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MTA Project

Guidance to commute safely during pandemic

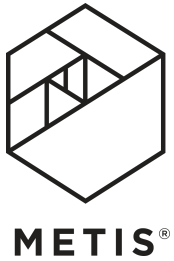
Introduction

- **Motivation**: positive Covid cases is rising. The client - a small company - wants to advise their employees on how to minimize exposure to the virus while taking public transportation.

- **Goal**: per CDC guidance, one should avoid close contact (within about 6 feet) with other people, which translates to avoiding crowds in a closed small space. What we need to find out is the lower trafficked times and location.

- **Key questions to address:**
  - What time of the day do people use public transportation?
  - How many people visit a certain station on a daily basis?
  - Any stations to pay specific attention to? (e.g. popular stations)

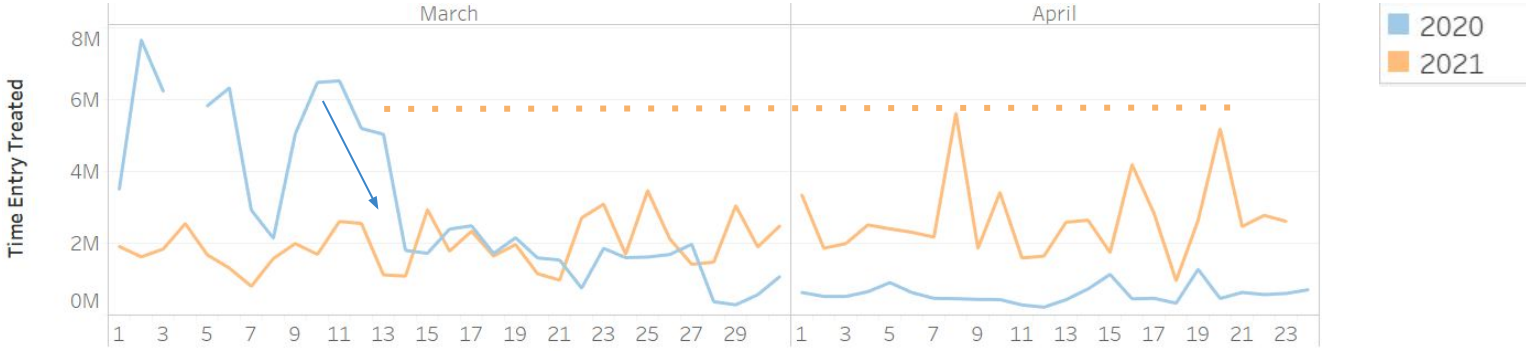
Methodology



- **Data**: Feb to April MTA data, Covid positive test case data (2020,2021)
- **Metric**:
  - At hourly level: median entry number
  - At daily level: new positive covid cases and total daily entries
  - At station level:
    - Crowd Index: Total Entry / # Turnstiles - this is an estimate of how crowd a station can get. (Assumption: more turnstiles, larger station)
- **Tools**: Tableau, Python, Seaborn, SQL
- **Data Treatment**: filter out 2020 and 2021 March and April data, solve reverse count turnstiles, take out extreme values(outliers), union 2020, 2021 data. Add covid positive test cases.

Motivation: Covid on the raise

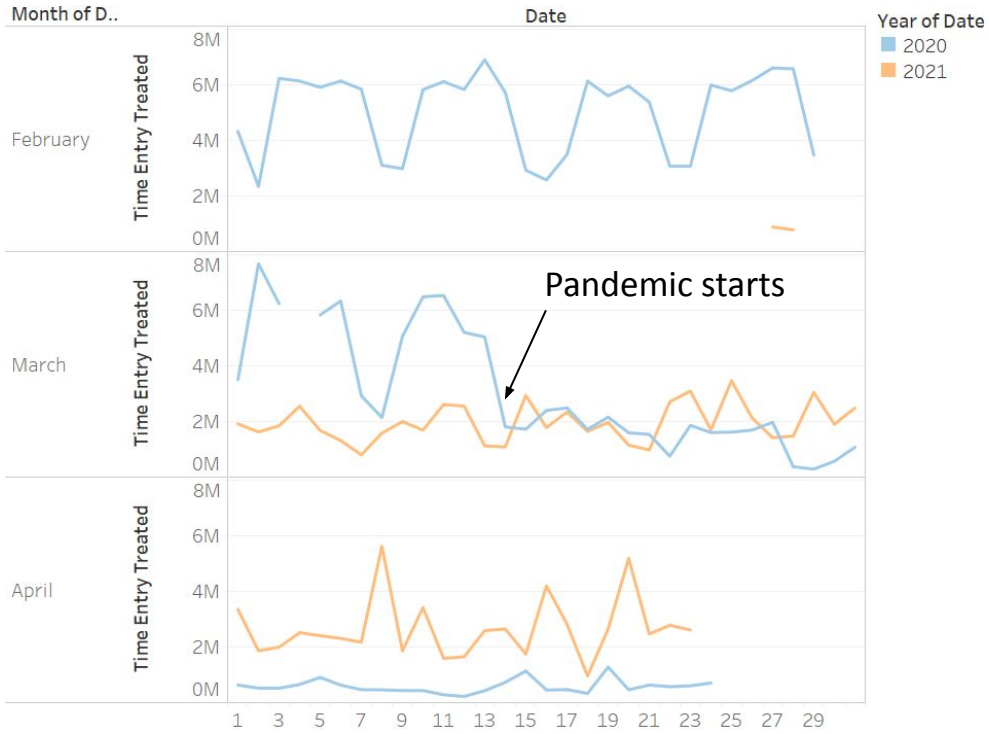
New Positive Covid Cases



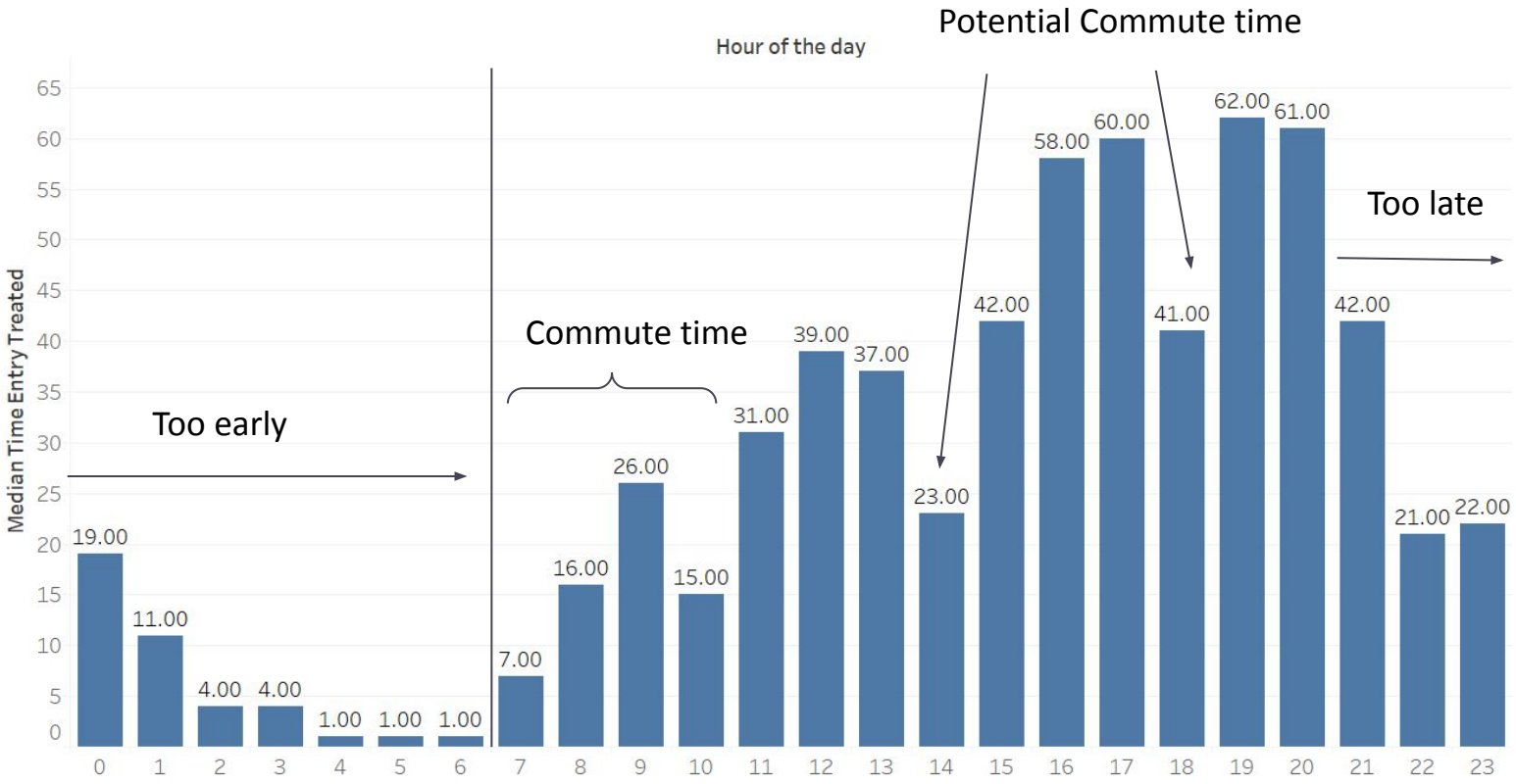
Daily Traffic

What time frame to use?

- Weekly pattern before pandemic
- Volume and pattern changed significantly since March 2020
- Conclusion: use 2021's data



What time of the day should one travel?



Daily traffic varies by stations

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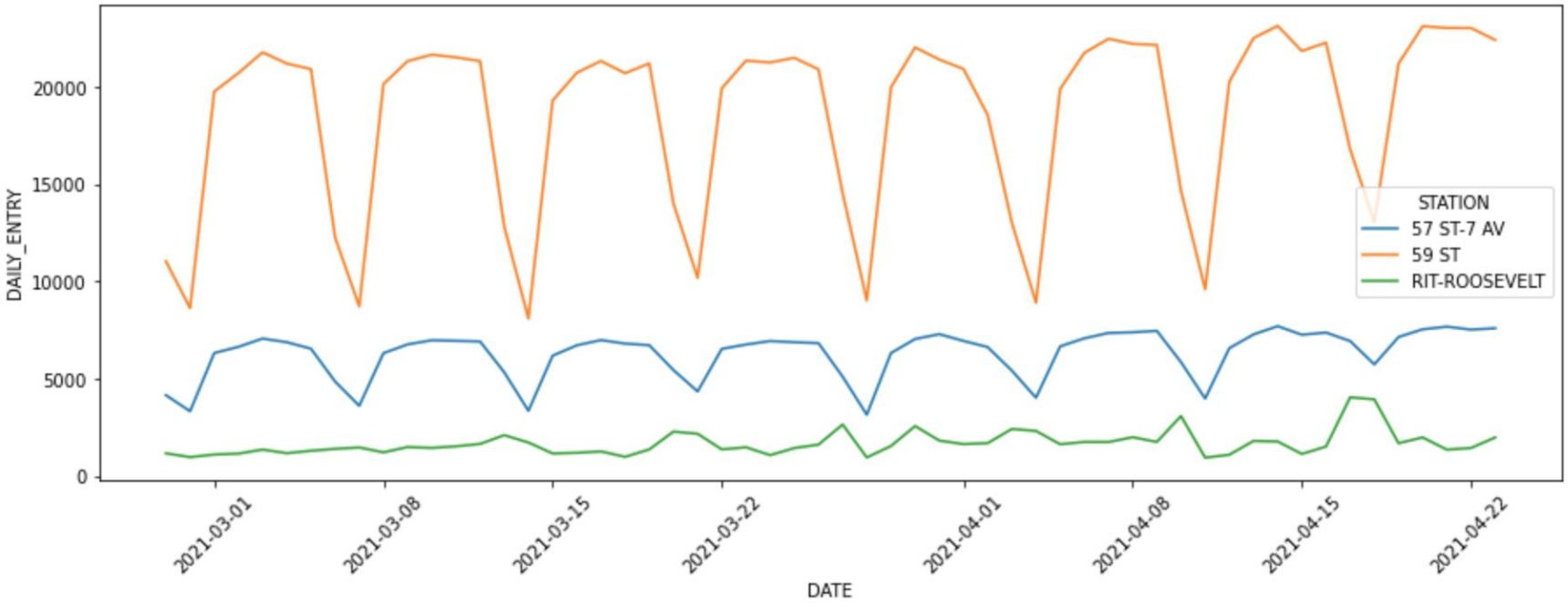
Just knowing the time isn't enough to help the employee navigate, let's look at the traffic between different stations



