

# Hospital antibiotics usage analysis year 2019

```
In [1]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

```
In [2]: data=pd.read_csv(r"C:\Users\Mahum\OneDrive\Desktop\data analysis\Project-4\data.csv")
pd.set_option('display.max_columns', None)
pd.set_option('display.max_rows', None)
```

```
In [3]: data.head(5)
```

Out[3]:

	Age	Date of Data Entry	Gender	Diagnosis	Name of Drug	Dosage (gram)	Route	Frequency	Duration (days)
0	85	19/12/2019 14:41:49	Female	ccf, hypertension, ida, ckd(stage 5), ?icm,	ceftriaxone	1	IV	BD	
1	87	19/12/2019 16:35:25	Female	pad(lt u.l), be amputation,/post op, akt	ceftriaxone	1	IV	BD	
2	82	19/12/2019 15:48:49	Male	type-2dm, ihd, col, copd, ht	ofloxacin	0.4	IV	BD	
3	82	19/12/2019 15:50:33	Male	type-2 dm, ihd, col, copd, ht	cefipime	1	IV	BD	
4	82	19/12/2019 15:52:20	Male	type-2 dm, ihd, col, copd, ht	azithromycin	0.5	Oral	OD	



```
In [4]: data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 833 entries, 0 to 832
Data columns (total 10 columns):
#   Column                Non-Null Count  Dtype
---  -
0   Age                    833 non-null    object
1   Date of Data Entry    833 non-null    object
2   Gender                 833 non-null    object
3   Diagnosis              833 non-null    object
4   Name of Drug           833 non-null    object
5   Dosage (gram)          833 non-null    object
6   Route                  833 non-null    object
7   Frequency              833 non-null    object
8   Duration (days)       833 non-null    object
9   Indication            832 non-null    object
dtypes: object(10)
memory usage: 65.2+ KB
```

```
In [5]: data.isnull()
```

Out[5]:

	Age	Date of Data Entry	Gender	Diagnosis	Name of Drug	Dosage (gram)	Route	Frequency	Duration (days)	Indication
0	False	False	False	False	False	False	False	False	False	False
1	False	False	False	False	False	False	False	False	False	False
2	False	False	False	False	False	False	False	False	False	False
3	False	False	False	False	False	False	False	False	False	False
4	False	False	False	False	False	False	False	False	False	False
5	False	False	False	False	False	False	False	False	False	False
6	False	False	False	False	False	False	False	False	False	False
7	False	False	False	False	False	False	False	False	False	False

```
In [6]: data.describe()
```

Out[6]:

	Age	Date of Data Entry	Gender	Diagnosis	Name of Drug	Dosage (gram)	Route	Frequency	Duration (days)
count	833	833	833	833	833	833	833	833	833
unique	73	436	3	264	57	28	4	6	15
top	48	19/12/2019 14:41:49	Male	ccf, koch's lung, copd, chest infection, pre-d...	ceftriaxone	1	IV	BD	1
freq	52	11	449	20	221	297	534	430	270

```
In [7]: data['Date of Data Entry'].value_counts() # this shows that the data is of y
```

```
19/12/2019 14:28:37    4
19/12/2019 14:41:27    4
19/12/2019 15:55:03    4
19/12/2019 14:10:25    4
19/12/2019 14:50:17    4
19/12/2019 14:45:52    4
19/12/2019 14:54:47    4
19/12/2019 14:44:46    4
19/12/2019 14:13:30    4
19/12/2019 14:01:17    4
19/12/2019 14:11:59    4
19/12/2019 14:25:09    4
19/12/2019 14:45:59    4
19/12/2019 14:26:26    4
19/12/2019 14:09:00    4
19/12/2019 16:11:35    4
19/12/2019 16:35:25    4
19/12/2019 14:00:05    4
19/12/2019 14:26:53    4
19/12/2019 15:37:12    3
```

## Exploring variables

### Age variable

```
In [8]: data['Age'].unique() # unique age values of all patients that is all the pa
```

```
Out[8]: array(['85', '87', '82', '55', '57', '22', '40', '74', '14', '72', '60',
               '53', '32', '48', '47', '63', '19', '64', '76', '51', '36', '62',
               '77', '67', '30', '66', '44', '15', '70', '45', '37', '78', '31',
               '38', '65', '86', '71', '59', '42', '34', '29', '49', '50', '61',
               '58', '69', '54', '52', '16', '20', '80', '75', '73', '43', '68',
               '25', '46', '41', '33', '23', '13', '90', '28', '1', '35', '56',
               '24', '18', 'Age', '17', '21', '39', '27'], dtype=object)
```

```
In [9]: data['Age'].value_counts()
```

```
Out[9]: 48      52
        52      37
        65      33
        78      31
        60      26
        70      26
        40      25
        32      25
        31      20
        64      19
        67      19
        45      19
        62      18
        53      18
        82      17
        57      17
        54      17
        22      16
        15      15
        66      14
        37      14
        19      14
        29      14
        76      13
        55      12
        58      12
        41      12
        25      12
        30      12
        56      12
        38      12
        74      11
        85      11
        23      11
        44      11
        13      10
        77      10
        50      10
        46       9
        71       9
        36       9
        63       9
        49       8
        42       8
        69       8
        73       7
        43       7
        35       7
        72       6
        68       6
        86       5
        51       5
        59       4
        24       4
        87       4
        61       4
        17       4
        47       4
        18       3
        20       3
        21       3
```

