or medication types: ['CICLOSPORIN' 'EPINASTINE' 'KETOTIFEN' 'OLOPATADINE']

BNF sub-section: OTHER ANTIANGINAL DRUGS

Chemical names or medication types: ['IVABRADINE' 'NICORANDIL' 'RANOLAZINE']

BNF sub-section: OTHER ANTIDEPRESSANT DRUGS

Chemical names or medication types: ['AGOMELATINE' 'DULOXETINE' 'ESKETAMINE' 'FLUPENTIXOL' 'MIRTAZAPINE'
'REBOXETINE' 'TRYPTOPHAN' 'VENLAFAXINE' 'VORTIOXETINE HYDROBROMIDE']

BNF sub-section: OTHER ANTIFUNGALS

Chemical names or medication types: ['GRISEOFULVIN' 'TERBINAFINE']

BNF sub-section: OTHER ANTINEOPLASTIC DRUGS

Chemical names or medication types: ['EVEROLIMUS' 'HYDROXYCARBAMIDE' 'IMATINIB' 'NINTEDANIB' 'OLAPARIB'
'PROCARBAZINE' 'RIBOCICLIB' 'TRETINOIN' 'VENETOCLAX']

BNF sub-section: OTHER DRUGS FOR RHEUMATIC DISEASES

Chemical names or medication types: ['GLUCOSAMINE HYDROCHLORIDE' 'GLUCOSAMINE SULFATE']

BNF sub-section: OTHER DRUGS USED IN CONSTIPATION

Chemical names or medication types: ['LINACLOTIDE' 'PRUCALOPRIDE']

BNF sub-section: OTHER EYE PREPARATIONS

Chemical names or medication types: ['IDEBENONE']

BNF sub-section: OTHER HEALTH SUPPLEMENTS

Chemical names or medication types: ['CRANBERRY' 'GLUCOSAMINE SULFATE']

BNF sub-section: OTHER IMMUNOMODULATING DRUGS

Chemical names or medication types: ['DIMETHYL FUMARATE' 'FINGOLIMOD' 'PEGINTERFERON ALFA']

BNF sub-section: OTITIS EXTERNA

Chemical names or medication types: ['CIPROFLOXACIN']

BNF sub-section: OXIDISERS AND DYES

Chemical names or medication types: ['POTASSIUM PERMANGANATE']

BNF sub-section: PARENT PREPN FOR FLUID AND ELECTROLYTE I

Chemical names or medication types: ['SODIUM BICARBONATE']

BNF sub-section: PARENTERAL ANTICOAGULANTS

Chemical names or medication types: ['ENOXAPARIN' 'FONDAPARINUX SODIUM']

BNF sub-section: PENICILLINS

Chemical names or medication types: ['AMOXICILLIN' 'AMPICILLIN' 'BENZYL PENICILLIN' 'CO-AMOXICLAV'
'CO-FLUAMPICIL' 'FLUCLOXACILLIN' 'PHENOXYMETHYL PENICILLIN'
'PIPERACILLIN' 'PIVMECILLINAM']

BNF sub-section: PERIPHERAL OPIOID-RECEPTOR ANTAGONISTS

Chemical names or medication types: ['METHYLNALTREXONE BROMIDE' 'NALOXEGOL']

BNF sub-section: PERIPHERAL VASODILATORS AND RELATED DRUG

Chemical names or medication types: ['CILOSTAZOL' 'MOXISYLYTE' 'NAFTIDROFURYL OXALATE' 'OXERUTINS'
'PENTOXIFYLLINE']

BNF sub-section: PHOSPHODIESTERASE TYPE-4 INHIBITORS

Chemical names or medication types: ['ROFLUMILAST']

BNF sub-section: PHOSPHORUS

Chemical names or medication types: ['CALCIUM ACETATE' 'LANTHANUM' 'SEVELAMER' 'SUCROFERRIC OXYHYDROXIDE']

BNF sub-section: POISONING ANTIDOTES

Chemical names or medication types: ['ACETYLCYSTEINE' 'CHARCOAL' 'NALOXONE HYDROCHLORIDE']

BNF sub-section: POSTERIOR PITUITARY HORMONES AND ANTAGON

Chemical names or medication types: ['DESMOPRESSIN' 'TOLVAPTAN']

BNF sub-section: POTASSIUM SPARING DIURETICS AND COMPOUND

Chemical names or medication types: ['AMILORIDE HYDROCHLORIDE' 'CO-AMILOFRUSE' 'CO-AMILOZIDE' 'C O-FLUMACTONE']

BNF sub-section: POTASSIUM-SPARING DIURETICS AND ALDOSTER

Chemical names or medication types: ['AMILORIDE HYDROCHLORIDE' 'EPLERENONE' 'SPIRONOLACTONE']

BNF sub-section: PREPARATIONS FOR ECZEMA

Chemical names or medication types: ['ALITRETINOIN' 'GAMOLENIC ACID']

BNF sub-section: PREPARATIONS FOR PSORIASIS

Chemical names or medication types: ['ACITRETIN' 'CALCIPOTRIOL' 'CALCITRIOL']

BNF sub-section: PREPARATIONS FOR VAGINAL AND VULVAL CHAN

Chemical names or medication types: ['ESTRADIOL' 'ESTRIOL']

BNF sub-section: PROGESTOGEN-ONLY CONTRACEPTIVES

Chemical names or medication types: ['DESOGESTREL' 'MEDROXYPROGESTERONE ACETATE' 'NORETHISTERONE ENANTHATE']

BNF sub-section: PROGESTOGENS

Chemical names or medication types: ['MEDROXYPROGESTERONE ACETATE' 'MEGESTROL ACETATE']

BNF sub-section: PROSTAGLANDIN ANALOGUES

Chemical names or medication types: ['MISOPROSTOL']

BNF sub-section: PROSTAGLANDINS AND OXYTOCICS

Chemical names or medication types: ['ERGOMETRINE MALEATE']

BNF sub-section: PROTON PUMP INHIBITORS

Chemical names or medication types: ['ESOMEPRAZOLE' 'LANSOPRAZOLE' 'OMEPRAZOLE' 'PANTOPRAZOLE' 'R ABEPRAZOLE']

BNF sub-section: QUINOLONES

Chemical names or medication types: ['CIPROFLOXACIN' 'LEVOFLOXACIN' 'MOXIFLOXACIN' 'OFLOXACIN']

BNF sub-section: RENIN-ANGIOTENSIN SYSTEM DRUGS

Chemical names or medication types: ['ALISKIREN' 'AZILSARTAN MEDOXOMIL' 'CANDESARTAN CILEXETIL' 'CAPTOPRIL'

'ENALAPRIL MALEATE' 'ENALAPRIL MALEATE ' 'EPROSARTAN MESILATE'

'FOSINOPRIL' 'IMIDAPRIL HYDROCHLORIDE' 'IRBESARTAN' 'LISINOPRIL'

'LOSARTAN' 'LOSARTAN ' 'OLMESARTAN MEDOXOMIL' 'OLMESARTAN MEDOXOMIL '

'OLMESARTAN MEDOXOMIL, AMLODIPINE' 'PERINDOPRIL' 'QUINAPRIL' 'RAMIPRIL'

'RAMIPRIL ' 'SACUBITRIL' 'TELMISARTAN' 'TRANDOLAPRIL' 'VALSARTAN']

BNF sub-section: REPLACEMENT THERAPY

Chemical names or medication types: ['FLUDROCORTISONE ACETATE']

BNF sub-section: RESPIRATORY SYNCYTIAL VIRUS

Chemical names or medication types: ['RIBAVIRIN']

BNF sub-section: RHEUMATIC DISEASE SUPPRESSANT DRUGS

Chemical names or medication types: ['ABATACEPT' 'ADALIMUMAB' 'ANAKINRA' 'APREMILAST' 'BARICITINIB'
'ETANERCEPT' 'GOLIMUMAB' 'HYDROXYCHLOROQUINE SULFATE' 'LEFLUNOMIDE'
'METHOTREXATE' 'PENICILLAMINE' 'SODIUM AUROTHIOMALATE'
'TOFACITINIB CITRATE' 'UPADACITINIB']

BNF sub-section: RUBEFACIENTS, TOPICAL NSAIDS, CAPSAICIN
Chemical names or medication types: ['DICLOFENAC']

BNF sub-section: SEDATIVE AND ANALGESIC PERI-OPERATIVE DR
Chemical names or medication types: ['ALFENTANIL' 'FENTANYL' 'KETOROLAC TROMETAMOL' 'MIDAZOLAM']

BNF sub-section: SELECTIVE SEROTONIN RE-UPTAKE INHIBITORS
Chemical names or medication types: ['CITALOPRAM' 'ESCITALOPRAM' 'FLUOXETINE' 'FLUVOXAMINE MALEATE'
'PAROXETINE' 'SERTRALINE']

BNF sub-section: SKELETAL MUSCLE RELAXANTS
Chemical names or medication types: ['BACLOFEN' 'DANTROLENE SODIUM' 'METHOCARBAMOL' 'PRIDINOL'
'TIZANIDINE HYDROCHLORIDE']

BNF sub-section: SOMATOMEDINS
Chemical names or medication types: ['MECASERMIN']

