Inference 3

We perform a Chi square test of Flights Data from 2020 and 2021. 2020 was a period before Vaccination was given and in 2021, vaccines were distributed.

We compare the Flights cancellation data of 2020 and 2021 for Maryland and Louisiana.

0 - Denotes flights that made the trip

1- Denotes cancelled flights

```
df_la_flight_2020['CANCELLED'].value_counts()
```

```
0    26132
1     3495
Name: CANCELLED, dtype: int64
```

```
df_la_flight_2021['CANCELLED'].value_counts()
```

```
0.0    50236
1.0     1067
Name: CANCELLED, dtype: int64
```

```
df_md_flight_2020['CANCELLED'].value_counts()
```

```
0    34117
1     4406
Name: CANCELLED, dtype: int64
```

```
df_md_flight_2021['CANCELLED'].value_counts()
```

```
0.0    65999
1.0     1819
Name: CANCELLED, dtype: int64
```

Chi Square Test:

Erc : Expected Value

Orc: Observed Value

1. Louisiana

	Non-Cancelled	Cancelled	Total
2020 (Data without Vaccination)	26132	3495	29627
2021 (Data with Vaccination)	50236	1067	51303
Total	76368	4562	80930
Erc	27956.93483	1670.065167	
	48411.06517	2891.934833	
[Erc - Orc]^2	3330387.143	3330387.143	
	3330387.143	3330387.143	
[Erc - Orc]^2 / Erc	119.1256181	1994.165981	
	68.79392411	1151.612099	
Chi-Statistic			
Sum ([Erc - Orc]^2 / Erc)	3333.697623		

- We Observe that the Chi-statistic is 3333.697623 which very much greater than 3.841 which is the limit for 0.05 p value.
- Therefore we can say that Vaccination influences the flight cancellation.

2. Maryland

	Non-Cancelled	Cancelled	Total
2020 (Data without Vaccination)	34117	4406	38523
2021 (Data with Vaccination)	65999	1819	67818
Total	100116	6225	106341
Erc	36267.93681	2255.063193	
	63848.06319	3969.936807	
[Erc - Orc]^2	4626529.148	4626529.148	
	4626529.148	4626529.148	
[Erc - Orc]^2 / Erc	127.5652699	2051.618404	
	72.46154255	1165.391132	
Sum ([Erc - Orc]^2 / Erc)	3417.036348		

- We obtain similar results for Maryland where Chi statistic value is **3417.036348** much higher compared to the limit of 3.84 for p value of 0.05
- Therefore we can say that Vaccination influences Flight Cancellations