```

39      3
28      3
14      2
33      2
75      2
90      2
16      1
1       1
27      1
34      1
Age      1
80      1
Name: Age, dtype: int64

```

```
In [10]: data['Age'].mode() # result: according to result shown the most of the patient
```

```
Out[10]: 0      48
dtype: object
```

```
In [11]: print("minimum age of a patient is",data['Age'].unique().min())
```

```
minimum age of a patient is 1
```

```
In [12]: print("Maximum age of a patient is",data['Age'].unique().max()) # one with
```

```
Maximum age of a patient is Age
```

```
In [13]: data['Age'].unique().max() # before removing 'Age' value from Age attribute
```

```
Out[13]: 'Age'
```

```
In [14]: data=data.drop(data[data['Age'] == 'Age'].index) # saving it in the existing
```

```
In [15]: data['Age'].unique().max() # after removing
```

```
Out[15]: '90'
```

## Minimum and Maximum age patient

```
In [16]: print("minimum age of a patient is",data['Age'].unique().min())
print("Maximum age of a patient is",data['Age'].unique().max())
```

```
minimum age of a patient is 1
Maximum age of a patient is 90
```

**Using count gives the no of records in each column for that particular val**

```
In [17]: Max_age=data[data['Age']=='90']
Max_age.count()
```

```
Out[17]: Age                2
Date of Data Entry        2
Gender                    2
Diagnosis                 2
Name of Drug              2
Dosage (gram)             2
Route                    2
Frequency                 2
Duration (days)          2
Indication                2
dtype: int64
```

```
In [18]: Min_age=data[data['Age']=='1']
Min_age.count()
```

```
Out[18]: Age                1
Date of Data Entry        1
Gender                    1
Diagnosis                 1
Name of Drug              1
Dosage (gram)             1
Route                    1
Frequency                 1
Duration (days)          1
Indication                1
dtype: int64
```

## Value\_counts returns in detail

```
In [19]: Max_age=data[data['Age']=='90']
Max_age.value_counts()
```

```
Out[19]: Age  Date of Data Entry  Gender  Diagnosis
Name of Drug  Dosage (gram)  Route  Frequency  Duration (days)  Indication
90  19/12/2019 15:08:08  Female  sick sinus syndrome, ccf, poor drug adhe
rence, ihd  cefixime  0.2  Oral  BD  3
dyspnoea  1
19/12/2019 15:04:30  Female  sick sinus syndrome, ccf, poor drug adhe
rence, ihd  ceftriaxone  1  IV  BD  4
dyspnoea  1
dtype: int64
```

```
In [20]: Min_age=data[data['Age']=='1']
Min_age.value_counts()
```

```
Out[20]: Age  Date of Data Entry  Gender  Diagnosis  Name of Drug  Dosa
ge (gram)  Route  Frequency  Duration (days)  Indication
1  19/12/2019 16:00:42  Male  fever with malaena  flucloxacillin  0.12
5  Oral  BD  1  fever  1
dtype: int64
```

# Exploring Gender col

```
In [21]: data['Gender'].value_counts()
```

```
Out[21]: Male      449  
         Female    382  
         Sex        1  
         Name: Gender, dtype: int64
```

```
In [22]: Gender=data[data['Gender']=='Sex']  
         Gender.count()
```

```
Out[22]: Age      1  
         Date of Data Entry  1  
         Gender      1  
         Diagnosis    1  
         Name of Drug    1  
         Dosage (gram)  1  
         Route        1  
         Frequency     1  
         Duration (days) 1  
         Indication    1  
         dtype: int64
```

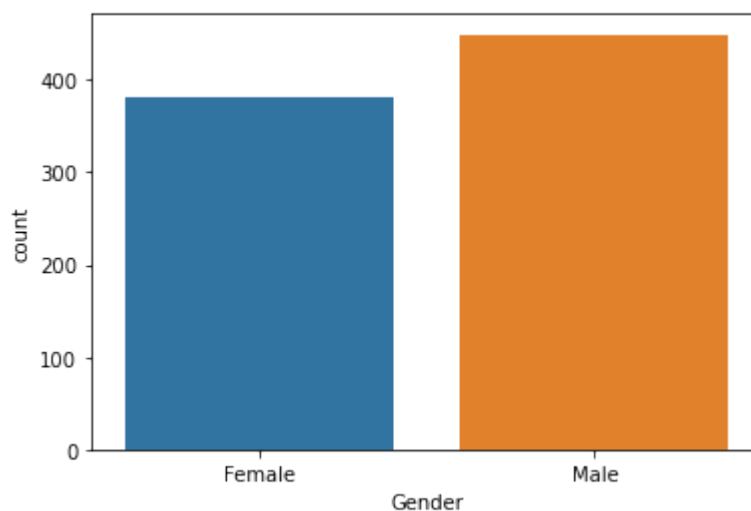
```
In [23]: data=data.drop(data[data['Gender'] == 'Sex'].index)
```

```
In [24]: data['Gender'].value_counts()
```

```
Out[24]: Male      449  
         Female    382  
         Name: Gender, dtype: int64
```