BNF sub-section: SOME OTHER ANTIBACTERIALS
Chemical names or medication types: ['CHLORAMPHENICOL' 'FIDAXOMICIN' 'FOSFOMYCIN' 'FUSIDIC ACID'
'LINEZOLID'
'RIFAXIMIN' 'TEICOPLANIN' 'VANCOMYCIN']

BNF sub-section: STIMULANT LAXATIVES
Chemical names or medication types: ['BISACODYL' 'CO-DANTHRAMER' 'CO-DANTHRUSATE' 'DOCUSATE SODIUM'
'GLYCEROL'
'SENNA' 'SENNOSIDES' 'SODIUM PICOSULFATE']

BNF sub-section: SULFONAMIDES AND TRIMETHOPRIM
Chemical names or medication types: ['CO-TRIMOXAZOLE' 'SULFADIAZINE' 'TRIMETHOPRIM']

BNF sub-section: SYSTEMIC NASAL DECONGESTANTS
Chemical names or medication types: ['PSEUDOEPHEDRINE HYDROCHLORIDE']

BNF sub-section: TEAR DEFICIENCY, EYE LUBRICANT AND ASTRI
Chemical names or medication types: ['MERCAPTAMINE']

BNF sub-section: TETRACYCLINES
Chemical names or medication types: ['DEMECLOXYCLINE HYDROCHLORIDE' 'DOXYCYCLINE' 'LYMECYCLINE' 'MINOCYCLINE'
'OXYTETRACYCLINE' 'TETRACYCLINE']

BNF sub-section: THEOPHYLLINE
Chemical names or medication types: ['AMINOPHYLLINE' 'THEOPHYLLINE']

BNF sub-section: THIAZIDES AND RELATED DIURETICS
Chemical names or medication types: ['BENDROFLUMETHIAZIDE' 'CHLORTALIDONE' 'INDAPAMIDE' 'XIPAMIDE']

BNF sub-section: THYROID HORMONES
Chemical names or medication types: ['LEVOTHYROXINE SODIUM' 'LIOTHYRONINE SODIUM']

BNF sub-section: TOPICAL CORTICOSTEROIDS
Chemical names or medication types: ['CLOBETASOL PROPIONATE']

BNF sub-section: TOPICAL PREPARATION FOR ROSACEA
Chemical names or medication types: ['BRIMONIDINE TARTRATE' 'IVERMECTIN']

BNF sub-section: TREATMENT OF DRY MOUTH
Chemical names or medication types: ['PILOCARPINE']

BNF sub-section: TREATMENT OF GLAUCOMA
Chemical names or medication types: ['ACETAZOLAMIDE' 'BIMATOPROST' 'BIMATOPROST ' 'BRINZOLAMIDE'
'DORZOLAMIDE'
'DORZOLAMIDE ' 'LATANOPROST' 'TAFLUPROST' 'TIMOLOL MALEATE' 'TRAVOPROST']

BNF sub-section: TREATMENT OF HYPOGLYCAEMIA

Chemical names or medication types: ['DIAZOXIDE' 'GLUCAGON' 'GLUCOSE']

BNF sub-section: TRIAZOLE ANTIFUNGALS

Chemical names or medication types: ['FLUCONAZOLE' 'ITRACONAZOLE' 'POSACONAZOLE' 'VORICONAZOLE']

BNF sub-section: TRICYCLIC AND RELATED ANTIDEPRESSANT DRUGS

Chemical names or medication types: ['AMITRIPTYLINE' 'CLOMIPRAMINE HYDROCHLORIDE' 'DOSULEPIN HYDROCHLORIDE']

'DOXEPIN' 'IMIPRAMINE HYDROCHLORIDE' 'LOFEPRAMINE'

'MIANSERIN HYDROCHLORIDE' 'NORTRIPTYLINE' 'TRAZODONE HYDROCHLORIDE'

'TRIMIPRAMINE']

BNF sub-section: URINARY-TRACT INFECTIONS

Chemical names or medication types: ['METHENAMINE HIPPURATE' 'NITROFURANTOIN']

BNF sub-section: VACCINES AND ANTISERA

Chemical names or medication types: ['HEPATITIS B VACCINE' 'TYPHOID VACCINE']

BNF sub-section: VAGINAL AND VULVAL INFECTIONS

Chemical names or medication types: ['CLOTRIMAZOLE' 'ECONAZOLE NITRATE' 'FENTICONAZOLE']

BNF sub-section: VASOCONSTRICTOR SYMPATHOMIMETICS

Chemical names or medication types: ['EPHEDRINE HYDROCHLORIDE' 'MIDODRINE HYDROCHLORIDE']

BNF sub-section: VASODILATOR ANTIHYPERTENSIVE DRUGS

Chemical names or medication types: ['BOSENTAN' 'HYDRALAZINE HYDROCHLORIDE' 'MINOXIDIL' 'RIOCIGUAT']

'SILDENAFIL' 'TADALAFIL']

BNF sub-section: VIRAL HEPATITIS

Chemical names or medication types: ['ADEFOVIR DIPIVOXIL' 'ELBASVIR' 'ENTECAVIR' 'GLECAPREVIR' 'SOFOSBUVIR']

'SOFOSBUVIR VELPATASVIR']

BNF sub-section: VITAMIN A

Chemical names or medication types: ['COD LIVER OIL']

BNF sub-section: VITAMIN B GROUP

Chemical names or medication types: ['POTASSIUM AMINOBENZOATE' 'PYRIDOXINE HYDROCHLORIDE' 'THIAMINE']

BNF sub-section: VITAMIN C

Chemical names or medication types: ['ASCORBIC ACID']

BNF sub-section: VITAMIN D

Chemical names or medication types: ['ALFACALCIDOL' 'CALCITRIOL' 'CALCIUM ' 'COLECALCIFEROL' 'ERGOCALCIFEROL']

'PARICALCITOL']

BNF sub-section: VITAMIN E

Chemical names or medication types: ['VITAMIN E']

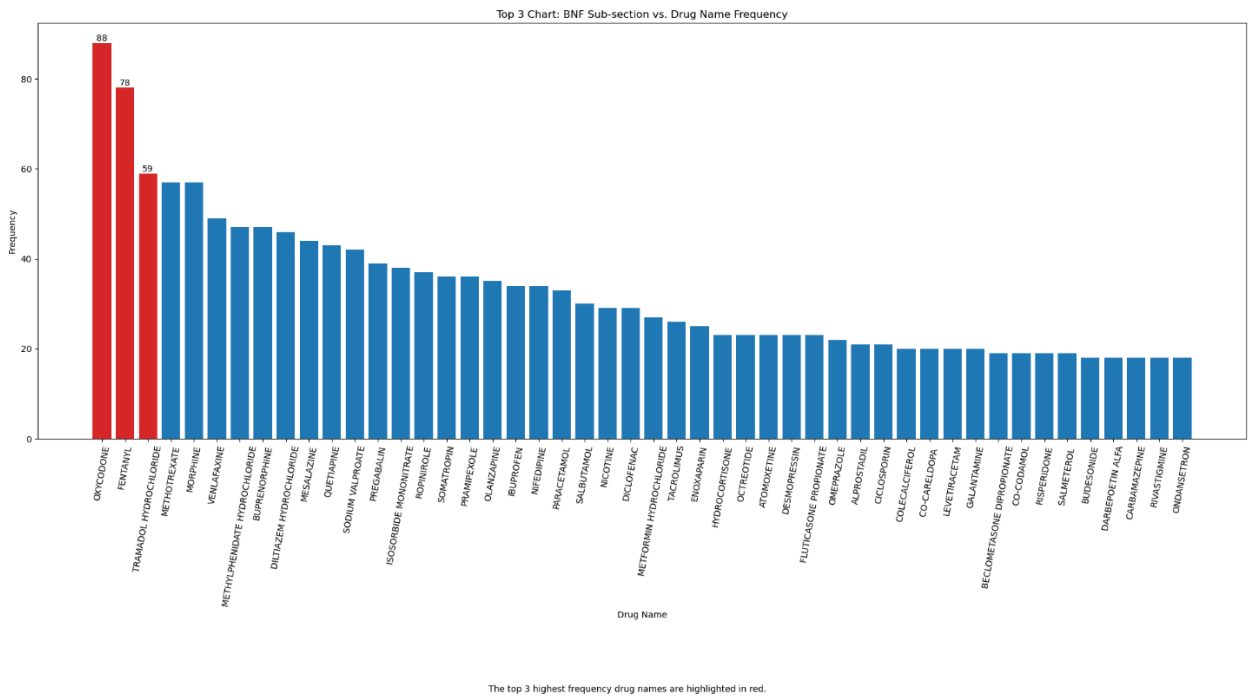
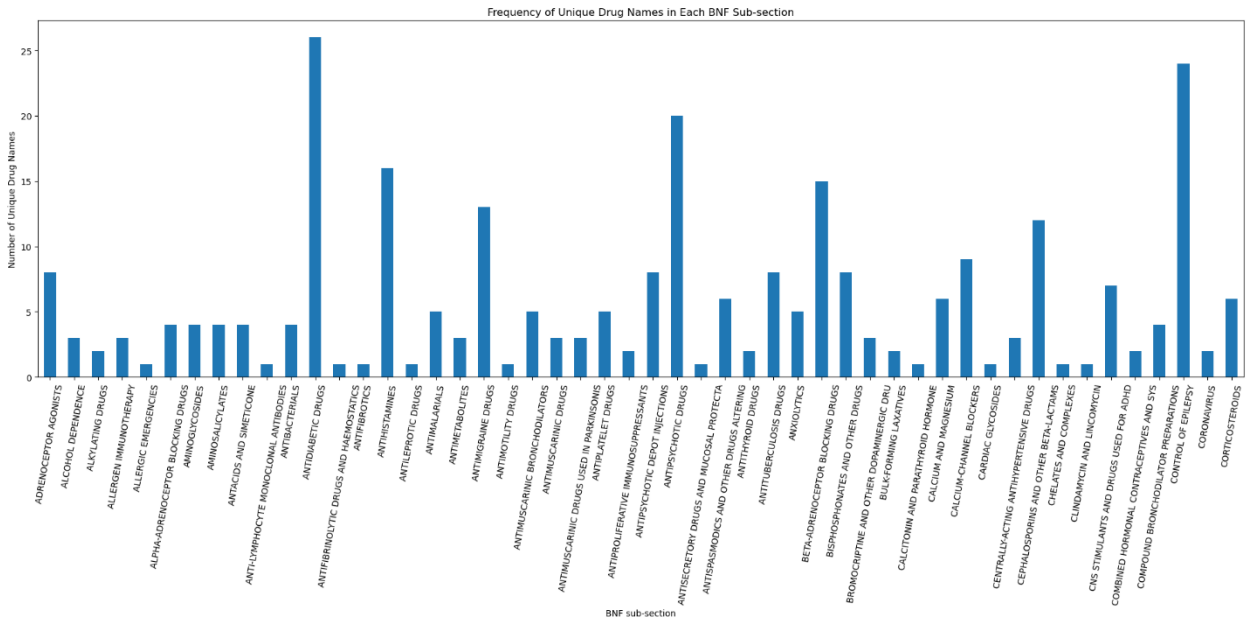
BNF sub-section: VITAMIN K

