In [1]:
```
import numpy as np
import pandas as pd
```

In [2]:
```
dataset=pd.read_csv("dataset/raw_data1.csv")
print(dataset.dtypes)

dataset.head()
```

```
Patient Number                                float64
State Patient Number                           object
Date Announced                                 object
Estimated Onset Date                          float64
Age Bracket                                    object
Gender                                         object
Detected City                                  object
Detected District                              object
Detected State                                 object
State code                                     object
Current Status                                 object
Notes                                          object
Contracted from which Patient (Suspected)      object
Nationality                                    object
Type of transmission                           object
Status Change Date                             object
Source_1                                       object
Source_2                                       object
Source_3                                       object
Backup Notes                                   object
Num cases                                       int64
dtype: object
```

Out[2]:

	Patient Number	State Patient Number	Date Announced	Estimated Onset Date	Age Bracket	Gender	Detected City	Detected District	Detected State	State code	...
0	1.0	KL-TS-P1	30/01/2020	NaN	20	F	Thrissur	Thrissur	Kerala	KL	...
1	2.0	KL-AL-P1	02/02/2020	NaN	NaN	NaN	Alappuzha	Alappuzha	Kerala	KL	...
2	3.0	KL-KS-P1	03/02/2020	NaN	NaN	NaN	Kasaragod	Kasaragod	Kerala	KL	...
3	4.0	DL-P1	02/03/2020	NaN	45	M	East Delhi (Mayur Vihar)	East Delhi	Delhi	DL	...
4	5.0	TS-P1	02/03/2020	NaN	24	M	Hyderabad	Hyderabad	Telangana	TG	...

5 rows × 21 columns

In [3]:

```
dataset.isnull().any()
```

Out[3]:

```
Patient Number                                  True
State Patient Number                            True
Date Announced                                 False
Estimated Onset Date                            True
Age Bracket                                     True
Gender                                          True
Detected City                                   True
Detected District                               True
Detected State                                  True
State code                                      True
Current Status                                 False
Notes                                           True
Contracted from which Patient (Suspected)       True
Nationality                                     True
Type of transmission                            True
Status Change Date                              True
Source_1                                        True
Source_2                                        True
Source_3                                        True
Backup Notes                                    True
Num cases                                      False
dtype: bool
```

In [4]:

```
dataset['Patient Number'].fillna(dataset['Patient Number'].median(),inplace = T
dataset['State Patient Number'].fillna(dataset['State Patient Number'].mode()[0
#dataset['Estimated Onset Date'].fillna(dataset['Estimated Onset Date'].mode()[
dataset['Age Bracket'].fillna(dataset['Age Bracket'].mode()[0],inplace = True)
dataset['Gender'].fillna(dataset['Gender'].mode()[0] ,inplace = True)
dataset['Detected City'].fillna(dataset['Detected City'].mode()[0],inplace = Tr
dataset['Detected District'].fillna(dataset['Detected District'].mode()[0],inpl
dataset['Detected State'].fillna(dataset['Detected State'].mode()[0],inplace =
dataset['State code'].fillna(dataset['State code'].mode()[0],inplace = True)
dataset['Nationality'].fillna(dataset['Nationality'].mode()[0] ,inplace = True)
dataset['Type of transmission'].fillna(dataset['Type of transmission'].mode()[0
dataset['Status Change Date'].fillna(dataset['Status Change Date'].mode()[0] ,i
dataset.drop(['Source_1', 'Source_2', 'Source_3', "Contracted from which Patien
dataset["Age Bracket"].replace({"28-35": "32", "1.5": 2}, inplace=True)
dataset["Age Bracket"] = dataset["Age Bracket"].astype(str).astype(int)
dataset.tail(2)
```

Out[4]:

	Patient Number	State Patient Number	Date Announced	Age Bracket	Gender	Detected City	Detected District	Detected State	State code	Current Status
17362	8653.5	AP-P110	19/04/2020	35	M	MCGM	Nagpur	Maharashtra	MH	Hospitalized
17363	8653.5	AP-P110	19/04/2020	35	M	MCGM	Mumbai	Maharashtra	MH	Hospitalized