```
In [25]: sns.countplot(x='Gender', data = data)
```

```
Out[25]: <AxesSubplot:xlabel='Gender', ylabel='count'>
```





```
In [26]: d=data.groupby(['Gender', 'Name of Drug']).size()  
k=data.groupby(['Gender', 'Age']).size()
```

```
In [27]: k
```

```
Out[27]: Gender  Age  
Female  15      4  
        17      1  
        19      7  
        22      8  
        23      3  
        25      4  
        28      2  
        29     13  
        30      1  
        31     18  
        32     18  
        34      1  
        35      3  
        36      3  
        37      1  
        38      1  
        39      3  
        40      1  
        ..      ..
```

```
In [28]: df2=data.loc[(data['Gender'] == 'Female') & (data['Age'] == '15' )]  
print(df2.count()) # verifying the above group by command .
```

```
Age      4  
Date of Data Entry  4  
Gender      4  
Diagnosis      4  
Name of Drug      4  
Dosage (gram)      4  
Route      4  
Frequency      4  
Duration (days)      4  
Indication      4  
dtype: int64
```

## Name of the drugs used based on gender

In [29]: `d# gender vs name of the drugs`

```

Out[29]: Gender Name of Drug
Female amikacin 6
        amoxicillin 1
        amoxicillin+flucloaxcin 1
        amoxicillin+flucloxacillin 16
        amoxicillin+flucloxiacillin 1
        amoxicillin+flucoxacillin 2
        azithromycin 2
        cefepime 6
        cefipime 10
        cefixime 22
        cefoperazone 4
        cefoperazone+sulbactam 1
        ceftazidime 10
        ceftriaxone 84
        ceftriaxone+sulbactam 1
        cifran 1
        ciprofloxacin 7
        clarithromycin 13
        clindamycin 2
        co-amoxiclav 99
        coamoxiclav 7
        doxycyclin 1
        flucloxacillin 1
        gentamicin 5
        imipenem 1
        levetofloxacin 1
        levofloxacin 14
        meropenem 1
        meropenem 4
        metronidazole 24
        nitrofurantoin 1
        pen v 5
        piperacillin+tazobactam 1
        rifaximin 3
        septrin 21
        streptomycin 3
Male amikacin 3
      amoxicillin 3
      amoxicillin+flucloxacillin 13
      amoxicillin+flucoxacillin 1
      amoxicillin+flucoxiacillin 1
      amoxiclav 1
      azithromycin 3
      cefaziclime 2
      cefepime 8
      cefexime 2
      cefipime 3
      cefixime 36
      cefoparazone+sulbactam 3
      cefoperazone 5
      ceftazidime 14
      ceftazidine 4
      cefteiaxone 1
      ceftiaxone 2
      ceftriaxone 137
      ceftriaxone+sulbactam 1
      cifran 3
      clarithromycin 19
      clarthromycin 4
      clindamycin 10

```

co-amoxiclav	63
coamoxiclav	2
dazolic	1
doxycycline	1
flucloxacillin	1
imipenem	1
levofloxacin	17
linezolid	3
meropenem	4
metronidazole	35
mirox	4
norfloxacin	3
ofloxacin	3
pentoxifylline	1
pentoxyfylline	1
rifampicin	5
rifaximin	7
septrin	16
streptomycin	1
vancomycin	1

dtype: int64

```
In [30]: data['Name of Drug'].unique()
```

```
Out[30]: array(['ceftriaxone', 'ofloxacin', 'cefipime', 'azithromycin',
                'ceftazidime', 'septrin', 'co-amoxiclav', 'clindamycin',
                'cefoperazone+sulbactam', 'metronidazole', 'cefixime', 'cefepime',
                'ciprofloxacin', 'norfloxacin', 'coamoxiclav', 'cifran',
                'meropenem', 'gentamicin', 'pen v', 'clarithromycin', 'mirox',
                'amoxicillin', 'cefexime', 'amikacin', 'ceftazidine', 'rifaximin',
                'cefoperazone', 'levofloxacin', 'amoxicillin+flucloxacillin',
                'linezolid', 'ceftriaxone+sulbactam', 'amoxicillin+flucoxiacillin',
                'clarthromycin', 'rifampicin', 'streptomycin',
                'amoxicillin+flucoxacillin', 'cefoparazone+sulbactam',
                'flucloxacillin', 'imipenem', 'doxycycline', 'amoxiclav',
                'amoxicillin+flucloaxcin', 'dazolic', 'cefaziclime', 'ceftiaxone',
                'cefteiaxone', 'vancomycin', 'pentoxyfylline', 'doxycyclin',
                'levefloxacin', 'menopem', 'pentoxifylline',
                'amoxicillin+flucloxiacillin', 'piperacillin+tazobactam',
                'nitrofurantoin'], dtype=object)
```