Chemical names or medication types: ['MENADIOL SODIUM PHOSPHATE' 'PHYTOMENADIONE']

BNF sub-section: ZINC AND OTHER MINERALS

Chemical names or medication types: ['ZINC SULFATE']

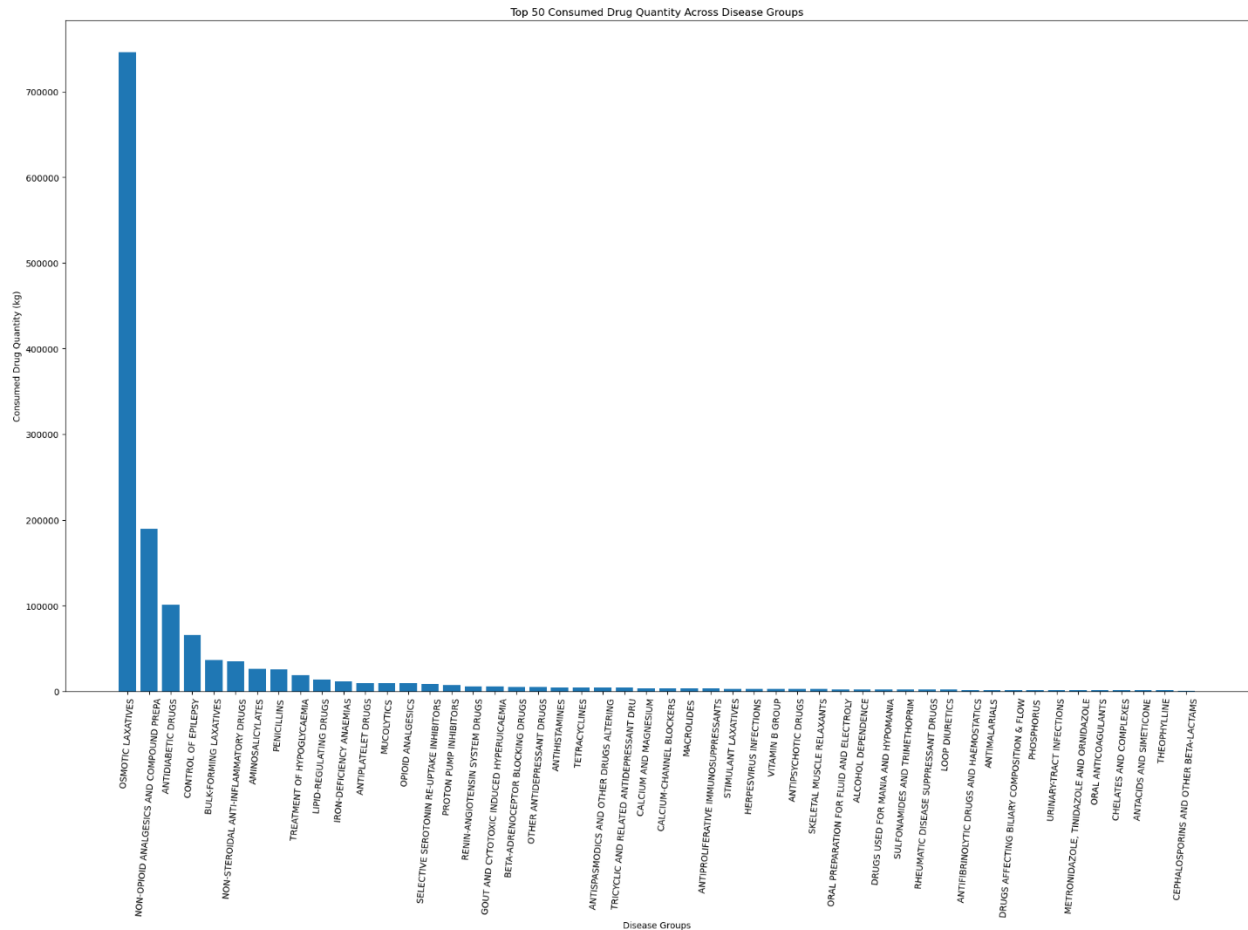
To identify the disease group that had the highest unique drug count associated with the disease groups we visualize using the bar plot below.



The resulting bar chart provides a visual representation of how the consumed drug quantity varies across different disease groups, allowing you to observe the relative differences in drug consumption.

How does the consumed drug quantity (in kilograms) vary across different disease groups?

We visualized the distribution of consumed drug weights for each disease group.



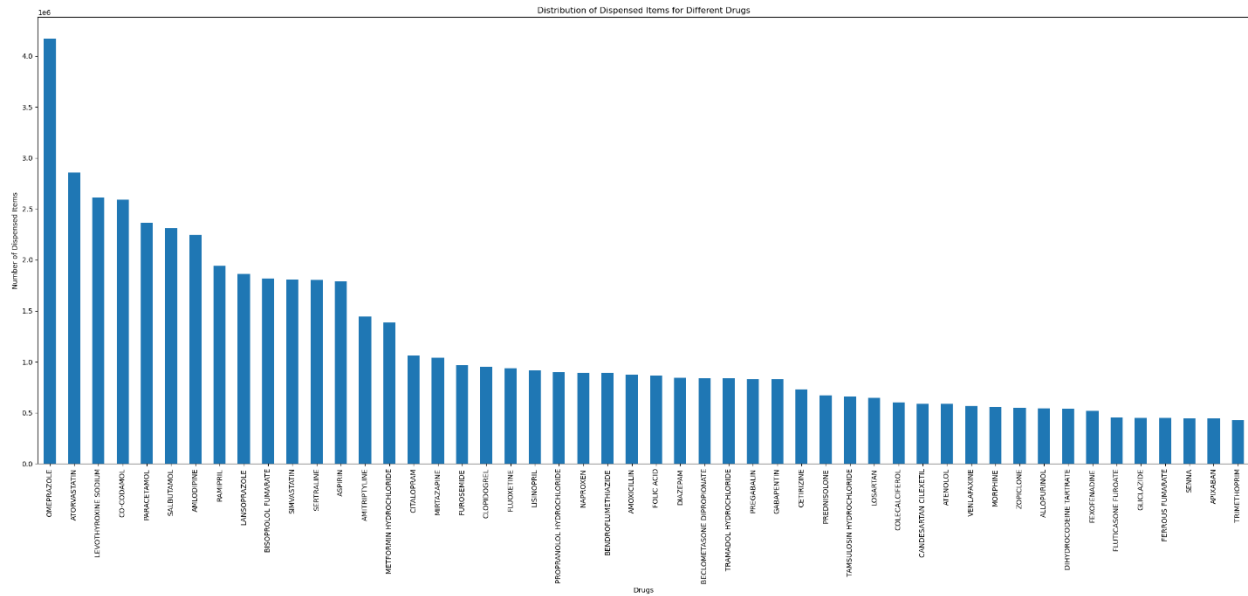
Is there a correlation between the gross ingredient cost and the dispensed quantity of drugs?