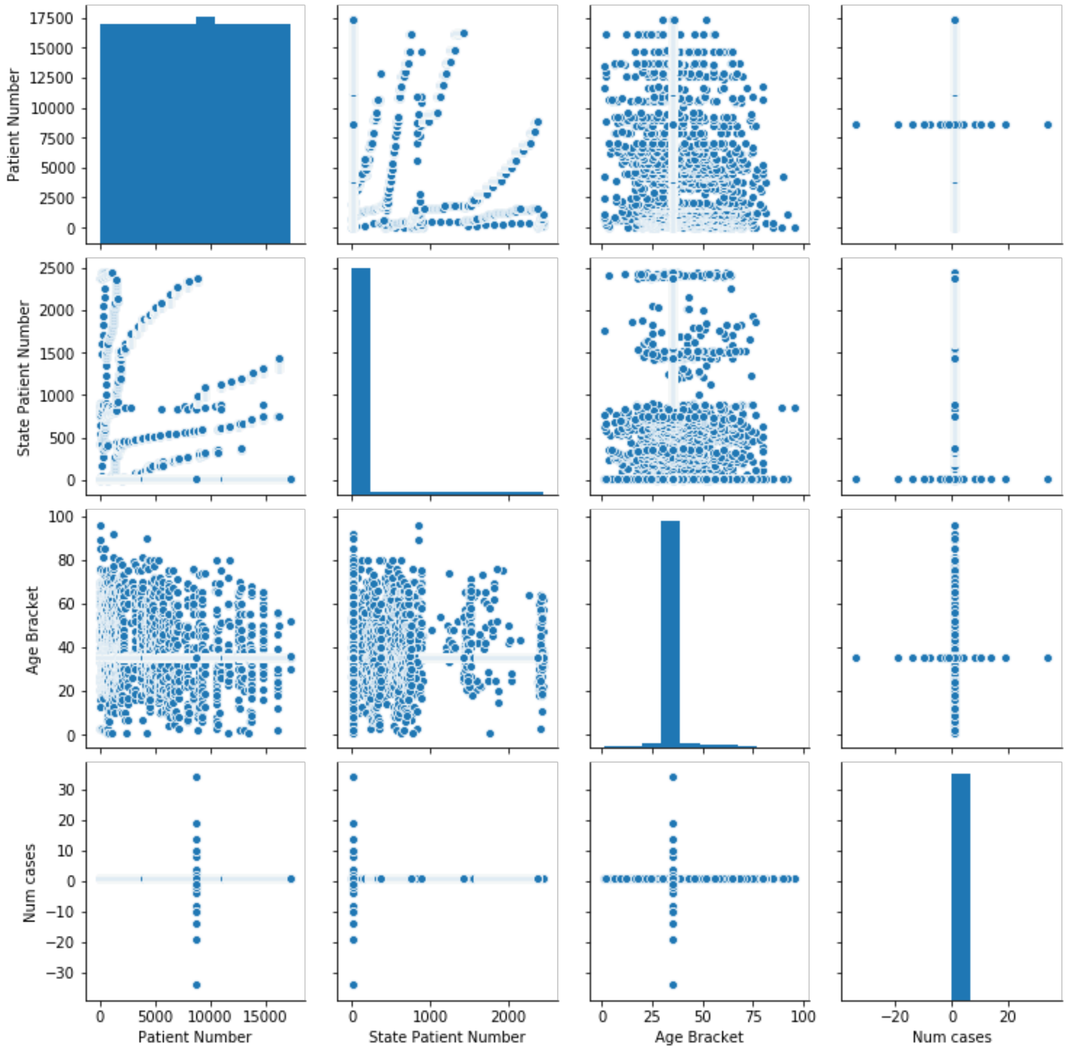
In [5]:
```
from sklearn.preprocessing import LabelEncoder
le = LabelEncoder()

#encoding
dataset["Patient Number"]=le.fit_transform(dataset["Patient Number"])
dataset["State Patient Number"]=le.fit_transform(dataset["State Patient Number"
#print(len(dataset["State Patient Number"].unique()))
dataset.head()
```

Out[5]:

	Patient Number	State Patient Number	Date Announced	Age Bracket	Gender	Detected City	Detected District	Detected State	State code	Current Status	
0	0	859	30/01/2020	20	F	Thrissur	Thrissur	Kerala	KL	Recovered	Tra V
1	1	818	02/02/2020	35	M	Alappuzha	Alappuzha	Kerala	KL	Recovered	Tra V
2	2	834	03/02/2020	35	M	Kasaragod	Kasaragod	Kerala	KL	Recovered	Tra V
3	3	420	02/03/2020	45	M	East Delhi (Mayur Vihar)	East Delhi	Delhi	DL	Recovered	Tra A
4	4	2374	02/03/2020	24	M	Hyderabad	Hyderabad	Telangana	TG	Recovered	Tra D Bar c

In [15]:
```
import seaborn as sns
sns.pairplot(dataset)
```

Out[15]:
```
<seaborn.axisgrid.PairGrid at 0x7ff1afd933d0>
```



In [6]:
```
from cn.protect import Protect
from cn.protect.privacy import KAnonymity
from cn.protect.hierarchy import DataHierarchy, OrderHierarchy, IntervalHierarc
from cn.protect.quality import Loss
from sklearn.linear_model import LogisticRegression, SGDClassifier
```

In [7]:
```
#print(len(dataset["Patient Number"].unique()))
prot=Protect(dataset, KAnonymity(17300))
prot.quality_model=Loss()
prot.suppression=.1
```

In [8]:
```
for col in dataset:
    if col not in ("Patient Number", "State Patient Number", "Detected District
        prot.itypes[col]='insensitive'

prot.itypes["Patient Number"]='identifying'
prot.itypes["State Patient Number"]='quasi'
prot.itypes["Detected District"]='quasi'
prot.itypes["Age Bracket"]='insensitive'
prot.itypes
```

Out[8]:
```
Patient Number          IDENTIFYING
State Patient Number          QUASI
Date Announced          INSENSITIVE
Age Bracket             INSENSITIVE
Gender                  INSENSITIVE
Detected City           INSENSITIVE
Detected District             QUASI
Detected State          INSENSITIVE
State code              INSENSITIVE
Current Status          INSENSITIVE
Notes                   INSENSITIVE
Nationality             INSENSITIVE
Type of transmission    INSENSITIVE
Status Change Date      INSENSITIVE
Backup Notes            INSENSITIVE
Num cases               INSENSITIVE
dtype: object
```

In [9]:
```
prot.stats
```

Out[9]:
```
Series([], dtype: float64)
```

In [10]:
```
priv = prot.protect()
priv=priv.rename(columns={"Age Bracket":"age"})
```

In [11]:
```
bins = [0,18, 30, 40, 50, 60, 70, 120]
labels = ['0-17','18-29', '30-39', '40-49', '50-59', '60-69', '70+']
priv['Age'] = pd.cut(priv.age, bins, labels = labels,include_lowest = True)
```

In [12]:
```
priv["age"]=priv["Age"]
priv.drop(["Age"], axis=1, inplace=True)
```

In [13]:
```
priv
```

Out[13]:

	Patient Number	State Patient Number	Date Announced	age	Gender	Detected City	Detected District	Detected State	State code	Current Status
0	*	*	30/01/2020	18-29	F	Thrissur	*	Kerala	KL	Recovered
1	*	*	02/02/2020	30-39	M	Alappuzha	*	Kerala	KL	Recovered
2	*	*	03/02/2020	30-39	M	Kasaragod	*	Kerala	KL	Recovered
3	*	*	02/03/2020	40-49	M	East Delhi (Mayur Vihar)	*	Delhi	DL	Recovered
4	*	*	02/03/2020	18-29	M	Hyderabad	*	Telangana	TG	Recovered
...	...	...	...	...	...	...	...	...	...	...
17359	*	*	16/04/2020	30-39	M	MCGM	*	Maharashtra	MH	Hospitalized
17360	*	*	18/04/2020	30-39	M	MCGM	*	Maharashtra	MH	Hospitalized
17361	*	*	18/04/2020	30-39	M	MCGM	*	Maharashtra	MH	Hospitalized
17362	*	*	19/04/2020	30-39	M	MCGM	*	Maharashtra	MH	Hospitalized
17363	*	*	19/04/2020	30-39	M	MCGM	*	Maharashtra	MH	Hospitalized

17364 rows × 16 columns

In [14]:
```
dataset.to_csv('Privacy_Protected_rawdata1.csv', index=False)
```

In [ ]: