

COVID19 IMPACTS ON TRANSPORTATION

Produced by the NYC Department of City Planning's Transportation Division

May 12, 2020



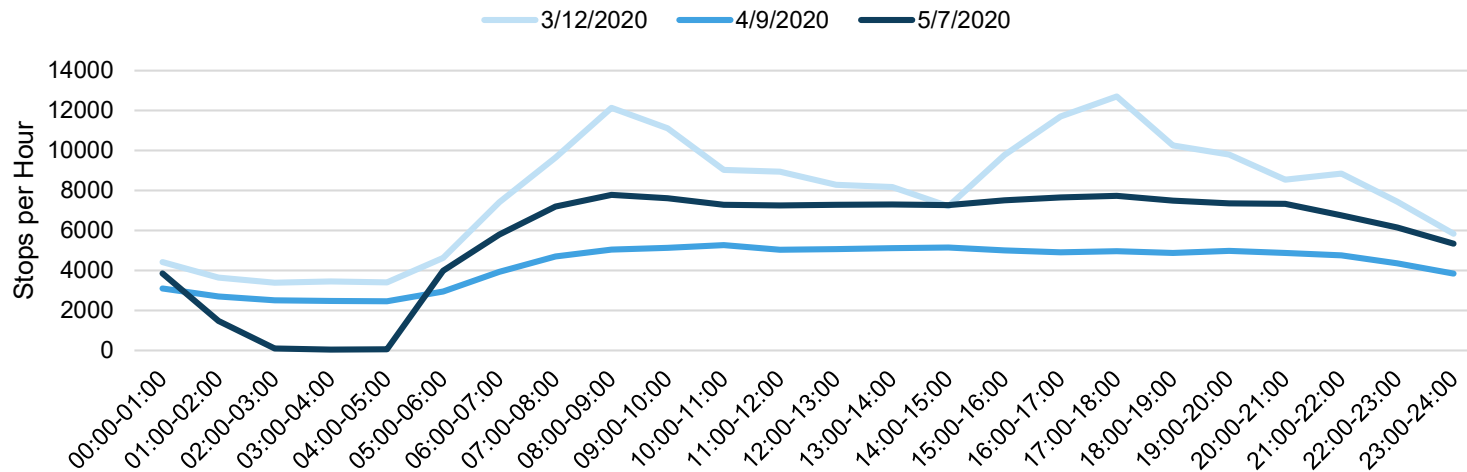
- The NYC Department of City Planning's Transportation Division is compiling data to help understand the effects of COVID19 on the transportation network. This is our seventh weekly report.
- This week's report includes the following information:
 1. Executive Summary
 2. Subway
 3. Sidewalks and 311 Complaints
 4. Traffic Safety
 5. Ferry
 6. Citi Bike
 7. Timeline and Appendix
- We continue to expand the content of these weekly reports as new data become available to us, and are prioritizing work around understanding how mobility trends relate to the economic and employment landscape. We have moved much of the material from previous weeks into the appendix if no new takeaways are apparent.
- This report may serve to help in pandemic response and longer-term recovery. We are eager for feedback in how to make this more useful. Feel free to reach out to Laura Smith (lsmith@planning.nyc.gov) with questions or comments.

- Subway ridership continues its third week of increases, and **total MetroCard swipes during the week of April 25- May 1 were higher than each of the previous three weeks.** Stations along the 7 train appear to be seeing the greatest increases in MetroCard swipes.
- Full fare MetroCard swipes have increased 10% over the previous week; Senior citizen/disabled card swipes have increased 8%.
- Overnight subway service stopped between 1am and 5am this week. A slight increase in ridership in the hours before and after the closure was observed, but this increase tracks with overall subway system ridership increases.
- **More than 31,000 social distancing 311 call complaints** have been logged since March 29, 2020, but the total calls per week has been declining in recent weeks. Good weather is associated with more calls.
- The number of motor vehicle collisions, injuries and fatalities decreased steadily from March 1 until early April. They have been increasing slowly since then. **Collisions occurring on highways** seem to make up a higher portion of total collisions during PAUSE than the same period last year.
- Since the beginning of April, NYC Ferry ridership has slowly increased, though passenger numbers remain very low.
- **There are fewer Citi Bike trips under the PAUSE than there were pre-PAUSE, and peak hour spikes in ridership are less pronounced.** Common weekend origin/destination pairings have dropped off substantially under the PAUSE, but remain more prevalent than weekday trips. These, too, appear to remain oriented around recreation.