Any busy station to avoid?

- Assumption: the more turnstiles, the larger the station
- Filtered for potential commute hour: 2pm and 6pm
- Crowd Index = Total Entry / # Turnstiles
- Best to avoid some busy stations and commute back at 2pm

Date / Hour of the day

Station	March 14	March 18	April 14	April 18
KEW GARDENS	1,392	1,547	1,826	2,063
34 ST-PENN STA	1,219	1,710	1,692	2,354
42 ST-PORT AUTH	1,045	1,809	1,435	2,552
5 AV/59 ST	619	2,389	905	3,160
5 AV/53 ST	431	1,627	615	2,221
JOURNAL SQUARE	527	484	464	378
WALL ST	317	833	444	1,108
CHRISTOPHER ST	324	760	287	524
GROVE STREET	353	441	287	353
NEWARK BM BW	372	463	280	368
THIRTY THIRD ST	263	807	222	626
14TH STREET	221	586	197	480
EXCHANGE PLACE	222	255	182	181

Time Entry/Co..
4 3,160

Conclusion

Recommendation:

1. The client should encourage employees to commute early between 7-10 am.

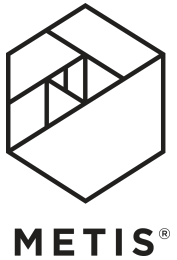
2. Since the traffic doesn't cool down until 10 pm, the best time to commute back is 2pm, followed by 6pm.

3. If one employee needs to transport through a busy station (e.g. Kew Garden, Penn Station), it's highly recommended to either avoid the station or leave before 2pm.

4. Assuming 8 working hours plus 1 hour break, two possible work schedule:
    1. 7am - 2pm + 1 hr work/commute time
    2. 2pm to 10pm

Interesting finding: Queens has most Covid cases and most crowded station.

Future Work



Potential deep dive area: geom data, correlation between number of positive covid cases and people using one popular station. (e.g. Queens)