```
In [31]: data['Name of Drug'].value_counts()
```

```
Out[31]: ceftriaxone                221
co-amoxiclav                162
metronidazole               59
cefixime                    58
septrin                     37
clarithromycin              32
levofloxacin                31
amoxicillin+flucloxacillin  29
ceftazidime                 24
cefepime                    14
cefipime                    13
clindamycin                 12
rifaximin                   10
coamoxiclav                 9
cefoperazone                9
amikacin                    9
meropenem                   8
ciprofloxacin               7
azithromycin                5
pen v                       5
rifampicin                  5
gentamicin                  5
cifran                      4
streptomycin                4
amoxicillin                 4
clarthromycin               4
mirox                       4
ceftazidine                 4
linezolid                   3
amoxicillin+flucoxacillin   3
cefoparazone+sulbactam      3
ofloxacin                   3
norfloxacin                 3
ceftiaxone                  2
flucloxacillin              2
cefexime                    2
cefaziclime                 2
ceftriaxone+sulbactam       2
imipenem                    2
piperacillin+tazobactam     1
amoxiclav                   1
menopem                     1
pentoxifylline              1
doxycycline                 1
levefloxacin                1
nitrofurantoin              1
amoxicillin+flucoxiacillin  1
cefteiaxone                 1
doxycyclin                  1
cefoperazone+sulbactam      1
dazolic                     1
amoxicillin+flucloaxcin     1
vancomycin                  1
pentoxyfylline              1
amoxicillin+flucloxiacillin 1
Name: Name of Drug, dtype: int64
```

**Since top 2 drugs used are ceftriaxone and co-amoxiclav with value count 221 and 162 so lets check it gender wise.**

Females

```
In [32]: f1=data.loc[(data['Gender'] == 'Female') & (data['Name of Drug'] == 'ceftriaxone')]
print(" female patients counts where drug used is ceftriaxone\n",f1.count())
f2=data.loc[(data['Gender'] == 'Female') & (data['Name of Drug'] == 'co-amoxiclav')]
print("female patients counts where drug used is co-amoxiclav \n",f2.count())
```

female patients counts where drug used is ceftriaxone

Age	84
Date of Data Entry	84
Gender	84
Diagnosis	84
Name of Drug	84
Dosage (gram)	84
Route	84
Frequency	84
Duration (days)	84
Indication	83

dtype: int64

female patients counts where drug used is co-amoxiclav

Age	99
Date of Data Entry	99
Gender	99
Diagnosis	99
Name of Drug	99
Dosage (gram)	99
Route	99
Frequency	99
Duration (days)	99
Indication	99

dtype: int64

**male**

```
In [33]: m1=data.loc[(data['Gender'] == 'Male') & (data['Name of Drug'] == 'ceftriaxone')]
print("male patients counts where drug used is ceftriaxone\n",m1.count())
m2=data.loc[(data['Gender'] == 'Male') & (data['Name of Drug'] == 'co-amoxiclav')]
print("male patients counts where drug used is co-amoxiclav\n",m2.count())
```

male patients counts where drug used is ceftriaxone

Age	137
Date of Data Entry	137
Gender	137
Diagnosis	137
Name of Drug	137
Dosage (gram)	137
Route	137
Frequency	137
Duration (days)	137
Indication	137

dtype: int64

male patients counts where drug used is co-amoxiclav

Age	63
Date of Data Entry	63
Gender	63
Diagnosis	63
Name of Drug	63
Dosage (gram)	63
Route	63
Frequency	63
Duration (days)	63
Indication	63

dtype: int64

```
In [34]: A=data.groupby(['Age', 'Name of Drug']).size()
A
```

```
Out[34]: Age  Name of Drug
1    flucloxacillin      1
13   amikacin           2
     cefaziclime         2
     cefixime            3
     ceftriaxone         3
14   cefixime           2
15   amoxicillin+flucloxacillin  2
     cefixime            4
     ceftriaxone         7
     metronidazole       1
     septrin             1
16   amoxicillin+flucloxacillin  1
17   ceftriaxone        2
     clindamycin         1
     co-amoxiclav        1
18   amoxicillin+flucloxacillin  2
     ceftriaxone         1
19   amoxicillin+flucloxacillin  1
     cefixime            1
```

```
In [35]: A.plot(kind='bar')
plt.xticks(rotation=90)
```

```
Out[35]: (array([ 0,  1,  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12,
                  13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25,
                  26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38,
                  39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51,
                  52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64,
                  65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77,
                  78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90,
                  91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103,
                  104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116,
                  117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129,
                  130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142,
                  143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155,
                  156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168,
                  169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181,
                  182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194,
                  195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207,
                  208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220,
                  221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233,
                  234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246,
                  247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259])
```

**For which age group top 2 antibiotics were mostly used.**



```
In [36]: m3=data['Age'].loc[(data['Name of Drug'] == 'ceftriaxone' )]  
m3.value_counts()
```

```
Out[36]: 48    13
          85    11
          64    10
          53    10
          40     8
          67     8
          65     7
          31     7
          44     7
          15     7
          37     6
          38     6
          70     6
          45     6
          56     5
          50     5
          49     5
          78     4
          52     4
          23     4
          30     4
          87     4
          74     4
          22     4
          29     4
          66     4
          19     3
          13     3
          54     3
          71     3
          57     3
          42     3
          77     3
          41     3
          58     3
          17     2
          76     2
          32     2
          20     2
          25     2
          59     2
          46     2
          72     2
          63     1
          34     1
          27     1
          47     1
          75     1
          33     1
          90     1
          43     1
          55     1
          62     1
          18     1
          35     1
          28     1
          68     1
          60     1
          Name: Age, dtype: int64
```