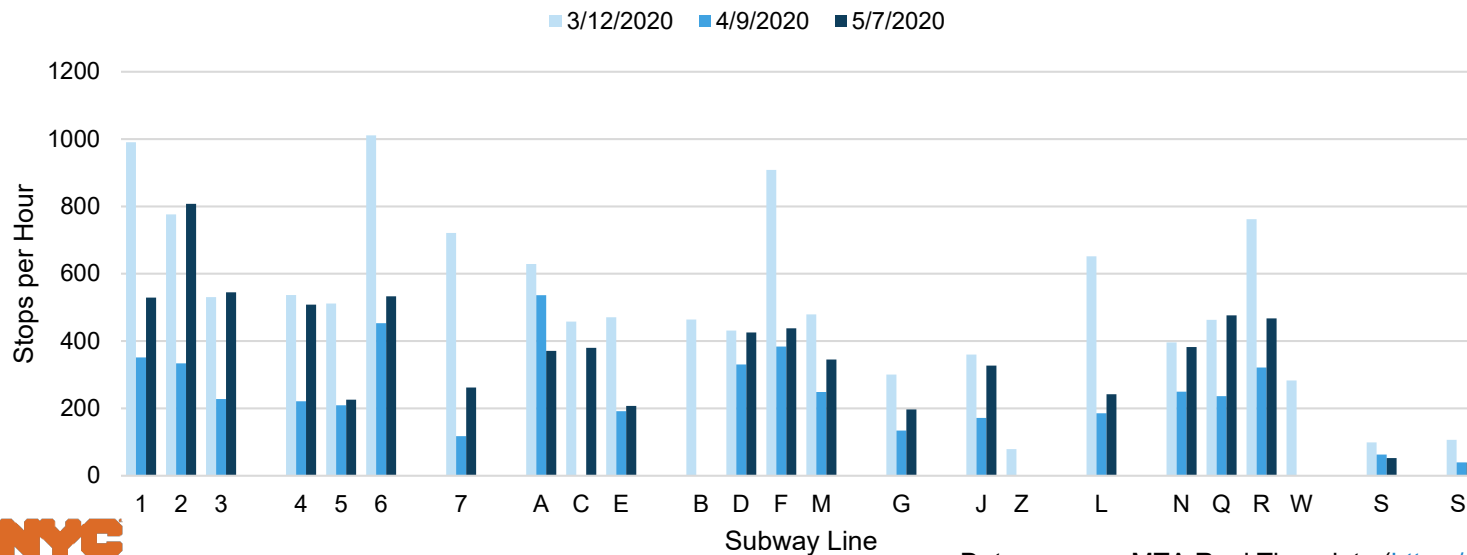
Subway

Subway System Service Changes

System-wide Weekday Service Change by Hour



Weekday Peak Hour Service Change



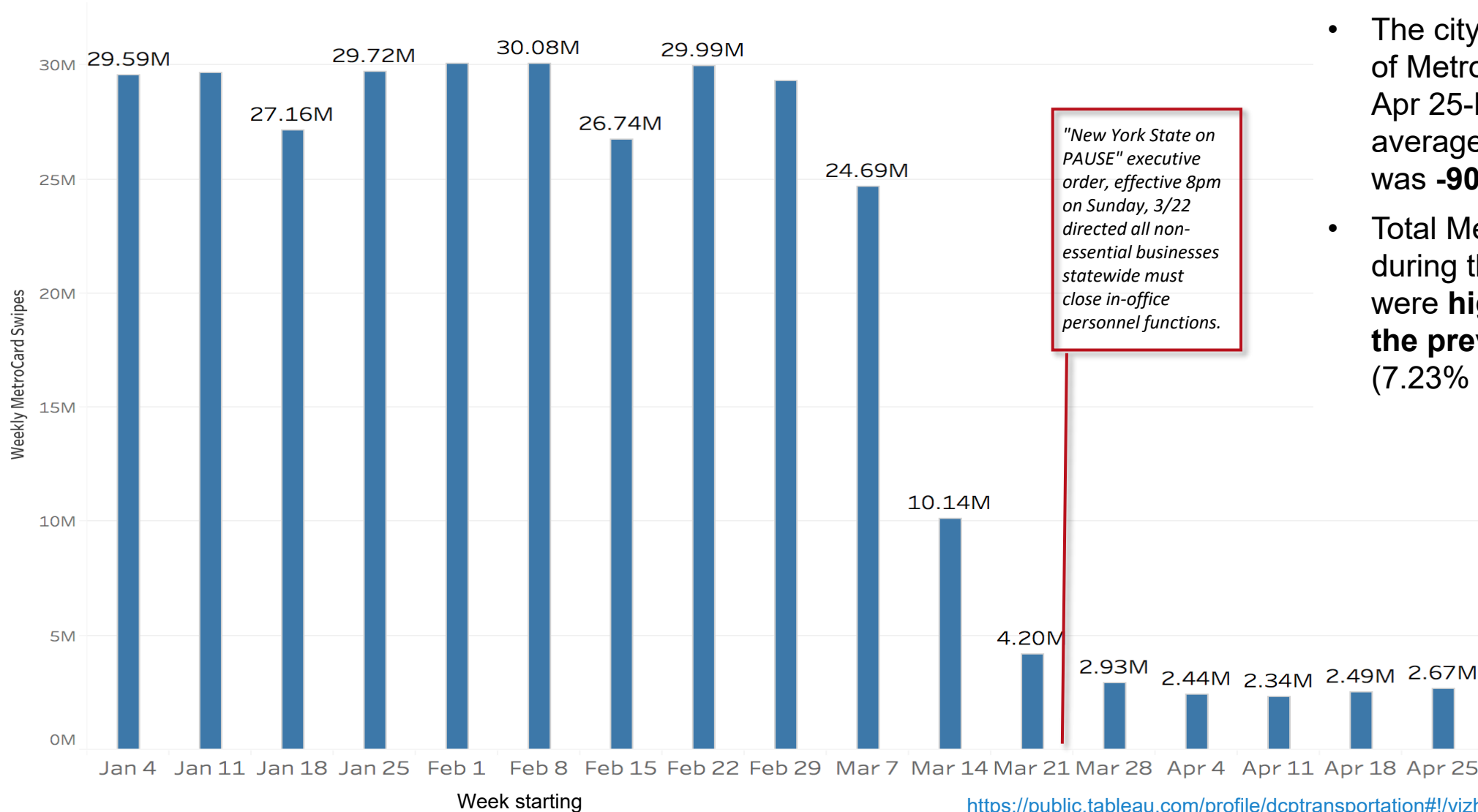
- MTA Subway started the MTA Essential Service Plan on March 25, 2020.
- The weekday peak hour services have been cut to about 60% capacity, resulting in no distinction between daytime peak and daytime off-peak service.
- In the most recent weeks, the service increased somewhat (shown as dark blue line in both charts). However, starting on May 6, 2020, MTA has stopped subway service from 1 am to 5 am to disinfect trains and stations.
- Stops per hour signifies the aggregated number of stops made by every train running (in the system on the top chart, and broken down by line, in the bottom chart).

Data sources: MTA Real Time data (<https://api.mta.info/#/landing>)

Subway System-wide Ridership Changes



Weekly MetroCard Swipe Trends (Jan 4 - May 1)



"New York State on PAUSE" executive order, effective 8pm on Sunday, 3/22 directed all non-essential businesses statewide must close in-office personnel functions.

- The citywide percent change of MetroCard swipes during Apr 25-May 1 vs weekly average of Jan 4- Feb 28 was **-90.82%**.
- Total MetroCard swipes during the week of April 18-24 were **higher than each of the previous three weeks** (7.23% increase).

Interactive dashboard link:

<https://public.tableau.com/profile/dcptransportation#!/vizhome/MetroCardSwipes/PercentChange>

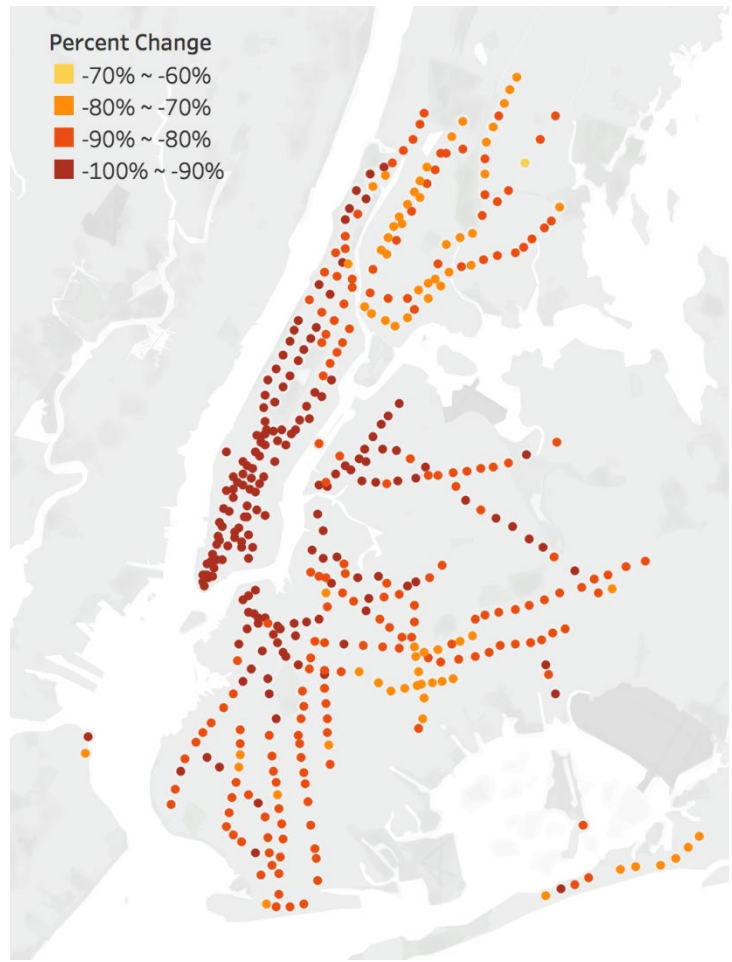
Data sources: MTA Fare Data (<http://web.mta.info/developers/fare.html>) MTA Turnstile data (<http://web.mta.info/developers/turnstile.html>)

MetroCard Swipe Change Jan/Feb 2020 vs Apr 25-May 1 2020

15 stations with most and least dramatic declines in ridership over the pre-PAUSE period