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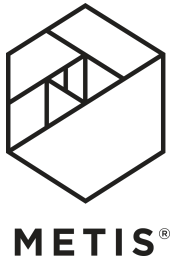
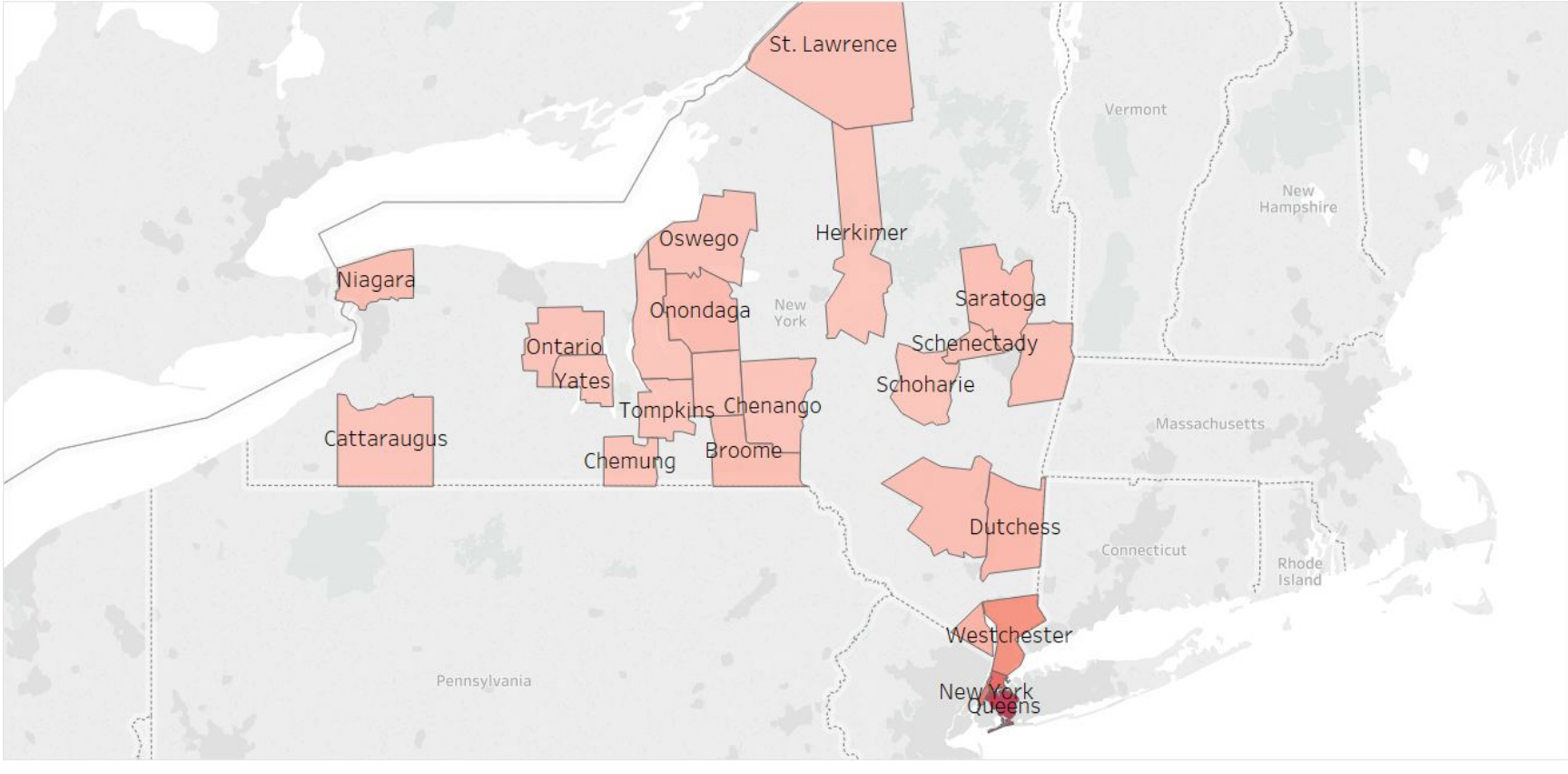
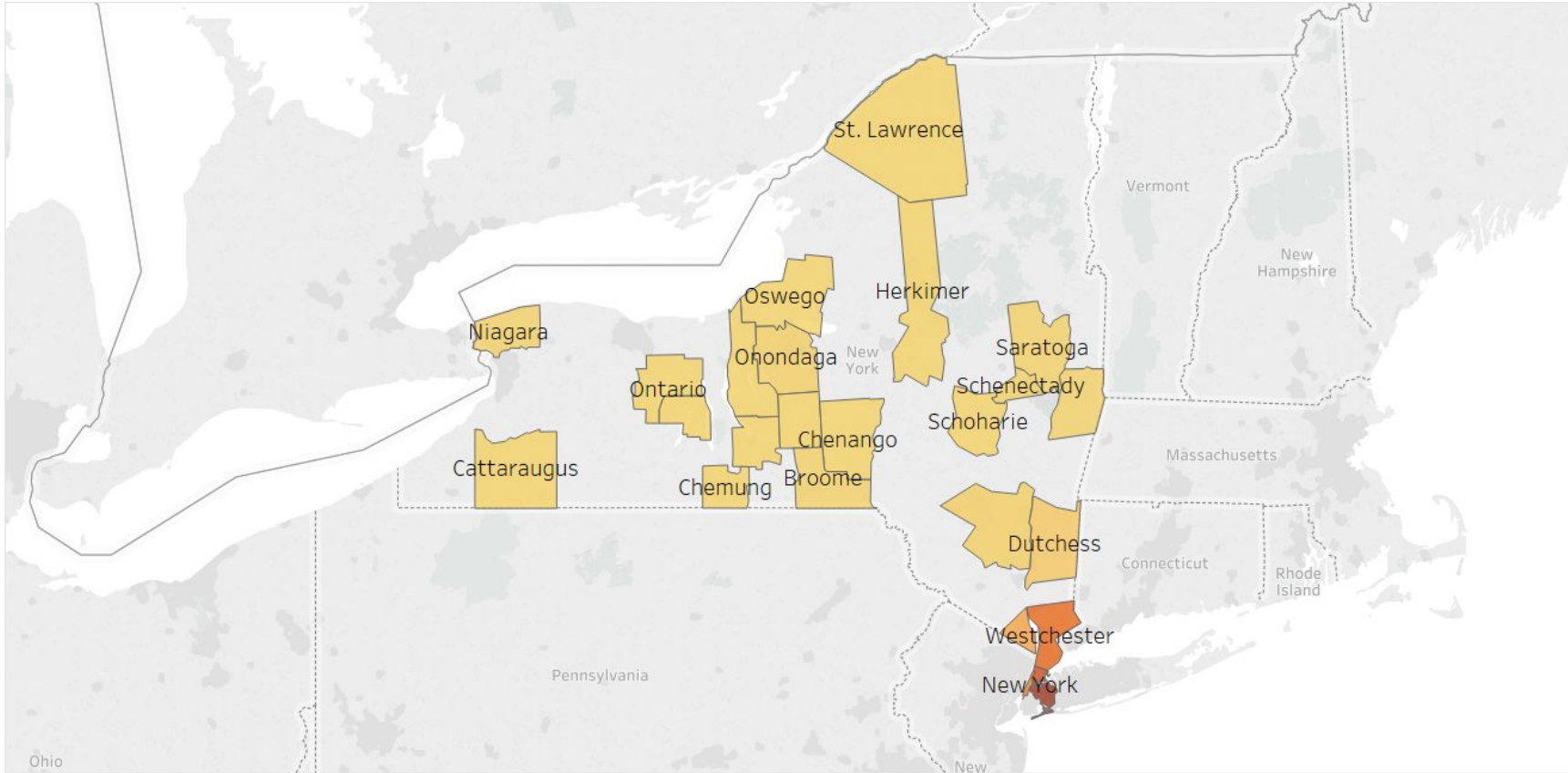
Appendix