```
In [37]: m4=data['Age'].loc[(data['Name of Drug'] == 'co-amoxiclav' )]  
m4.value_counts()
```

```
Out[37]: 60      23  
78      18  
65      13  
52      12  
32      12  
73       6  
76       4  
54       4  
86       4  
61       4  
62       4  
48       4  
55       3  
67       3  
72       3  
40       3  
29       3  
36       3  
25       3  
57       3  
53       2  
23       2  
22       2  
46       2  
77       2  
68       2  
51       2  
71       2  
24       2  
17       1  
82       1  
21       1  
80       1  
37       1  
19       1  
30       1  
43       1  
35       1  
75       1  
50       1  
31       1  
Name: Age, dtype: int64
```

**For which Disease Treatment these 2 drugs were mostly used**

```
In [38]: I4=data['Indication'].loc[(data['Name of Drug'] == 'co-amoxiclav' )]  
I4.value_counts()
```

Out[38]:	chest infection	27
	koch's lung	7
	copd	6
	asthma	5
	hcv	5
	ccf	5
	type 2 dm	4
	ckd	4
	aki	3
	ihd	3
	tb	3
	col	3
	multiple myeloma	3
	prevention of infection	3
	pre-diabetes	2
	hydronephrosis	2
	esrd	2
	lung abscess	2
	retro(+)	2
	cap	2
	general debility e excessive vomitting	2
	uraemic gastritis	2
	hypertension	2
	multinodular goiter	2
	thyrotoxicosis	2
	uti	2
	severe anaemia	2
	heart failure	2
	he	2
	rt	2
	ca lung	2
	aortic dissection	1
	myoma uterus	1
	haemoptysis	1
	kochs'lung	1
	left sided tension pneumothorax	1
	left empyema	1
	renal impairment	1
	degenerative mr	1
	atypical pneumonia	1
	Addison's disease	1
	copd, chest infection	1
	lung consodilation(rlz)	1
	hbv infection	1
	left sided pleural effusion	1
	hydropneumothorax	1
	chronic cardiac failure	1
	cheat infection	1
	rvi	1
	klebsiella pneumonia	1
	aspiration pneumonia	1
	left sided massive tuberculous pleural effusion	1
	empyema	1
	increased lft	1
	acute pulmonary edema	1
	left moderate pleural effusion	1
	fever	1
	consolidation	1
	respiratory infection	1
	right lower lobe consolidation	1
	old stroke	1

svt	1
symptomatic hypoglycemia	1
left sided hemiparesis	1
acute gastritis vomiting ē hk+	1
thrombocytopenia	1
af	1
abscess on chin	1
pleural effusion	1
hypokalemia	1
cardiogenic shock	1
skin infection	1
septic shock	1
ht	1
anteroseptal mi	1
acute bronchitis	1
pcp	1
pe in distal bronchi of left lung pulmonary arteries	1

Name: Indication, dtype: int64

```
In [39]: I5=data['Indication'].loc[(data['Name of Drug'] == 'ceftriaxone' )]
I5.value_counts()
```

```
Out[39]: chest infection                22
col                                     14
uti                                    9
type 2 dm                             7
prevention of infection                6
koch's lung                           5
fever                                  5
aspiration pneumonia                  4
rvi                                    4
copd                                   4
ckd                                    4
ccf                                    3
hypertension                          3
surgery                               3
dhf                                    3
cap                                    3
hepatitis                             3
ihd                                    3
hcv                                    3
hiv                                    2
```

## For which Disease Treatment which antibiotics is used

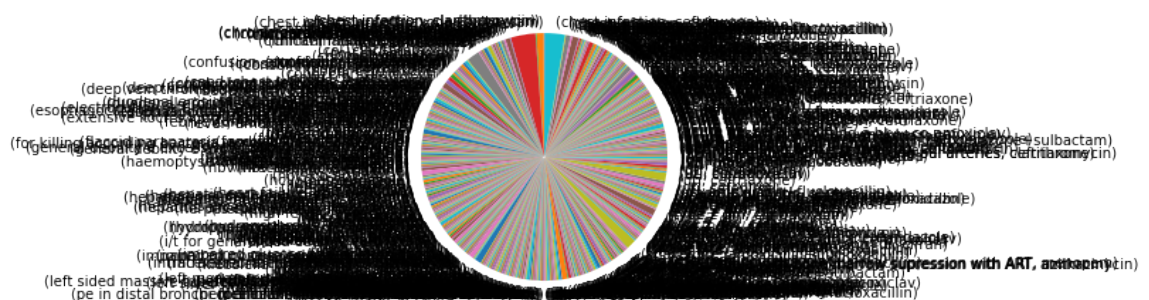
```
In [40]: IN=data.groupby(['Indication', 'Name of Drug']).size()
```

In [41]: IN

5	co-amoxiclav
5	metronidazole
2	rifaximin
1	septrin
1	cefteiaxone
1	ceftriaxone
3	co-amoxiclav
2	levofloxacin
1	linezolid
1	rifampicin
-	

In [42]: IN.plot(kind='pie')  
plt.xticks(rotation=90)

Out[42]: (array([], dtype=float64), [])



**frequency of antibiotics used**