Station (Route)	Percent Change	Station (Route)	Percent Change
Aqueduct Racetrack (A)	-98.74%	Gun Hill Rd (5)	-65.36%
5 Av/53 St (E M)	-98.38%	Alabama Av (J)	-71.79%
Prince St (R W)	-98.12%	New Lots Av (L)	-72.47%
Franklin St (1)	-97.40%	Far Rockaway - Mott Av (A)	-72.53%
Rector St (1)	-97.37%	Longwood Av (6)	-72.69%
Spring St (C E)	-97.15%	Tompkinsville (SIR)	-73.17%
47-50 Sts - Rockefeller Ctr (B D F M)	-97.10%	New Lots Av (3)	-73.33%
28 St (R W)	-97.08%	Van Siclen Av (3)	-73.35%
18 St (1)	-97.06%	Atlantic Av (L)	-73.81%
72 St (B C)	-96.93%	138 St - Grand Concourse (4 5)	-73.82%
Spring St (6)	-96.90%	Livonia Av (L)	-73.96%
Rector St (R W)	-96.87%	E 105 St (L)	-74.10%
Wall St (2 3)	-96.85%	Beach 60 St (A)	-74.22%
8 St - NYU (R W)	-96.83%	Coney Island - Stillwell Av (D F N Q)	-74.35%
66 St - Lincoln Center (1)	-96.81%	Mt Eden Av (4)	-74.72%

Percent Change of Swipes (Apr 25-May 1 2020 vs. Weekly Average of Jan 4 to Feb 28 2020)



- The week of Apr 25, the sixth week where 100% of the nonessential workforce was required to stay home, every subway station in the system saw MetroCard swipe declines of at least 60% over pre-PAUSE ridership.
- However, **most stations in the system continue to see increases in ridership over the previous week**, evidenced by the reintroduction of the “-70% - -60%” bracket to this week’s map.
- This trend is explored in more detail on the next slides.**

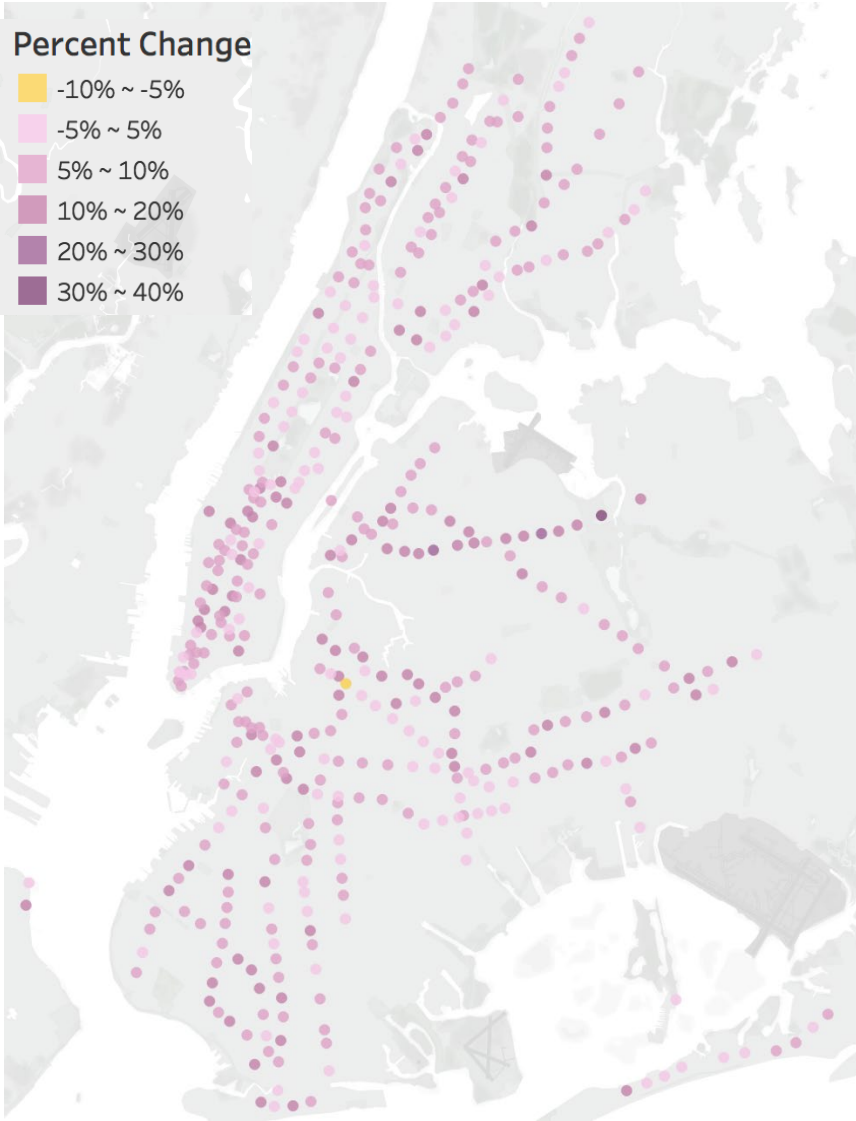
Interactive dashboard link:
<https://public.tableau.com/profile/dcptransportation#!/vizhome/MetroCardSwipes/PercentChange>
 Data sources: MTA Fare Data
<http://web.mta.info/developers/fare.html> May 12, 2020

MetroCard Swipe Change Apr 25-May 1 vs Apr 18-24 2020

15 stations with most and least dramatic changes in ridership over the previous week

Station (Route)	Percent Change	Station (Route)	Percent Change
Mets - Willets Point (7)	30.34%	Lorimer St (J M)	-5.75%
Junction Blvd (7)	22.55%	Beach 105 St (A S)	-4.85%
52 St (7)	20.51%	Beach 90 St (A S)	-3.99%
Canal St (1)	19.72%	Rector St (1)	-3.87%
Crescent St (J Z)	19.16%	Alabama Av (J)	-3.69%
5 Av/53 St (E M)	19.04%	Flushing Av (J M)	-3.23%
82 St - Jackson Hts (7)	18.73%	Myrtle Av (J M Z)	-2.72%
111 St (7)	18.31%	Hewes St (J M)	-2.01%
18 Av (D)	17.25%	Lafayette Av (C)	-1.17%
Flushing Av (G)	16.32%	Hunts Point Av (6)	-0.90%
90 St - Elmhurst Av (7)	16.03%	Ralph Av (C)	-0.89%
Bedford Av (L)	15.77%	Howard Beach - JFK Airport (A)	-0.66%
Simpson St (2 5)	15.64%	Kosciuszko St (J)	-0.48%
9 Av (D)	15.29%	Shepherd Av (C)	-0.43%
Broadway (G)	14.86%	Liberty Av (C)	-0.16%

Percent Change of MetroCard Swipes by Station (Apr 25-May 1 vs. Apr 18-24)