The correlation between Gross ingredient cost (£) and Dispensed quantity is: 0.2990826709822178
There is a positive correlation between the Gross ingredient cost (£) and Dispensed quantity.
This means that as the Gross ingredient cost increases, the Dispensed quantity also tends to increase.

Are there significant differences in the consumed drug weights for specific drug classes or therapeutic categories?

ANOVA Results:
p-value: nan
There are no significant differences in the consumed drug weights among the groups.

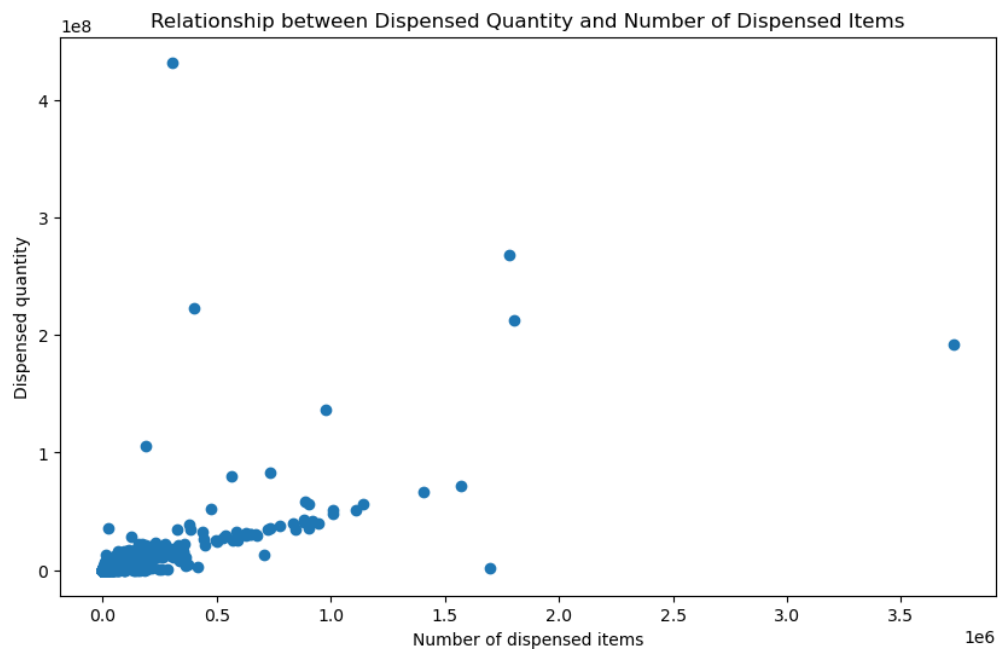
Drug Utilization Analysis
Analyzing the distribution of dispensed quantities and the number of dispensed items for different drugs.
Identifying the most frequently prescribed drugs and any variations.



The most frequently prescribed drugs:

BNF_chemical_name(1)	Dispensed quantity	Number of dispensed items
OMEPRAZOLE	2.133169e+08	4172092
ATORVASTATIN	1.312170e+08	2855330
LEVOTHYROXINE SODIUM	1.303484e+08	2610046
CO-CODAMOL	3.043742e+08	2591231
PARACETAMOL	4.358794e+08	2362586

Explore the relationship between the dispensed quantity and the number of dispensed items. Are there any patterns or trends



The correlation between Number of dispensed items and Dispensed quantity is:
0.6552277506618962

There is a high positive correlation between the Number of dispensed items and Dispensed quantity.

This means that as the Number of dispensed items increases, the Dispensed quantity also tends to increase.

Disease Group Analysis

Investigating the distribution of drugs across different disease groups. Identify the most prevalent disease groups and the corresponding drugs.

Most prevalent disease group: ADRENOCEPTOR AGONISTS
Corresponding drug: SALBUTAMOL

Most prevalent disease group: ALCOHOL DEPENDENCE
Corresponding drug: ACAMPROSATE CALCIUM

Most prevalent disease group: ALKYLATING DRUGS
Corresponding drug: BUSULFAN

Most prevalent disease group: ALLERGEN IMMUNOTHERAPY
Corresponding drug: MEPOLIZUMAB

Most prevalent disease group: ALLERGIC EMERGENCIES
Corresponding drug: EPINEPHRINE

Most prevalent disease group: ALPHA-ADRENOCEPTOR BLOCKING DRUGS
Corresponding drug: DOXAZOSIN

Most prevalent disease group: AMINOGLYCOSIDES
Corresponding drug: TOBRAMYCIN

Most prevalent disease group: AMINOSALICYLATES
Corresponding drug: MESALAZINE

Most prevalent disease group: ANTACIDS AND SIMETICONE
Corresponding drug: ACTIVATED SIMETICONE

Most prevalent disease group: ANTI-LYMPHOCYTE MONOCLONAL ANTIBODIES
Corresponding drug: RITUXIMAB

Most prevalent disease group: ANTIBACTERIALS
Corresponding drug: LEVOFLOXACIN

Most prevalent disease group: ANTIDIABETIC DRUGS
Corresponding drug: METFORMIN HYDROCHLORIDE

Most prevalent disease group: ANTIFIBRINOLYTIC DRUGS AND HAEMOSTATICS
Corresponding drug: TRANEXAMIC ACID

Most prevalent disease group: ANTIFIBROTICS
Corresponding drug: PIRFENIDONE

Most prevalent disease group: ANTIHISTAMINES
Corresponding drug: CETIRIZINE

Most prevalent disease group: ANTILEPROTIC DRUGS
Corresponding drug: DAPSONE

Most prevalent disease group: ANTIMALARIALS
Corresponding drug: QUININE

Most prevalent disease group: ANTIMETABOLITES
Corresponding drug: METHOTREXATE

Most prevalent disease group: ANTIMIGRAINE DRUGS
Corresponding drug: SUMATRIPTAN

Most prevalent disease group: ANTIMOTILITY DRUGS
Corresponding drug: LOPERAMIDE HYDROCHLORIDE

Most prevalent disease group: ANTIMUSCARINIC BRONCHODILATORS
Corresponding drug: TIOTROPIUM

Most prevalent disease group: ANTIMUSCARINIC DRUGS
Corresponding drug: ATROPINE SULFATE

Most prevalent disease group: ANTIMUSCARINIC DRUGS USED IN PARKINSONIS
Corresponding drug: PROCYCLIDINE HYDROCHLORIDE

Most prevalent disease group: ANTIPLATELET DRUGS
Corresponding drug: TICAGRELOR

Most prevalent disease group: ANTIPROLIFERATIVE IMMUNOSUPPRESSANTS
Corresponding drug: MYCOPHENOLATE

Most prevalent disease group: ANTIPSYCHOTIC DEPOT INJECTIONS
Corresponding drug: PALIPERIDONE

Most prevalent disease group: ANTIPSYCHOTIC DRUGS
Corresponding drug: QUETIAPINE

Most prevalent disease group: ANTISECRETORY DRUGS AND MUCOSAL PROTECTA
Corresponding drug: HELICOBACTER PYLORI TEST

Most prevalent disease group: ANTISPASMODICS AND OTHER DRUGS ALTERING
Corresponding drug: ALVERINE CITRATE

Most prevalent disease group: ANTITHYROID DRUGS
Corresponding drug: CARBIMAZOLE

Most prevalent disease group: ANTITUBERCULOSIS DRUGS
Corresponding drug: RIFAMPICIN

Most prevalent disease group: ANXIOLYTICS
Corresponding drug: DIAZEPAM

Most prevalent disease group: BETA-ADRENOCEPTOR BLOCKING DRUGS
Corresponding drug: BISOPROLOL FUMARATE

Most prevalent disease group: BISPHOSPHONATES AND OTHER DRUGS
Corresponding drug: ALENDRONIC ACID

Most prevalent disease group: BROMOCRIPTINE AND OTHER DOPAMINERGIC DRUGS
Corresponding drug: CABERGOLINE

Most prevalent disease group: BULK-FORMING LAXATIVES
Corresponding drug: ISPAGHULA HUSK

Most prevalent disease group: CALCITONIN AND PARATHYROID HORMONE
Corresponding drug: TERIPARATIDE

Most prevalent disease group: CALCIUM AND MAGNESIUM
Corresponding drug: CALCIUM CARBONATE

Most prevalent disease group: CALCIUM-CHANNEL BLOCKERS
Corresponding drug: DILTIAZEM HYDROCHLORIDE

Most prevalent disease group: CARDIAC GLYCOSIDES
Corresponding drug: DIGOXIN

Most prevalent disease group: CENTRALLY-ACTING ANTIHYPERTENSIVE DRUGS
Corresponding drug: METHYLDOPA

Most prevalent disease group: CEPHALOSPORINS AND OTHER BETA-LACTAMS
Corresponding drug: CEFLEXIN

Most prevalent disease group: CHELATES AND COMPLEXES
Corresponding drug: SUCRALFATE

Most prevalent disease group: CLINDAMYCIN AND LINCOMYCIN
Corresponding drug: CLINDAMYCIN

Most prevalent disease group: CNS STIMULANTS AND DRUGS USED FOR ADHD
Corresponding drug: METHYLPHENIDATE HYDROCHLORIDE

Most prevalent disease group: COMBINED HORMONAL CONTRACEPTIVES AND SYS
Corresponding drug: DROSPIRENONE

Most prevalent disease group: COMPOUND BRONCHODILATOR PREPARATIONS
Corresponding drug: TIOTROPIUM

Most prevalent disease group: CONTROL OF EPILEPSY
Corresponding drug: SODIUM VALPROATE

Most prevalent disease group: CORONAVIRUS
Corresponding drug: MOLNUPIRAVIR

Most prevalent disease group: CORTICOSTEROIDS
Corresponding drug: BUDESONIDE

Most prevalent disease group: CORTICOSTEROIDS (RESPIRATORY)
Corresponding drug: FLUTICASONE PROPIONATE

Most prevalent disease group: CORTICOSTEROIDS AND OTHER IMMUNOSUPPRESS
Corresponding drug: TACROLIMUS

Most prevalent disease group: COUGH SUPPRESSANTS
Corresponding drug: PHOLCODINE

Most prevalent disease group: CROMOGLYCATE AND RELATED THERAPY
Corresponding drug: SODIUM CROMOGLICATE

Most prevalent disease group: CYTOTOXIC DRUGS
Corresponding drug: CALCIUM FOLINATE

Most prevalent disease group: DOPAMINERGIC DRUGS USED IN PARKINSONISM
Corresponding drug: ROPINIROLE

Most prevalent disease group: DRUGS AFFECTING BILIARY COMPOSITION & FLOW
Corresponding drug: URSODEOXYCHOLIC ACID

Most prevalent disease group: DRUGS AFFECTING GONADOTROPHINS
Corresponding drug: DANAZOL

Most prevalent disease group: DRUGS AFFECTING THE IMMUNE RESPONSE
Corresponding drug: PIMECROLIMUS

Most prevalent disease group: DRUGS FOR ARRHYTHMIAS
Corresponding drug: FLECAINIDE ACETATE

Most prevalent disease group: DRUGS FOR DEMENTIA
Corresponding drug: GALANTAMINE

Most prevalent disease group: DRUGS FOR ERECTILE DYSFUNCTION
Corresponding drug: ALPROSTADIL

Most prevalent disease group: DRUGS FOR ORAL ULCERATION AND INFLAMMATI
Corresponding drug: DOXYCYCLINE

Most prevalent disease group: DRUGS FOR PNEUMOCYSTIS PNEUMONIA
Corresponding drug: ATOVAQUONE

Most prevalent disease group: DRUGS FOR PREMATURE EJACULATION
Corresponding drug: DAPOXETINE

Most prevalent disease group: DRUGS FOR THREADWORMS

Corresponding drug: MEBENDAZOLE

Most prevalent disease group: DRUGS FOR URINARY FREQUENCY ENURESIS AND
Corresponding drug: TOLTERODINE

Most prevalent disease group: DRUGS FOR URINARY RETENTION
Corresponding drug: TAMSULOSIN HYDROCHLORIDE

Most prevalent disease group: DRUGS USED FOR MANIA AND HYPOMANIA
Corresponding drug: LITHIUM CARBONATE

Most prevalent disease group: DRUGS USED IN MEGALOBlastic ANAEMIAS
Corresponding drug: FOLIC ACID

Most prevalent disease group: DRUGS USED IN METABOLIC DISORDERS
Corresponding drug: MERCAPTAMINE BITARTRATE

Most prevalent disease group: DRUGS USED IN NASAL ALLERGY
Corresponding drug: BECLOMETASONE DIPROPIONATE

Most prevalent disease group: DRUGS USED IN NAUSEA AND VERTIGO
Corresponding drug: ONDANSETRON

Most prevalent disease group: DRUGS USED IN NEUTROPENIA
Corresponding drug: FILGRASTIM

Most prevalent disease group: DRUGS USED IN PLATELET DISORDERS
Corresponding drug: ELTROMBOPAG

Most prevalent disease group: DRUGS USED IN STATUS EPILEPTICUS
Corresponding drug: MIDAZOLAM HYDROCHLORIDE

Most prevalent disease group: DRUGS WHICH ENHANCE NEUROMUSCULAR TRANSM
Corresponding drug: PYRIDOSTIGMINE BROMIDE

Most prevalent disease group: EMERGENCY CONTRACEPTION
Corresponding drug: LEVONORGESTREL

Most prevalent disease group: ESSENTIAL TREMOR, CHOREA, TICS AND RELATED
Corresponding drug: PIRACETAM

Most prevalent disease group: FEMALE SEX HORMONES AND THEIR MODULATORS
Corresponding drug: ESTRADIOL

Most prevalent disease group: FLUORIDE
Corresponding drug: SODIUM FLUORIDE

Most prevalent disease group: FOOD ALLERGY
Corresponding drug: SODIUM CROMOGLICATE

Most prevalent disease group: FOODS FOR SPECIAL DIETS
Corresponding drug: FOODS FOR SPECIAL DIETS

Most prevalent disease group: GASTRO-INTESTINAL ANTI-OBESITY DRUGS
Corresponding drug: ORLISTAT

Most prevalent disease group: GLUCOCORTICOID THERAPY
Corresponding drug: HYDROCORTISONE

Most prevalent disease group: GOUT AND CYTOTOXIC INDUCED HYPERURICAEMIA
Corresponding drug: ALLOPURINOL

Most prevalent disease group: H2-RECEPTOR ANTAGONISTS
Corresponding drug: RANITIDINE

Most prevalent disease group: HERPESVIRUS INFECTIONS
Corresponding drug: ACICLOVIR

Most prevalent disease group: HIV INFECTION
Corresponding drug: DOLUTEGRAVIR

Most prevalent disease group: HORMONE ANTAGONISTS
Corresponding drug: OCTREOTIDE

Most prevalent disease group: HYPNOTICS
Corresponding drug: MELATONIN

Most prevalent disease group: HYPOPLASTIC,HAEMOLYTIC AND RENAL ANAEMIA
Corresponding drug: DARBEPOETIN ALFA

Most prevalent disease group: HYPOTHALAMIC & ANTERIOR PITUITARY HORMON
Corresponding drug: SOMATROPIN

Most prevalent disease group: INFLUENZA
Corresponding drug: OSELTAMIVIR

Most prevalent disease group: INTRAVENOUS ANAESTHETICS
Corresponding drug: KETAMINE

Most prevalent disease group: IRON-DEFICIENCY ANAEMIAS
Corresponding drug: FERROUS FUMARATE

Most prevalent disease group: LEUKOTRIENE RECEPTOR ANTAGONISTS
Corresponding drug: MONTELUKAST

Most prevalent disease group: LIPID-REGULATING DRUGS
Corresponding drug: ATORVASTATIN

Most prevalent disease group: LOCAL ANAESTHETICS
Corresponding drug: PRILOCAINE HYDROCHLORIDE

Most prevalent disease group: LOOP DIURETICS
Corresponding drug: FUROSEMIDE

Most prevalent disease group: LOZENGES AND SPRAYS
Corresponding drug: DEQUALINIUM CHLORIDE

Most prevalent disease group: MACROLIDES
Corresponding drug: ERYTHROMYCIN

Most prevalent disease group: MALE SEX HORMONES AND ANTAGONISTS
Corresponding drug: TESTOSTERONE

Most prevalent disease group: METRONIDAZOLE, TINIDAZOLE AND ORNIDAZOLE
Corresponding drug: METRONIDAZOLE

Most prevalent disease group: METYRAPONE
Corresponding drug: METYRAPONE

Most prevalent disease group: MONOAMINE-OXIDASE INHIBITORS (MAOIS)
Corresponding drug: MOCLOBEMIDE

Most prevalent disease group: MUCOLYTICS
Corresponding drug: CARBOCISTEINE

Most prevalent disease group: NICOTINE DEPENDENCE
Corresponding drug: NICOTINE

Most prevalent disease group: NITRATES
Corresponding drug: ISOSORBIDE MONONITRATE

Most prevalent disease group: NON-OPIOID ANALGESICS AND COMPOUND PREPA
Corresponding drug: PARACETAMOL

Most prevalent disease group: NON-STEROIDAL ANTI-INFLAMMATORY DRUGS
Corresponding drug: IBUPROFEN

Most prevalent disease group: OCULAR DIAGNOSTIC & PERI-OPERATIVE PREPN
Corresponding drug: NEPAFENAC

Most prevalent disease group: OESTROGENS
Corresponding drug: DIETHYLSTILBESTROL

Most prevalent disease group: OPIOID ANALGESICS
Corresponding drug: OXYCODONE

Most prevalent disease group: OPIOID DEPENDENCE
Corresponding drug: BUPRENORPHINE

Most prevalent disease group: ORAL ANTICOAGULANTS
Corresponding drug: RIVAROXABAN

Most prevalent disease group: ORAL PREPARATION FOR FLUID AND ELECTROLY
Corresponding drug: SODIUM CHLORIDE

Most prevalent disease group: ORAL PREPARATIONS FOR ACNE
Corresponding drug: ISOTRETINOIN

Most prevalent disease group: OROPHARYNGEAL ANTI-INFECTIVE DRUGS
Corresponding drug: MICONAZOLE