```
In [43]: D=data.groupby(['Frequency', 'Name of Drug']).size()  
D
```



```

Out[43]: Frequency Name of Drug
BD
    amikacin 9
    amoxicillin 4
    amoxiclav 1
    azithromycin 1
    cefepime 7
    cefexime 2
    cefipime 13
    cefixime 57
    cefoparazone+sulbactam 3
    cefoperazone 9
    cefoperazone+sulbactam 1
    ceftazidime 1
    cefteiaxone 1
    ceftiaxone 2
    ceftriaxone 207
    ceftriaxone+sulbactam 2
    cifran 4
    ciprofloxacin 6
    clarithromycin 32
    clarthromycin 4
    co-amoxiclav 11
    dazolic 1
    doxycyclin 1
    doxycycline 1
    flucloxacillin 1
    gentamicin 5
    levofloxacin 3
    linezolid 3
    menopem 1
    meropenem 4
    mirox 4
    nitrofurantoin 1
    norfloxacin 3
    ofloxacin 3
    pen v 4
    piperacillin+tazobactam 1
    rifampicin 5
    rifaximin 10
    septrin 1
    vancomycin 1
OD
    azithromycin 4
    cefepime 4
    ceftazidime 1
    ceftriaxone 11
    ciprofloxacin 1
    co-amoxiclav 15
    coamoxiclav 6
    levfloxacin 1
    levofloxacin 28
    meropenem 1
    septrin 34
    streptomycin 4
QID
    amoxicillin+flucloxacillin 4
    amoxicillin+flucoxacillin 1
    amoxicillin+flucoxiacillin 1
    imipenem 1
    pen v 1
TDS
    amoxicillin+flucloaxcin 1
    amoxicillin+flucloxacillin 25
    amoxicillin+flucloxiacillin 1

```

amoxicillin+flucoxacillin	2
cefaziclime	2
cefepime	3
cefixime	1
ceftazidime	22
ceftazidine	4
ceftriaxone	3
clindamycin	12
co-amoxiclav	136
coamoxiclav	3
flucloxacillin	1
imipenem	1
meropenem	3
metronidazole	59
pentoxifylline	1
pentoxyfylline	1
septrin	2

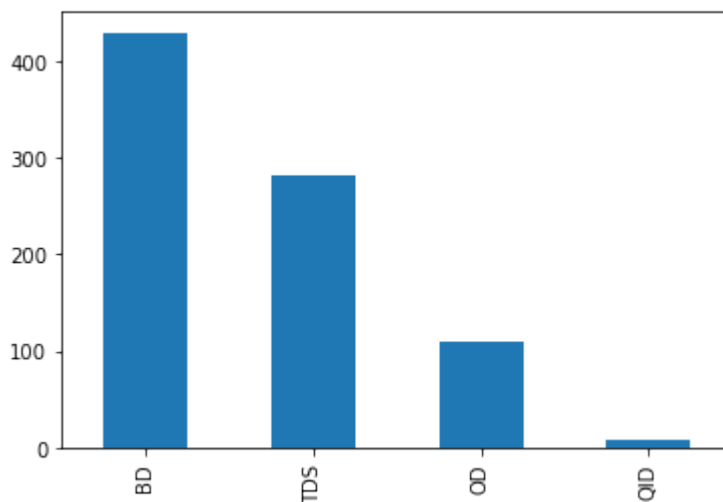
dtype: int64

```
In [44]: b=data['Frequency'].value_counts()
b
```

```
Out[44]: BD      430
TDS      283
OD       110
QID        8
Name: Frequency, dtype: int64
```

```
In [45]: b.plot(kind='bar')
```

```
Out[45]: <AxesSubplot:>
```

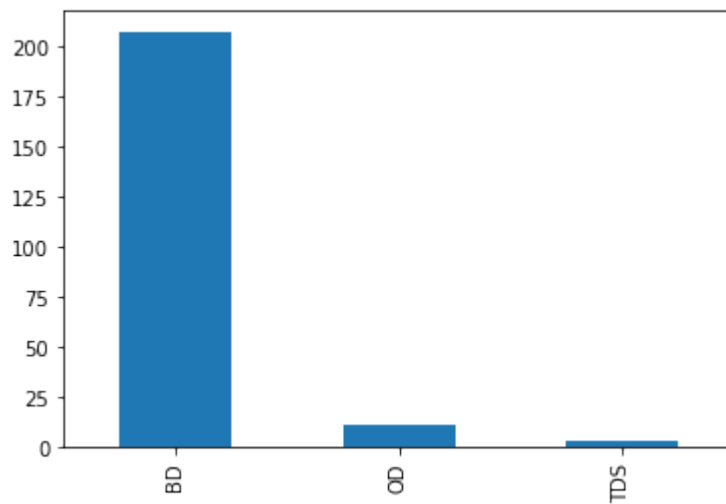


```
In [46]: ce=data['Frequency'].loc[(data['Name of Drug'] == 'ceftriaxone' )]
l=ce.value_counts()
l
```

```
Out[46]: BD      207
OD        11
TDS        3
Name: Frequency, dtype: int64
```