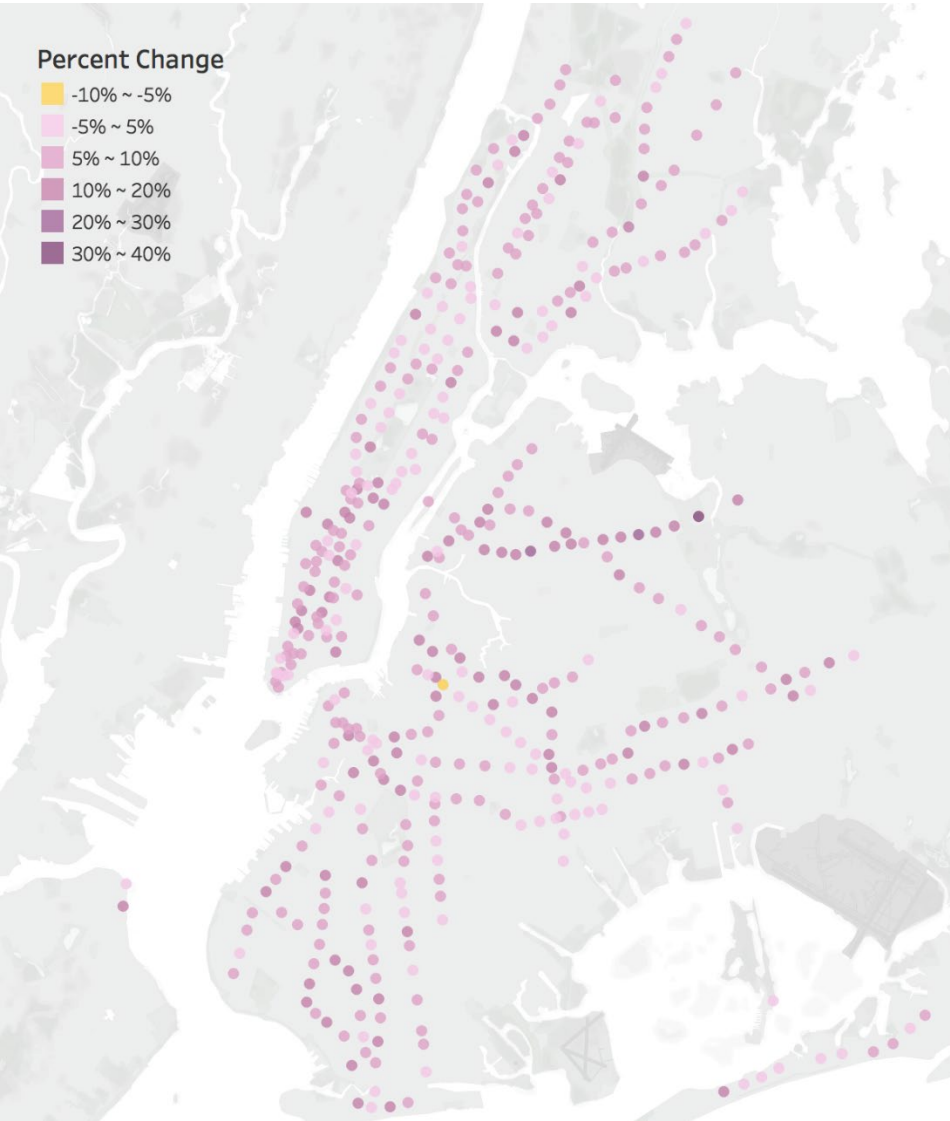
- The vast majority of stations in the system continue to see increasing ridership over the previous week.
- Stations along the 7 train line in Queens make up half of the top 14 stations showing the greatest ridership % increases over the previous week.
- Full fare card swipes have increased 10% over the previous week; Senior citizen/disabled card swipes have increased 8%.

Interactive dashboard link:
https://public.tableau.com/profile/dcpt_ransportation#!/vizhome/MetroCardSwipes/LastWeekComparison

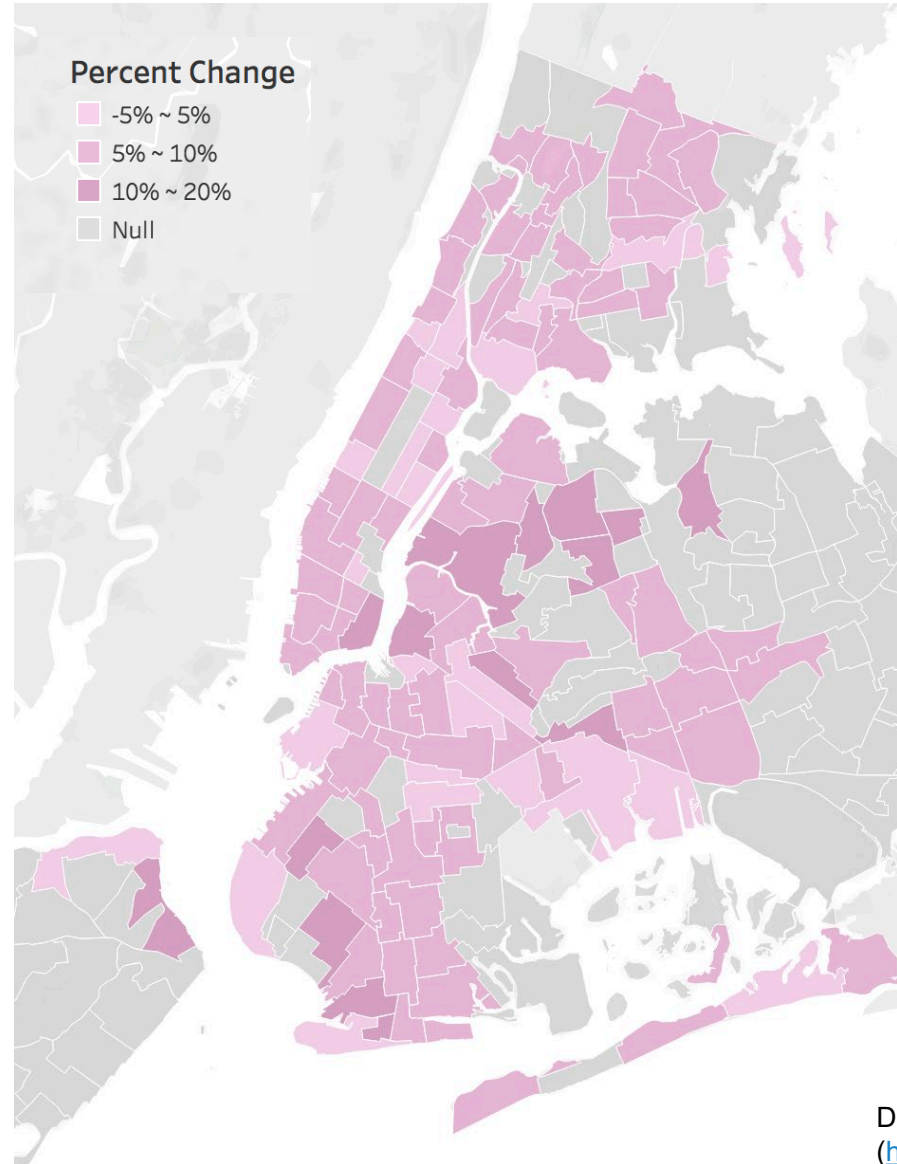
Note: stations with unusual activity levels due to construction or renovations were removed from this analysis

MetroCard Swipe Change by Neighborhood and Station Over Previous Week

Percent Change of MetroCard Swipes by Station
(Apr 25-May 1 vs. Apr 18-24)



Percent Change of MetroCard Swipes by Neighborhood
(Apr 25-May 1 vs. Apr 18-24)



Aggregating station level changes to the neighborhood (NTA) level, we see areas in darkest purple showing the greatest increases in ridership over the previous week.

Neighborhoods along the 7 train line in Queens appear in darker purple.