Most prevalent disease group: OSMOTIC LAXATIVES
Corresponding drug: LACTULOSE

Most prevalent disease group: OTHER ANTI-INFLAMMATORY PREPARATIONS
Corresponding drug: KETOTIFEN

Most prevalent disease group: OTHER ANTIANGINAL DRUGS
Corresponding drug: RANOLAZINE

Most prevalent disease group: OTHER ANTIDEPRESSANT DRUGS
Corresponding drug: VENLAFAXINE

Most prevalent disease group: OTHER ANTIFUNGALS
Corresponding drug: GRISEOFULVIN

Most prevalent disease group: OTHER ANTINEOPLASTIC DRUGS
Corresponding drug: EVEROLIMUS

Most prevalent disease group: OTHER DRUGS FOR RHEUMATIC DISEASES
Corresponding drug: GLUCOSAMINE HYDROCHLORIDE

Most prevalent disease group: OTHER DRUGS USED IN CONSTIPATION
Corresponding drug: PRUCALOPRIDE

Most prevalent disease group: OTHER EYE PREPARATIONS
Corresponding drug: IDEBENONE

Most prevalent disease group: OTHER HEALTH SUPPLEMENTS
Corresponding drug: GLUCOSAMINE SULFATE

Most prevalent disease group: OTHER IMMUNOMODULATING DRUGS
Corresponding drug: DIMETHYL FUMARATE

Most prevalent disease group: OTITIS EXTERNA
Corresponding drug: CIPROFLOXACIN

Most prevalent disease group: OXIDISERS AND DYES
Corresponding drug: POTASSIUM PERMANGANATE

Most prevalent disease group: PARENT PREPN FOR FLUID AND ELECTROLYTE I
Corresponding drug: SODIUM BICARBONATE

Most prevalent disease group: PARENTERAL ANTICOAGULANTS
Corresponding drug: ENOXAPARIN

Most prevalent disease group: PENICILLINS
Corresponding drug: CO-AMOXICLAV

Most prevalent disease group: PERIPHERAL OPIOID-RECEPTOR ANTAGONISTS
Corresponding drug: NALOXEGOL

Most prevalent disease group: PERIPHERAL VASODILATORS AND RELATED DRUG

Corresponding drug: CILOSTAZOL

Most prevalent disease group: PHOSPHODIESTERASE TYPE-4 INHIBITORS
Corresponding drug: ROFLUMILAST

Most prevalent disease group: PHOSPHORUS
Corresponding drug: LANTHANUM

Most prevalent disease group: POISONING ANTIDOTES
Corresponding drug: NALOXONE HYDROCHLORIDE

Most prevalent disease group: POSTERIOR PITUITARY HORMONES AND ANTAGON
Corresponding drug: DESMOPRESSIN

Most prevalent disease group: POTASSIUM SPARING DIURETICS AND COMPOUND
Corresponding drug: CO-AMILOFRUSE

Most prevalent disease group: POTASSIUM-SPARING DIURETICS AND ALDOSTER
Corresponding drug: SPIRONOLACTONE

Most prevalent disease group: PREPARATIONS FOR ECZEMA
Corresponding drug: ALITRETINOIN

Most prevalent disease group: PREPARATIONS FOR PSORIASIS
Corresponding drug: ACITRETIN

Most prevalent disease group: PREPARATIONS FOR VAGINAL AND VULVAL CHAN
Corresponding drug: ESTRADIOL

Most prevalent disease group: PROGESTOGEN-ONLY CONTRACEPTIVES
Corresponding drug: DESOGESTREL

Most prevalent disease group: PROGESTOGENS
Corresponding drug: MEDROXYPROGESTERONE ACETATE

Most prevalent disease group: PROSTAGLANDIN ANALOGUES
Corresponding drug: MISOPROSTOL

Most prevalent disease group: PROSTAGLANDINS AND OXYTOCICS
Corresponding drug: ERGOMETRINE MALEATE

Most prevalent disease group: PROTON PUMP INHIBITORS
Corresponding drug: OMEPRAZOLE

Most prevalent disease group: QUINOLONES
Corresponding drug: CIPROFLOXACIN

Most prevalent disease group: RENIN-ANGIOTENSIN SYSTEM DRUGS
Corresponding drug: TELMISARTAN

Most prevalent disease group: REPLACEMENT THERAPY
Corresponding drug: FLUDROCORTISONE ACETATE

Most prevalent disease group: RESPIRATORY SYNCYTIAL VIRUS
Corresponding drug: RIBAVIRIN

Most prevalent disease group: RHEUMATIC DISEASE SUPPRESSANT DRUGS
Corresponding drug: METHOTREXATE

Most prevalent disease group: RUBEFACIENTS, TOPICAL NSAIDS, CAPSAICIN
Corresponding drug: DICLOFENAC

Most prevalent disease group: SEDATIVE AND ANALGESIC PERI-OPERATIVE DR
Corresponding drug: MIDAZOLAM

Most prevalent disease group: SELECTIVE SEROTONIN RE-UPTAKE INHIBITORS
Corresponding drug: FLUOXETINE

Most prevalent disease group: SKELETAL MUSCLE RELAXANTS
Corresponding drug: BACLOFEN

Most prevalent disease group: SOMATOMEDINS
Corresponding drug: MECASERMIN

Most prevalent disease group: SOME OTHER ANTIBACTERIALS
Corresponding drug: FOSFOMYCIN

Most prevalent disease group: STIMULANT LAXATIVES
Corresponding drug: DOCUSATE SODIUM

Most prevalent disease group: SULFONAMIDES AND TRIMETHOPRIM
Corresponding drug: CO-TRIMOXAZOLE

Most prevalent disease group: SYSTEMIC NASAL DECONGESTANTS
Corresponding drug: PSEUDOEPHEDRINE HYDROCHLORIDE

Most prevalent disease group: TEAR DEFICIENCY, EYE LUBRICANT AND ASTRI
Corresponding drug: MERCAPTAMINE

Most prevalent disease group: TETRACYCLINES
Corresponding drug: MINOCYCLINE

Most prevalent disease group: THEOPHYLLINE
Corresponding drug: AMINOPHYLLINE

Most prevalent disease group: THIAZIDES AND RELATED DIURETICS
Corresponding drug: INDAPAMIDE

Most prevalent disease group: THYROID HORMONES
Corresponding drug: LEVOTHYROXINE SODIUM

Most prevalent disease group: TOPICAL CORTICOSTEROIDS
Corresponding drug: CLOBETASOL PROPIONATE

Most prevalent disease group: TOPICAL PREPARATION FOR ROSACEA
Corresponding drug: BRIMONIDINE TARTRATE

Most prevalent disease group: TREATMENT OF DRY MOUTH
Corresponding drug: PILOCARPINE

Most prevalent disease group: TREATMENT OF GLAUCOMA
Corresponding drug: DORZOLAMIDE

Most prevalent disease group: TREATMENT OF HYPOGLYCAEMIA
Corresponding drug: DIAZOXIDE

Most prevalent disease group: TRIAZOLE ANTIFUNGALS
Corresponding drug: FLUCONAZOLE

Most prevalent disease group: TRICYCLIC AND RELATED ANTIDEPRESSANT DRUGS
Corresponding drug: TRAZODONE HYDROCHLORIDE

Most prevalent disease group: URINARY-TRACT INFECTIONS
Corresponding drug: NITROFURANTOIN

Most prevalent disease group: VACCINES AND ANTISERA
Corresponding drug: HEPATITIS B VACCINE

Most prevalent disease group: VAGINAL AND VULVAL INFECTIONS
Corresponding drug: CLOTRIMAZOLE

Most prevalent disease group: VASOCONSTRICTOR SYMPATHOMIMETICS
Corresponding drug: MIDODRINE HYDROCHLORIDE

Most prevalent disease group: VASODILATOR ANTIHYPERTENSIVE DRUGS
Corresponding drug: MINOXIDIL

Most prevalent disease group: VIRAL HEPATITIS
Corresponding drug: SOFOSBUVIR

Most prevalent disease group: VITAMIN A
Corresponding drug: COD LIVER OIL

Most prevalent disease group: VITAMIN B GROUP
Corresponding drug: THIAMINE

Most prevalent disease group: VITAMIN C
Corresponding drug: ASCORBIC ACID

Most prevalent disease group: VITAMIN D
Corresponding drug: COLECALCIFEROL

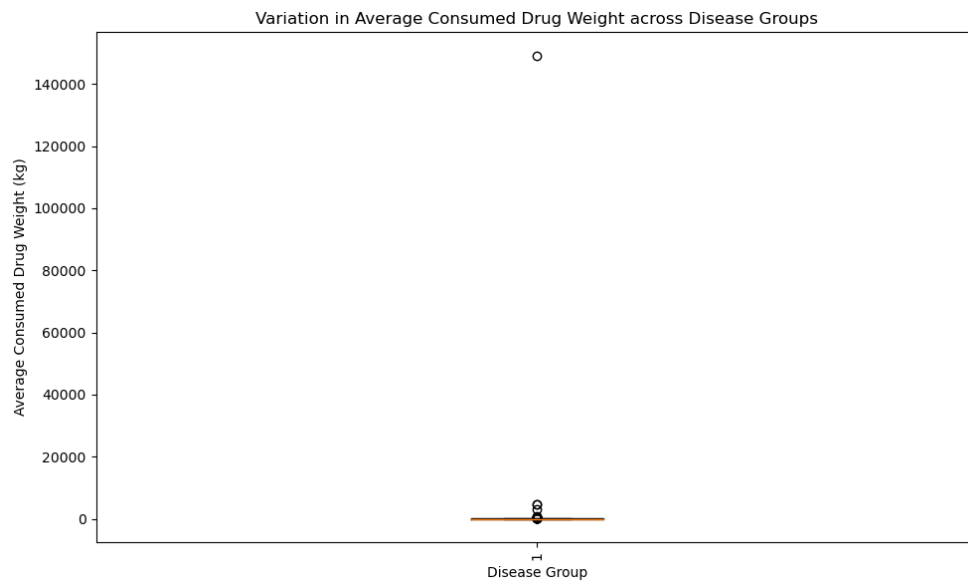
Most prevalent disease group: VITAMIN E
Corresponding drug: VITAMIN E

Most prevalent disease group: VITAMIN K
Corresponding drug: PHYTOMENADIONE

Most prevalent disease group: ZINC AND OTHER MINERALS
Corresponding drug: ZINC SULFATE

The most prevalent disease groups and their corresponding drugs: Among the disease groups, HIV INFECTION is associated with the drug ABACAVIR, which has the highest frequency. RHEUMATIC DISEASE SUPPRESSANT DRUGS are mainly associated with the drug ABATACEPT. HORMONE ANTAGONISTS are primarily associated with the drug ABIRATERONE. ALCOHOL DEPENDENCE is linked to the drug ACAMPROSATE CALCIUM. ANTIDIABETIC DRUGS are associated with the drug ACARBOSE. BETA-ADRENOCEPTOR BLOCKING DRUGS are primarily associated with the drug ACEBUTOLOL. NON-STEROIDAL ANTI-INFLAMMATORY DRUGS are associated with the drug ACECLOFENAC and so on.

Calculate the average consumed drug weight for each disease group and analyze any variations or outliers.



Average consumed drug weight for each disease group:

BNF sub-section	
ADRENOCEPTOR AGONISTS	0.125717
ALCOHOL DEPENDENCE	408.776833
ALKYLATING DRUGS	0.089943
ALLERGEN IMMUNOTHERAPY	0.020153
ALLERGIC EMERGENCIES	0.003935
...	
VITAMIN C	18.993071
VITAMIN D	0.351290
VITAMIN E	33.900000

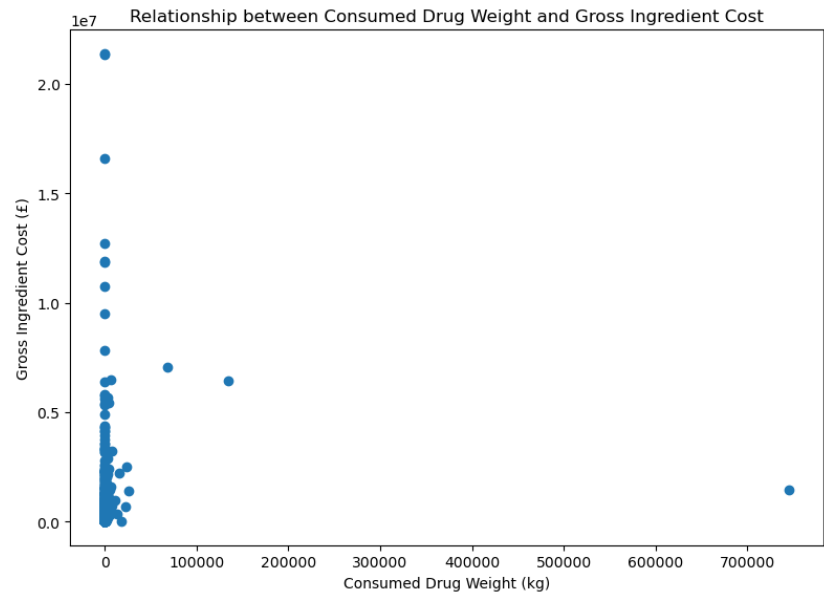
```
VITAMIN K                                0.030034
ZINC AND OTHER MINERALS                   2.025274
Name: consumed_drug_1(kg), Length: 190, dtype: float64

Outliers in the average consumed drug weight:
BNF sub-section
OSMOTIC LAXATIVES      149174.637
```

The average consumed drug weight varies significantly across different disease groups. Some disease groups have significantly higher average consumed drug weights compared to others, indicating variations in the quantity of drugs consumed for different conditions. There is an outlier in the 'OSMOTIC LAXATIVES' group, where the average consumed drug weight is 149174.637 kg. This outlier suggests a potential variation or special case within the 'OSMOTIC LAXATIVES' group.

Gross Ingredient Cost Analysis

Analyzing the relationship between the consumed drug weight and the gross ingredient cost. Are there any drugs that have a higher cost despite lower consumption or vice versa?



Drugs with higher cost despite lower consumption:

	BNF sub-section	Gross ingredient cost (£)	consumed_drug_1(kg)
6	HORMONE ANTAGONISTS	21389480.55	219.495000
395	ORAL ANTICOAGULANTS	21316685.71	112.323683
9738	VIRAL HEPATITIS	16575776.80	3.580400

There are drugs that have a higher cost despite lower consumption, indicating that they may be more expensive per unit. Drugs like "HORMONE ANTAGONISTS", "ORAL ANTICOAGULANTS", "VIRAL HEPATITIS" and so on.

Drugs with lower cost despite higher consumption:

Out[44]:

	BNF sub-section	Gross ingredient cost (£)	consumed_drug_1(kg)
4564	TREATMENT OF HYPOGLYCAEMIA	2874.48	18585.0000
7695	CORONAVIRUS	0.00	6.2880
8568	CORONAVIRUS	0.00	3.6855

Similarly, there are drugs with lower cost despite higher consumption, suggesting that they may be more cost-effective. This analysis highlights the importance of considering both the consumed drug weight and the cost when evaluating the value and efficiency of medications.

Identify drugs with a significant impact on the overall ingredient cost. Are there any cost-saving opportunities?

Drugs with a significant impact on the overall ingredient cost:

	BNF chemical name(1)	Total ingredient cost
8191	OMEPRazole	2.113244e+13
2050	CO-CODAMOL	1.165639e+13
8442	PARACETAMOL	1.149398e+13
7379	METFORMIN HYDROCHLORIDE	6.903816e+12
395	APIXABAN	5.812271e+12
...
1781	CHLORPROMAZINE HYDROCHLORIDE	1.007418e+04
9477	SIROLIMUS	1.007400e+04
1731	CHLORDIAZEPOXIDE	1.005186e+04
10450	TRAMADOL HYDROCHLORIDE	1.004400e+04
9787	SOMATROPIN	1.001376e+04

Are there potential cost-saving opportunities?

The Potential cost-saving opportunities: £ 1640710.5625

There are potential cost-saving opportunities.

A potential cost-saving opportunity refers to a situation where there is a possibility to reduce costs or expenses related to a specific aspect, such as medication or healthcare.

This calculates the total ingredient cost for each drug by multiplying the "Gross ingredient cost (£)" with the "Number of dispensed items". It then sorts the drugs based on the total ingredient cost and selects drugs with a significant impact on the overall ingredient cost (those with a total ingredient cost greater than 10000). The code also calculates the potential cost-saving opportunities by subtracting the total ingredient cost of significant drugs from the overall ingredient cost. Finally, it prints the drugs with a significant impact on the ingredient cost and the potential cost-saving opportunities.

Drug Class Comparison

Compare the consumed drug weights across different drug classes or therapeutic categories. Are there notable differences in drug utilization?

Consumed Drug Weights Across Different Drug Classes or Therapeutic Categories:

BNF_chemical_name(1)	consumed_drug_1(kg)
LACTULOSE	7.458649e+05
PARACETAMOL	1.803197e+05
METFORMIN HYDROCHLORIDE	9.647979e+04
ISPAGHULA HUSK	3.665449e+04
GABAPENTIN	3.089815e+04
...	
CETRORELIX	1.500000e-06
MOMETASONE	7.000000e-07
PARICALCITOL	2.800000e-07
OLODATEROL	2.075000e-07
GLYCOPYRRONIUM	2.016000e-07

Notable differences in drug utilization can be observed across different drug classes or therapeutic categories.