```
In [47]: l.plot(kind='bar')
```

```
Out[47]: <AxesSubplot:>
```

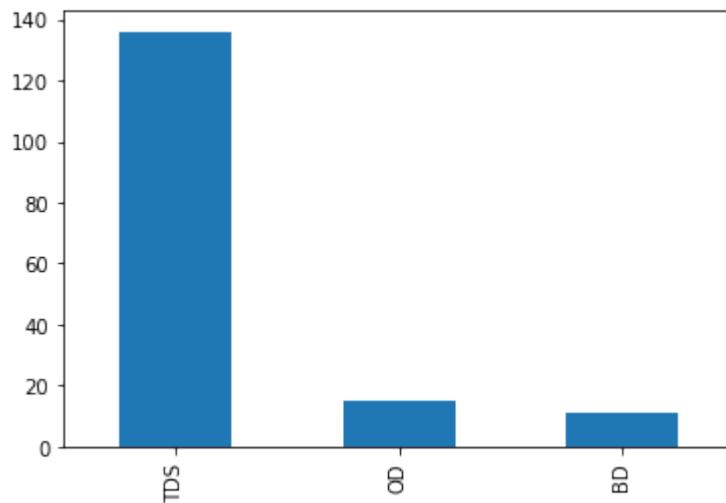


```
In [48]: ce=data['Frequency'].loc[(data['Name of Drug'] == 'co-amoxiclav' )]  
j=ce.value_counts()  
j
```

```
Out[48]: TDS      136  
         OD        15  
         BD         11  
         Name: Frequency, dtype: int64
```

```
In [49]: j.plot(kind='bar')
```

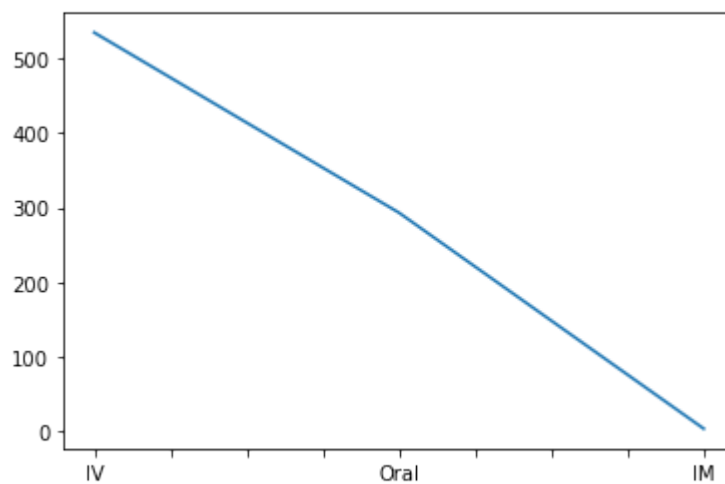
```
Out[49]: <AxesSubplot:>
```



**Mostly used Route for the antibiotics**

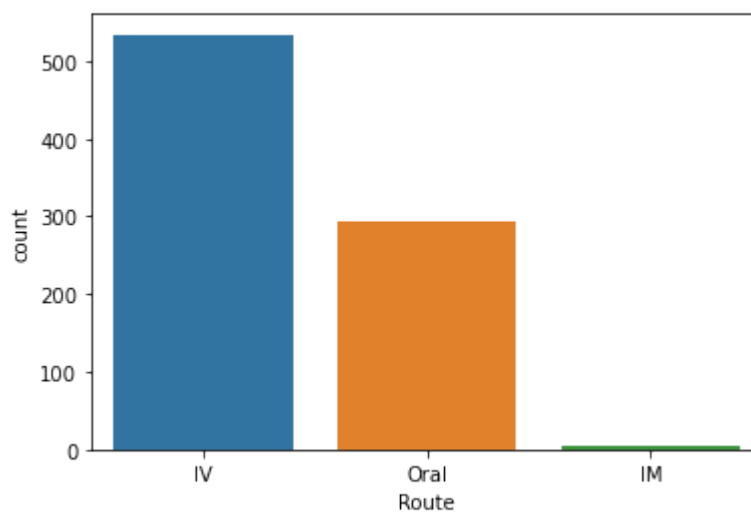
```
In [50]: data['Route'].value_counts().plot()
```

```
Out[50]: <AxesSubplot:>
```



```
In [51]: sns.countplot(x='Route', data=data)
```

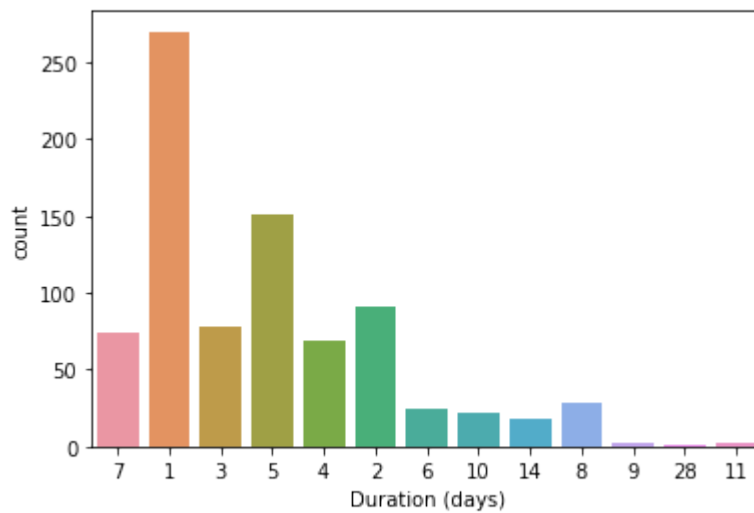
```
Out[51]: <AxesSubplot:xlabel='Route', ylabel='count'>
```



## Antibiotics Duration