Interactive dashboard links:

<https://public.tableau.com/profile/dcptransportation#!/vizhome/MetroCardSwipes/LastWeekComparison>

<https://public.tableau.com/profile/dcptransportation#!/vizhome/MetroCardSwipes-NTAs/NTAmap>

Note: stations with unusual activity levels due to construction or renovations were removed from this analysis

Data sources: MTA Fare Data

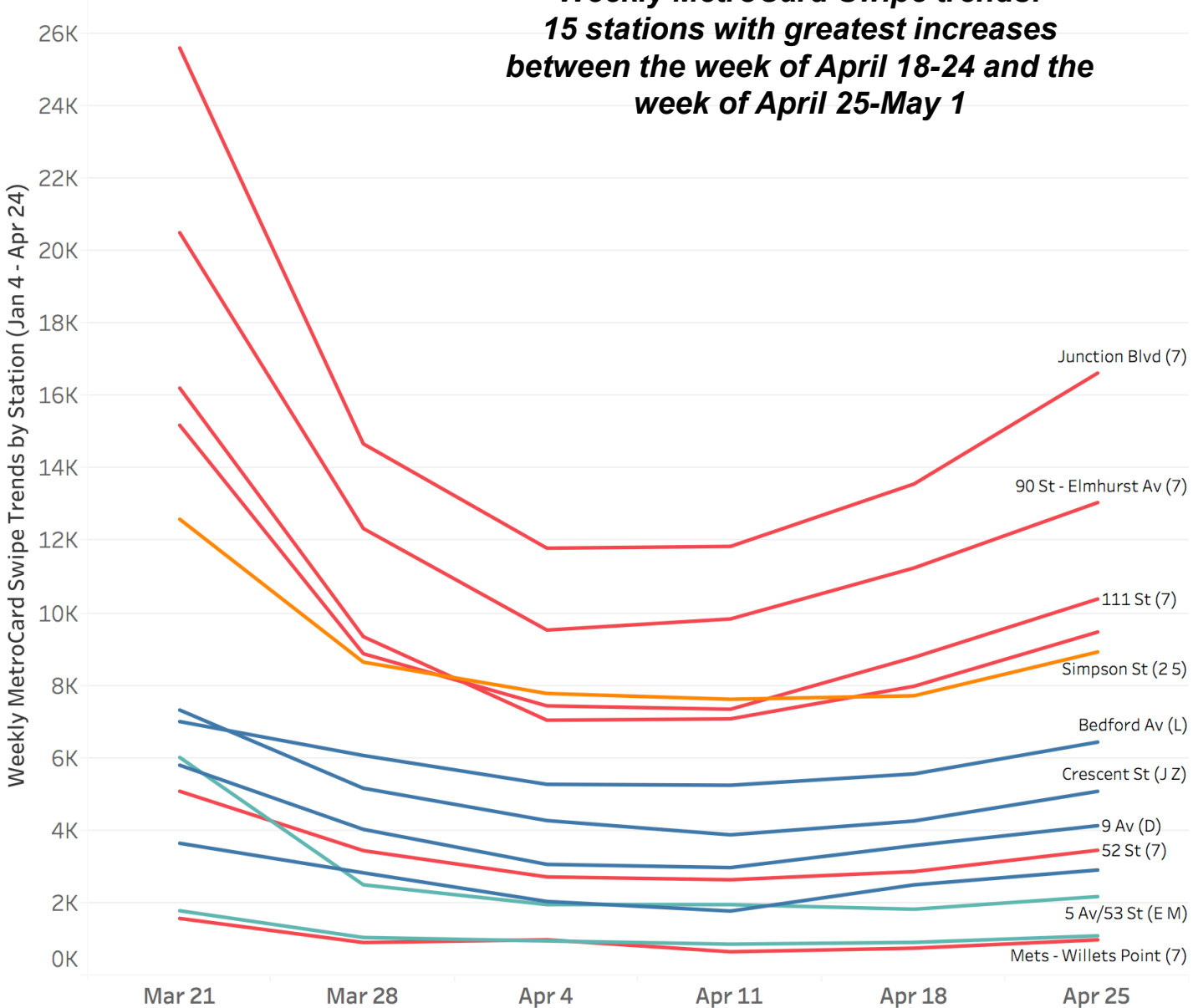
(<http://web.mta.info/developers/fare.html>)

May 12, 2020

MetroCard Swipe Trends by Station Since PAUSE Began

Weekly MetroCard Swipes by Station

**Weekly MetroCard Swipe trends:
15 stations with greatest increases
between the week of April 18-24 and the
week of April 25-May 1**



- Stations in Queens and Brooklyn show the greatest increases in ridership.
- Subway stations along 7 train in Queens saw the total number of MetroCard swipes increase significantly.

Interactive dashboard link:
<https://public.tableau.com/profile/dcptransportation#!/vizhome/MetroCardSwipes/Stations>

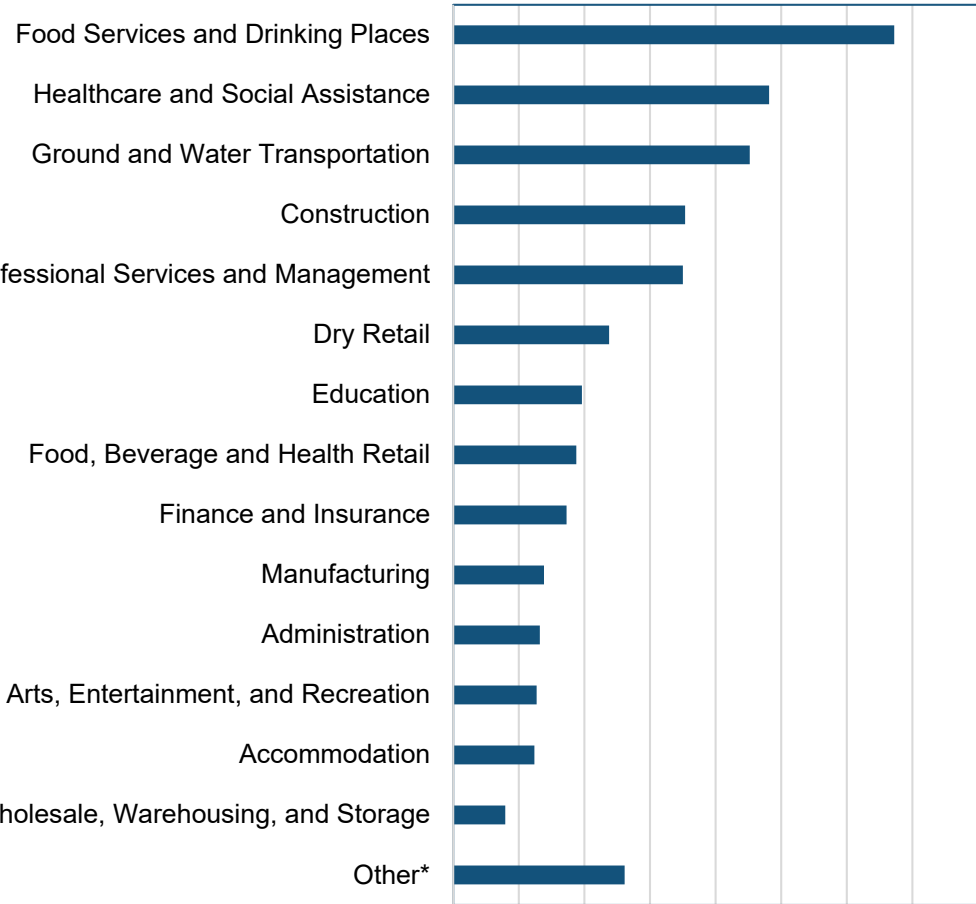
Data sources: MTA Fare Data
<http://web.mta.info/developers/fare.html>



Early Morning Subway Ridership

**Pre-COVID19 Subway Commuters
Leaving Home to Work
between 1am and 5am**

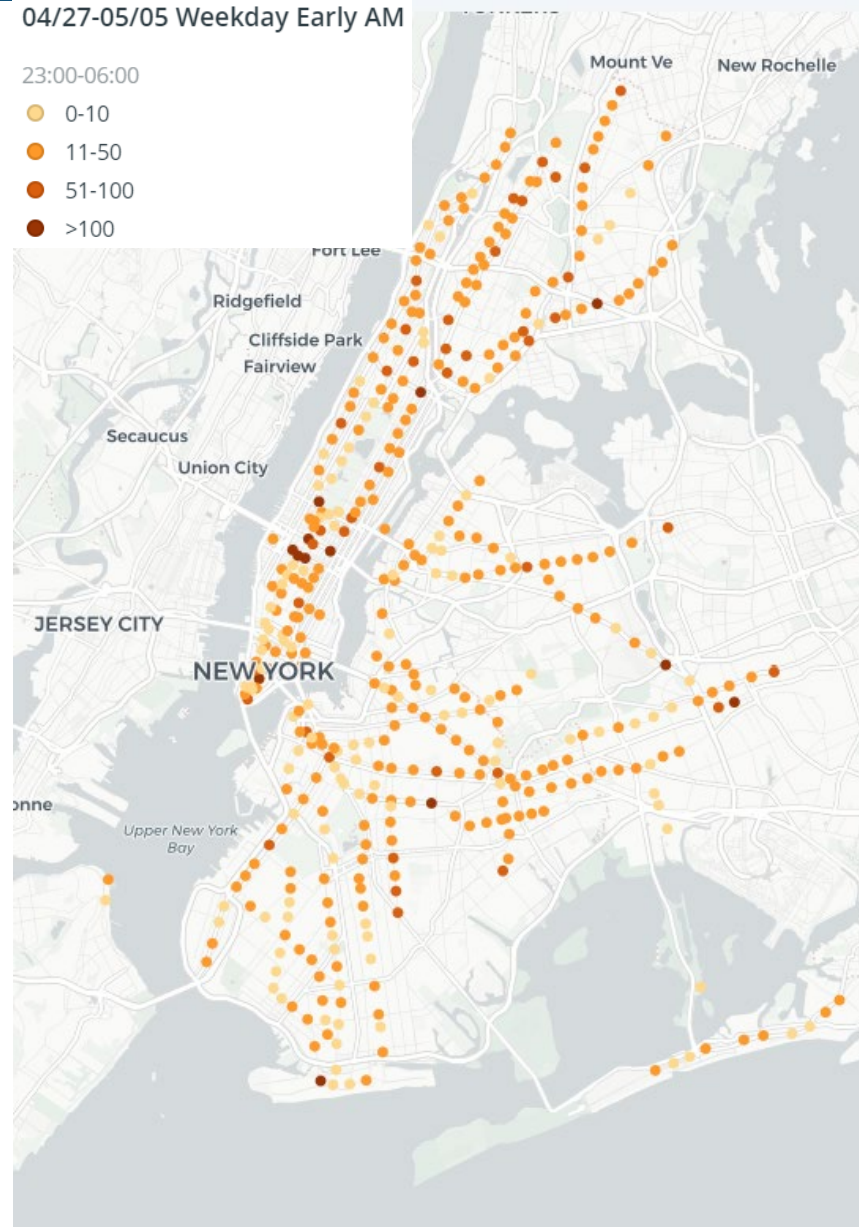
0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000



04/27-05/05 Weekday Early AM

23:00-06:00

- 0-10
- 11-50
- 51-100
- >100

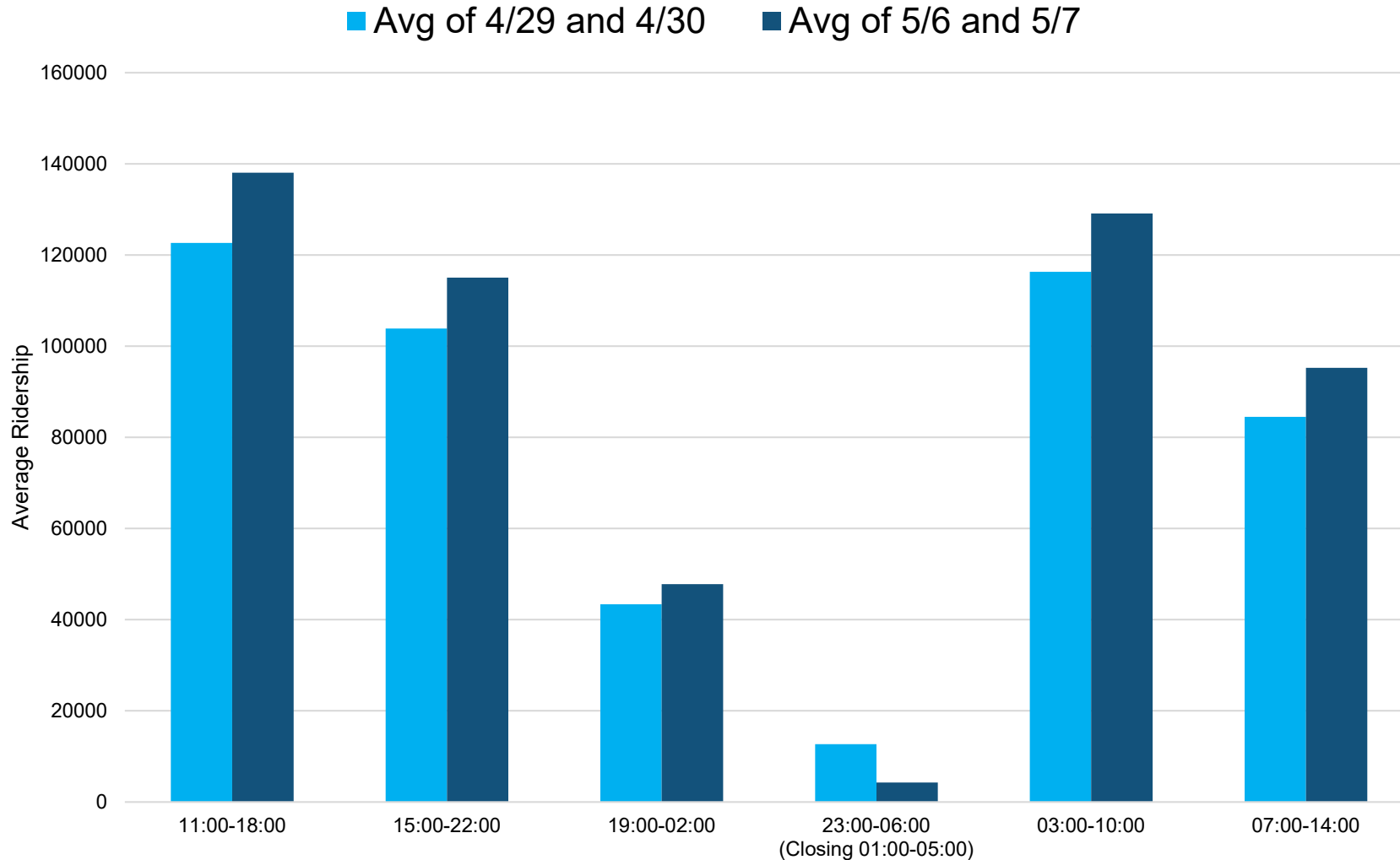


- The MTA announced full subway shut downs from 1am to 5am beginning May 6. We looked into the Pre-COVID19 subway ridership during that time period by industry.
- As the data show, **Food Service and Drinking Places** and **Healthcare and Social Assistance** have the highest number of workers who commute by subway during early morning.