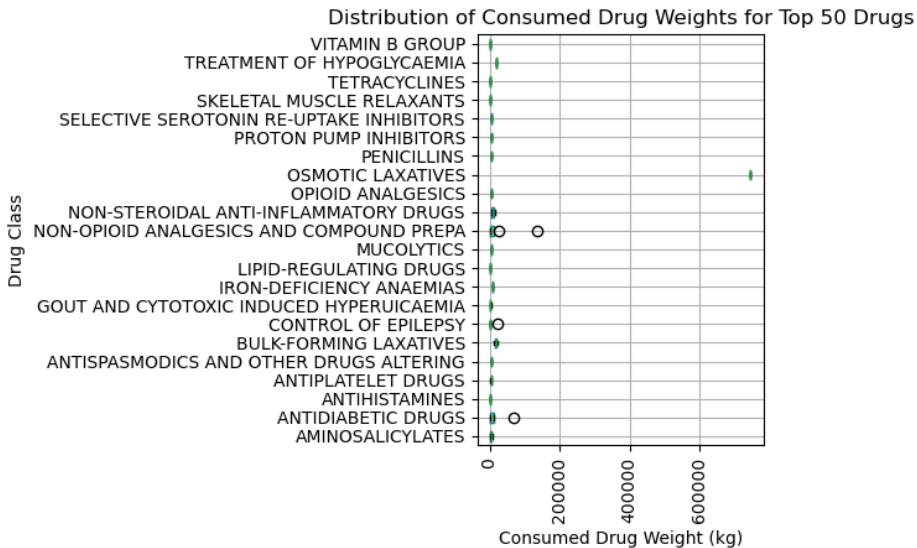
The drug class or therapeutic category with the highest total consumed drug weight is:

LACTULOSE

The drug class or therapeutic category with the lowest total consumed drug weight is:

GLYCOPYRRONIUM

Analyze the distribution of consumed drug weights for each drug class. Are there any outliers or drugs with significantly higher or lower weights?



Summary Statistics:

BNF_chemical_name(1)	
LACTULOSE	7.458649e+05
PARACETAMOL	1.803197e+05
METFORMIN HYDROCHLORIDE	9.647979e+04
ISPAGHULA HUSK	3.665449e+04

```
GABAPENTIN          3.089815e+04
...
CETRORELIX          1.500000e-06
MOMETASONE           7.000000e-07
PARICALCITOL         2.800000e-07
OLODATEROL           2.075000e-07
GLYCOPYRRONIUM       2.016000e-07
```

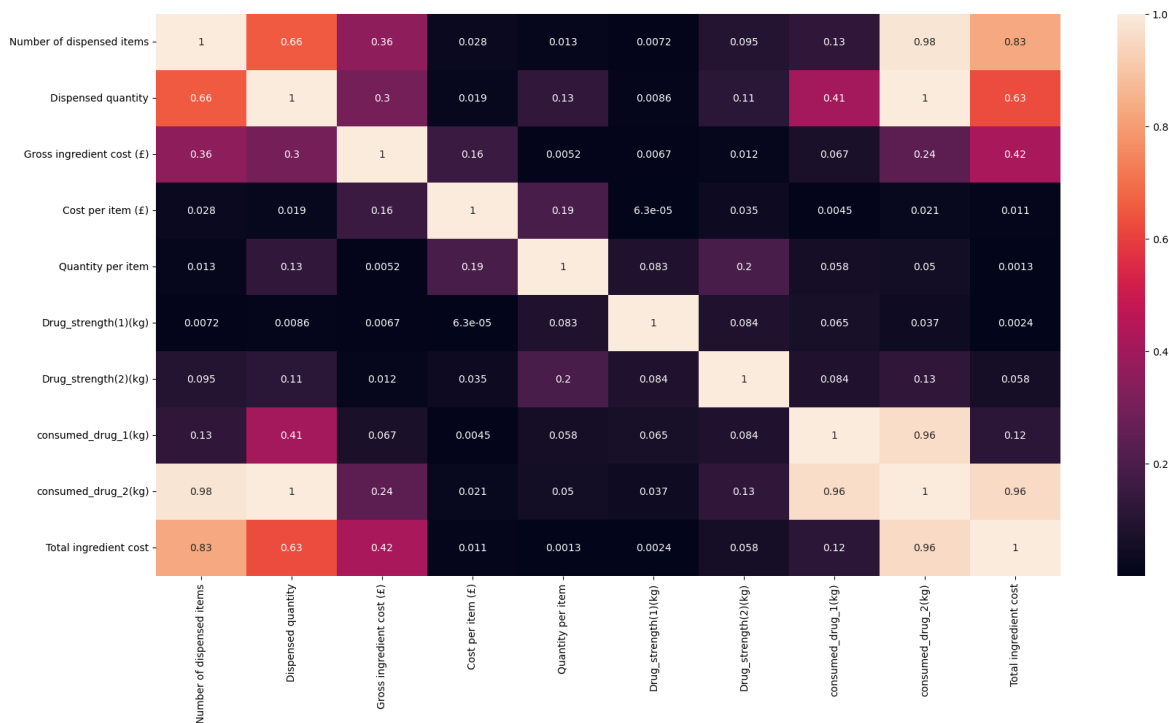
```
Outliers:
BNF sub-section
OSMOTIC LAXATIVES    149174.637
```

The box plots provide insights into the distribution of consumed drug weights for each drug class. Based on the box plots, we can observe the following:

- Some drug classes, such as 'OSMOTIC LAXATIVES', have a wide range of consumed drug weights.
- The drug class 'HIV INFECTION' has relatively lower consumed drug weights compared to other classes.
- These observations indicate variations in the consumed drug weights across different drug classes.

Correlation Analysis

Conduct a correlation analysis to examine relationships between variables. For example, explore the correlation between the dispensed quantity, consumed drug weight, and gross ingredient cost.



Based on the correlation coefficients:

- There is a positive correlation between dispensed quantity and consumed drug weight.
- There is no strong correlation between dispensed quantity and gross ingredient cost (£), or between consumed drug weight and gross ingredient cost (£).

Interpretations:

- There is a low positive correlation between Gross ingredient cost (£) and Cost per item (£). This suggests that as the cost per item increases, the gross ingredient cost also tends to increase.
- There is a low positive correlation between Cost per item (£) and Number of dispensed items. This indicates that as the cost per item increases, the number of dispensed items increase.
- There is a moderate positive correlation between Gross ingredient cost (£) and Number of dispensed items. This implies that as the gross ingredient cost increases, the number of dispensed items also tends to increase.

- Significant Correlations:

•	Number of dispensed items	Number of dispensed items	1.000000
•		Dispensed quantity	0.655228
•		consumed_drug_2 (kg)	0.984087
•		Total ingredient cost	0.828401
•	Dispensed quantity	Number of dispensed items	0.655228
•		Dispensed quantity	1.000000
•		consumed drug 2 (kg)	0.998342
•		Total ingredient cost	0.627384
•	Gross ingredient cost (£)	Gross ingredient cost (£)	1.000000
•	Cost per item (£)	Cost per item (£)	1.000000
•	Quantity per item	Quantity per item	1.000000
•	Drug_strength(1) (kg)	Drug_strength(1) (kg)	1.000000
•	Drug_strength(2) (kg)	Drug_strength(2) (kg)	1.000000
•	consumed_drug_1 (kg)	consumed_drug_1 (kg)	1.000000
•		consumed drug 2 (kg)	0.963482
•	consumed_drug_2 (kg)	Number of dispensed items	0.984087
•		Dispensed quantity	0.998342
•		consumed_drug_1 (kg)	0.963482
•		consumed drug 2 (kg)	1.000000
•		Total ingredient cost	0.955452
•	Total ingredient cost	Number of dispensed items	0.828401
•		Dispensed quantity	0.627384
•		consumed_drug_2 (kg)	0.955452
•		Total ingredient cost	1.000000

- dtype: float64

- Correlation Interpretations:

- There is a positive correlation between Number of dispensed items and Number of dispensed items.
- There is a positive correlation between Number of dispensed items and Dispensed quantity.
- There is a positive correlation between Number of dispensed items and consumed_drug_2 (kg).
- There is a positive correlation between Number of dispensed items and Total ingredient cost.

- There is a positive correlation between Dispensed quantity and Number of dispensed items.
- There is a positive correlation between Dispensed quantity and Dispensed quantity.
- There is a positive correlation between Dispensed quantity and consumed drug 2(kg).
- There is a positive correlation between Dispensed quantity and Total ingredient cost.
- There is a positive correlation between Gross ingredient cost (£) and Gross ingredient cost (£).
- There is a positive correlation between Cost per item (£) and Cost per item (£).
- There is a positive correlation between Quantity per item and Quantity per item.
- There is a positive correlation between Drug_strength(1)(kg) and Drug_strength(1)(kg).
- There is a positive correlation between Drug_strength(2)(kg) and Drug_strength(2)(kg).
- There is a positive correlation between consumed_drug_1(kg) and consumed_drug_1(kg).
- There is a positive correlation between consumed drug 1(kg) and consumed drug 2(kg).
- There is a positive correlation between consumed drug 2(kg) and Number of dispensed items.
- There is a positive correlation between consumed_drug_2(kg) and Dispensed quantity.
- There is a positive correlation between consumed_drug_2(kg) and consumed_drug_1(kg).
- There is a positive correlation between consumed drug 2(kg) and consumed drug 2(kg).
- There is a positive correlation between consumed_drug_2(kg) and Total ingredient cost.
- There is a positive correlation between Total ingredient cost and Number of dispensed items.
- There is a positive correlation between Total ingredient cost and Dispensed quantity.
- There is a positive correlation between Total ingredient cost and consumed drug 2(kg).
- There is a positive correlation between Total ingredient cost and Total ingredient cost.