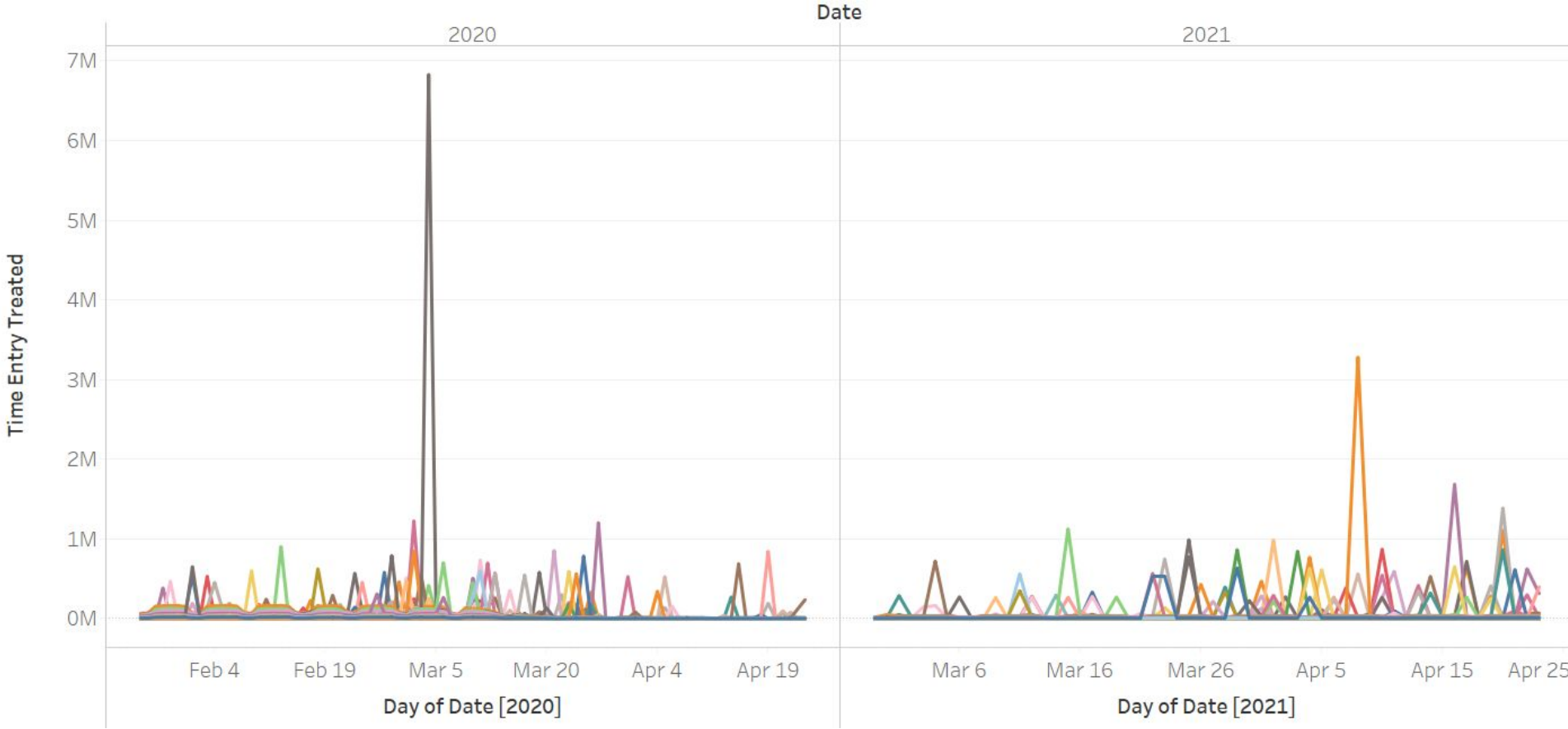
NYC 2021 Positive Case



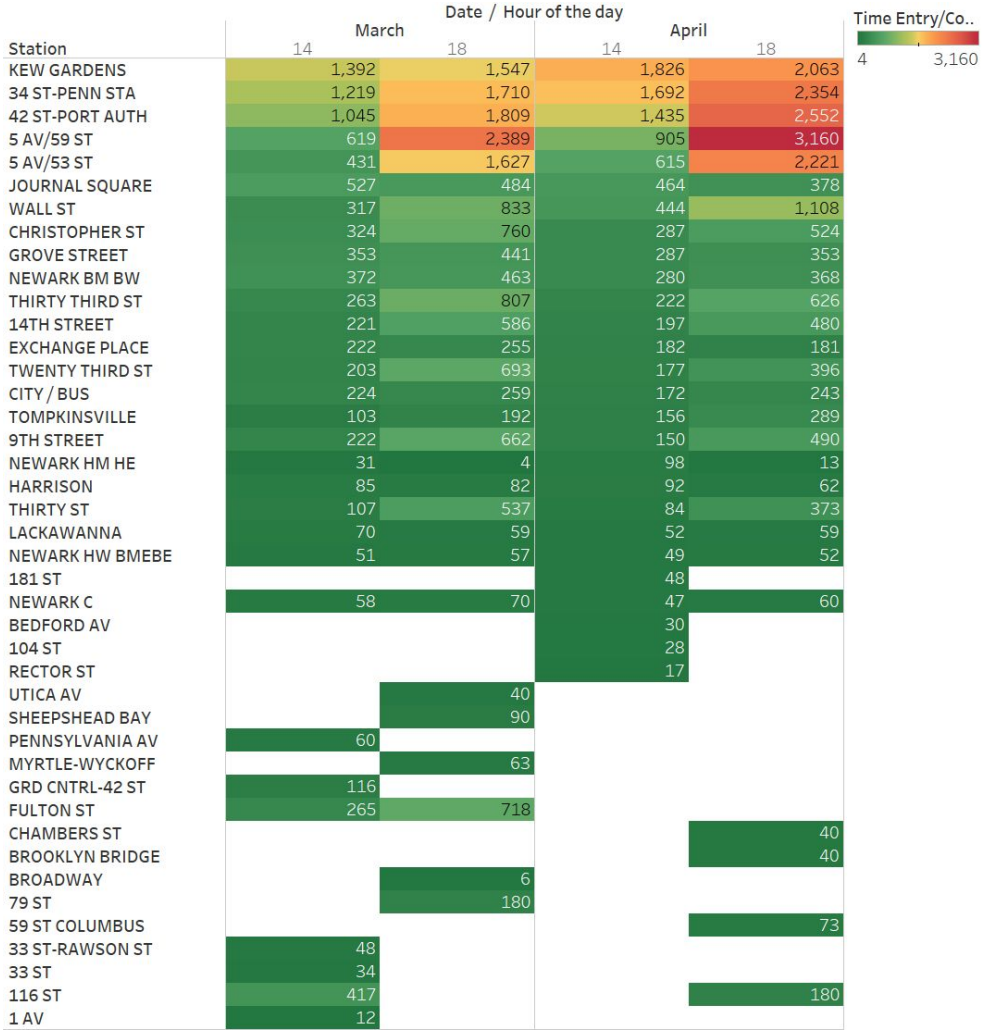
NYC 2020 Positive Case



Outlier


Date
2020
2021
7M
6M
5M
4M
3M
2M
1M
0M
Time Entry Treated
Feb 4
Feb 19
Mar 5
Mar 20
Apr 4
Apr 19
Day of Date [2020]
Mar 6
Mar 16
Mar 26
Apr 5
Apr 15
Apr 25
Day of Date [2021]

Crowd Index



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EXCHANGE PLACE	222	255	182	181
TWENTY THIRD ST	203	693	177	396
CITY / BUS	224	259	172	243
TOMPKINSVILLE	103	192	156	289
9TH STREET	222	662	150	490
NEWARK HM HE	31	4	98	13
HARRISON	85	82	92	62
THIRTY ST	107	537	84	373
LACKAWANNA	70	59	52	59
NEWARK HW BMEBE	51	57	49	52
181 ST			48	
NEWARK C	58	70	47	60
BEDFORD AV			30	
104 ST			28	
RECTOR ST			17	
UTICA AV		40		
SHEEPSHEAD BAY		90		
PENNSYLVANIA AV	60			
MYRTLE-WYCKOFF		63		
GRD CNTRL-42 ST	116			
FULTON ST	265	718		
CHAMBERS ST				40
BROOKLYN BRIDGE				40
BROADWAY		6		
79 ST		180		
59 ST COLUMBUS				73
33 ST-RAWSON ST	48			
33 ST	34			
116 ST	417			180
1 AV	12			

Time Entry/Co.. 4 – 3,160

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