Data source: 2014-2018 PUMS; MTA Turnstile data

Note: 1. Other is a sum of all other industries to ensure statistical significance. 2. Universe is people who both lived and worked in NYC

Effect of Early Morning Subway Closure



- The MTA announced full subway shut downs from 1am to 5am beginning May 6. We looked into the Pre-COVID19 subway ridership during that time period by industry.
- As a result of the shutdowns, we see a dip in ridership between 11pm and 6am, the only window of time available for analysis that encompasses the 1am-5am shutdown period.
- The graph to the left also illustrates the overall increase in ridership during all other travel periods available for analysis.

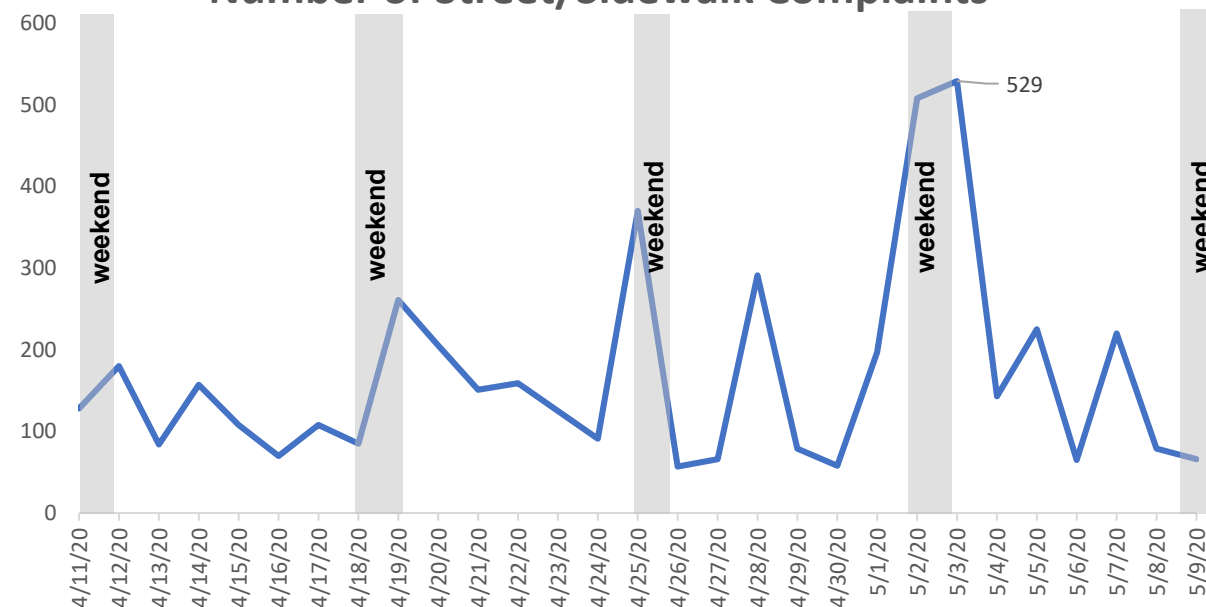
Note, overlapping periods of subway ridership is due to the discrepancies of how data are released for each station.

Sidewalks and 311 Complaints

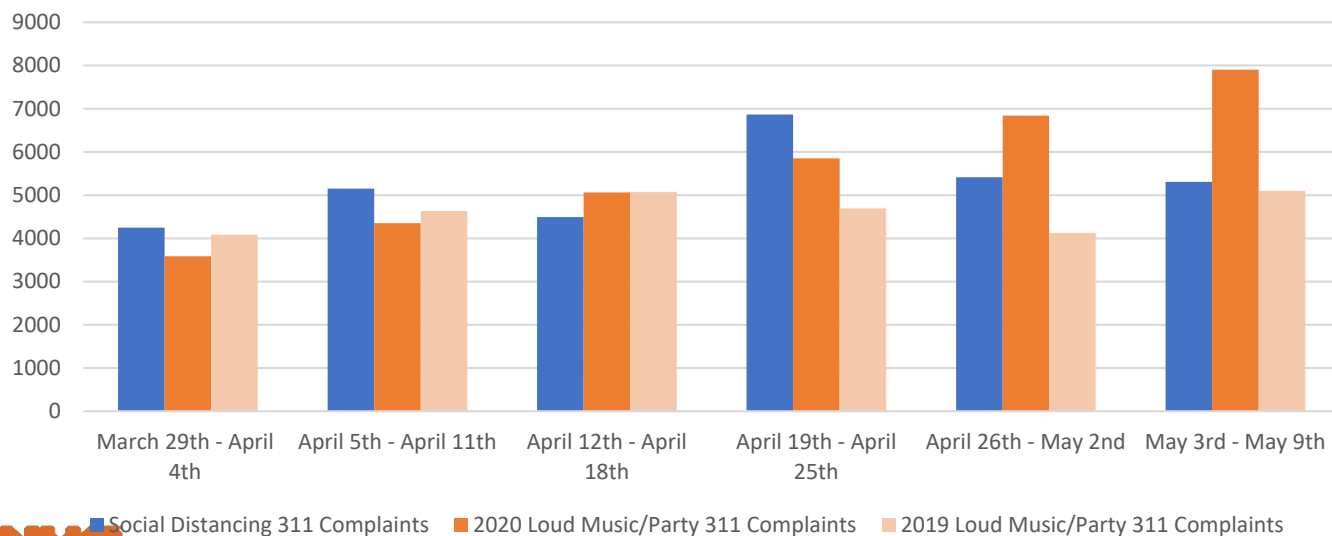
311 Social Distance Complaints: Street and Sidewalk

- “Social Distancing” is the **second most common** 311 service complaint (5308 records) after “Loud Music/Party,” out of all 311 service complaints between May 3, 2020 and May 9, 2020.
- **Weather continues to be the greatest predictor** of 311 complaints for street/sidewalk social distancing.
- More than 31,000 social distancing 311 call complaints have been logged since March 29, 2020, but the total calls per week has been declining in recent weeks.
- Loud music/party complaints have been steadily increasing, and are being reported at higher rates than over the same periods in 2019. Depending on the circumstances and location of these complaints, they may also be indicative of unsafe congregations of crowding.