```
In [52]: sns.countplot(x = 'Duration (days)', data = data)
```

```
Out[52]: <AxesSubplot:xlabel='Duration (days)', ylabel='count'>
```



```
In [53]: data['Duration (days)'].value_counts()
```

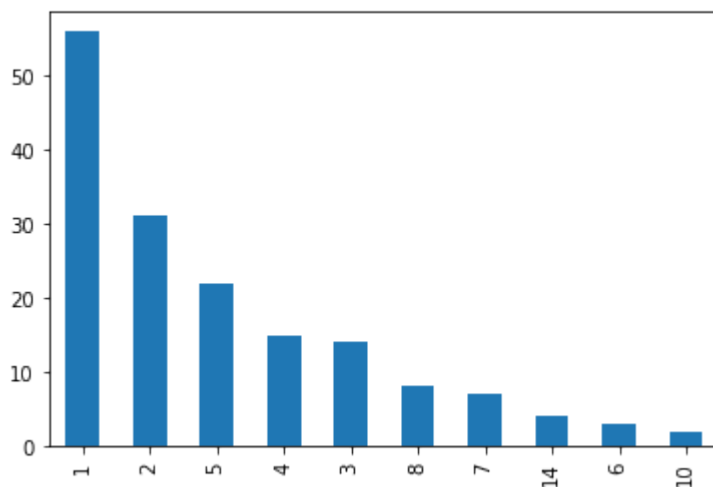
```
Out[53]: 1      270
         5      151
         2       91
         3       78
         7       74
         4       69
         8       28
         6       25
        10       22
        14       18
        11        2
         9        2
        28        1
        Name: Duration (days), dtype: int64
```

```
In [54]: D=data.groupby(['Duration (days)', 'Name of Drug']).size()
D
```

```
Out[54]: Duration (days)  Name of Drug
1                        amikacin          1
                        amoxicillin+flucloxacillin      8
                        amoxicillin+flucoxacillin       2
                        amoxicillin+flucoxiacillin       1
                        azithromycin          1
                        cefepime             4
                        cefipime             5
                        cefixime             7
                        ceftazidime          5
                        ceftazidine          2
                        ceftiaxone           2
                        ceftriaxone          75
                        ciprofloxacin         2
                        clarithromycin         4
                        clarthromycin         4
                        clindamycin          4
                        co-amoxiclav         56
                        dazolic              1
                        ... ..
```

```
In [55]: S1=data['Duration (days)'].loc[(data['Name of Drug'] == 'co-amoxiclav' )]
S1.value_counts().plot(kind='bar')
```

```
Out[55]: <AxesSubplot:>
```

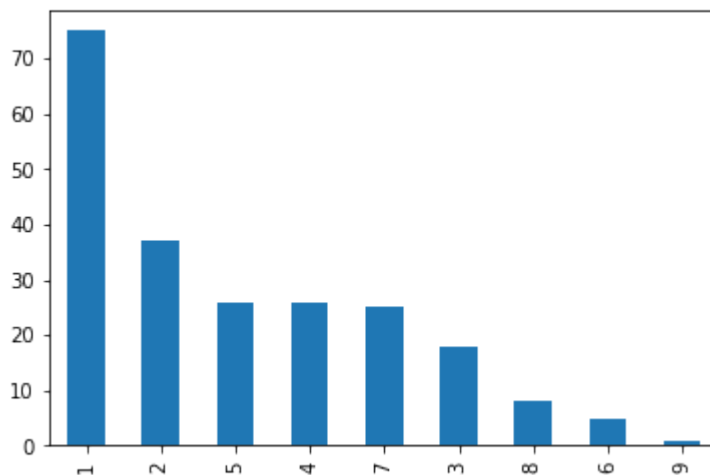


```
In [56]: S1.value_counts()
```

```
Out[56]: 1      56
         2      31
         5      22
         4      15
         3      14
         8       8
         7       7
        14       4
         6       3
        10       2
         Name: Duration (days), dtype: int64
```

```
In [57]: S2=data['Duration (days)'].loc[(data['Name of Drug'] == 'ceftriaxone' )]  
S2.value_counts().plot(kind='bar')
```

Out[57]: <AxesSubplot:>



```
In [58]: S2.value_counts()
```

Out[58]:

1	75
2	37
5	26
4	26
7	25
3	18
8	8
6	5
9	1

Name: Duration (days), dtype: int64

## Conclusion ¶

According to the analysis, the most commonly prescribed antibiotics in December 2019 for patients primarily suffering from chest infections through IV were ceftriaxone (ranked first) and co-amoxiclav (ranked second). These patients received these medications twice daily, with a typical course of treatment lasting one day. The majority of these patients were male and aged 48. Antibiotic consumption declined by 98.66% until the ninth day of use as the number of days rose.

```
In [ ]:
```