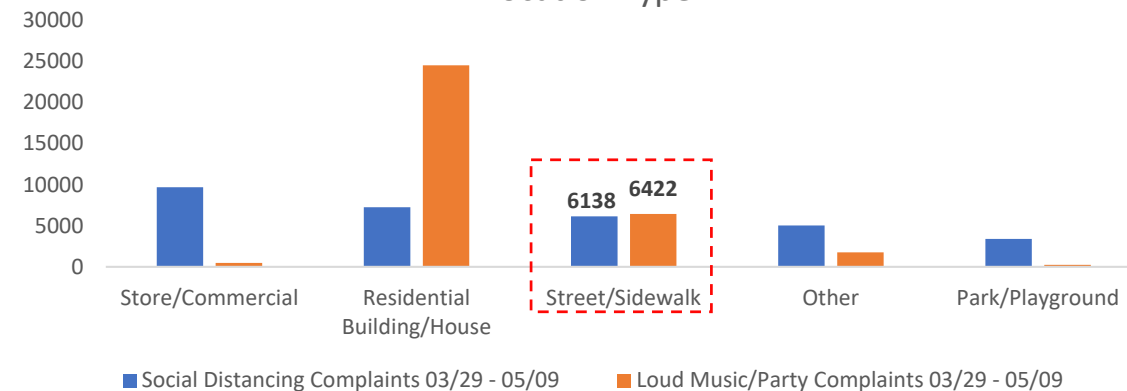
Number of Street/Sidewalk Complaints



Social Distancing and Loud Music/Party 311 Complaints



Social Distancing and Loud Music/Party 311 Complaints by Location Type



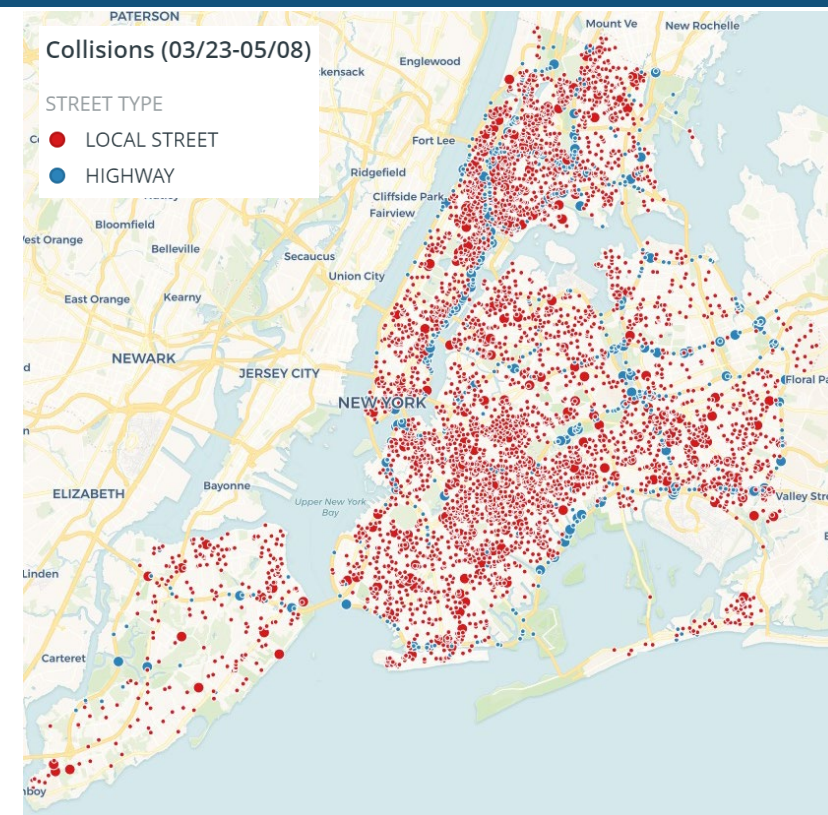
*Not shown: Loud Music/Party also includes the location types of Club/Bar/Restaurant & House of Worship

Source: NYC Open Data: 311 Service Requests

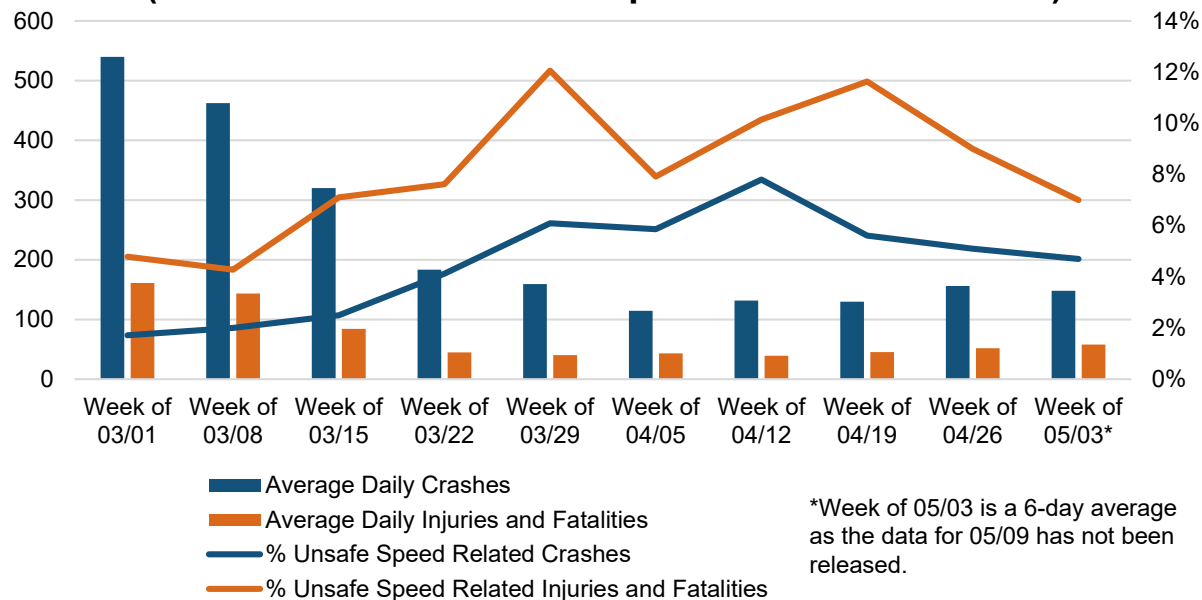
Traffic Safety

Motor Vehicle Collisions- March 1st to May 8th 2020

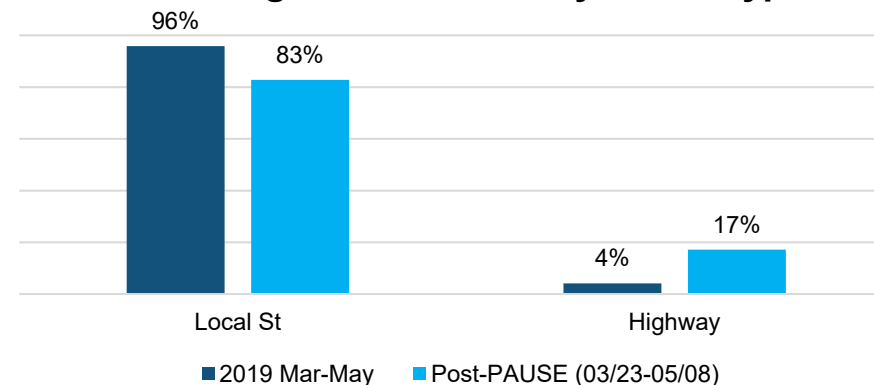
- The number of motor vehicle collisions, injuries and fatalities decreased steadily from March 1 until early April. They have been increasing slowly since then.
- As total number of crashed decreased, the shares of *unsafe speed-related* collisions, injuries and fatalities rose. Although these have started to level off, they are still higher than pre-PAUSE levels.
- Collisions occurring on highways seem to make up a higher portion of total collisions during PAUSE than the same period last year.



**Collisions, Injuries, Fatalities
(All Collisions vs. Unsafe-Speed-Related Collisions)**



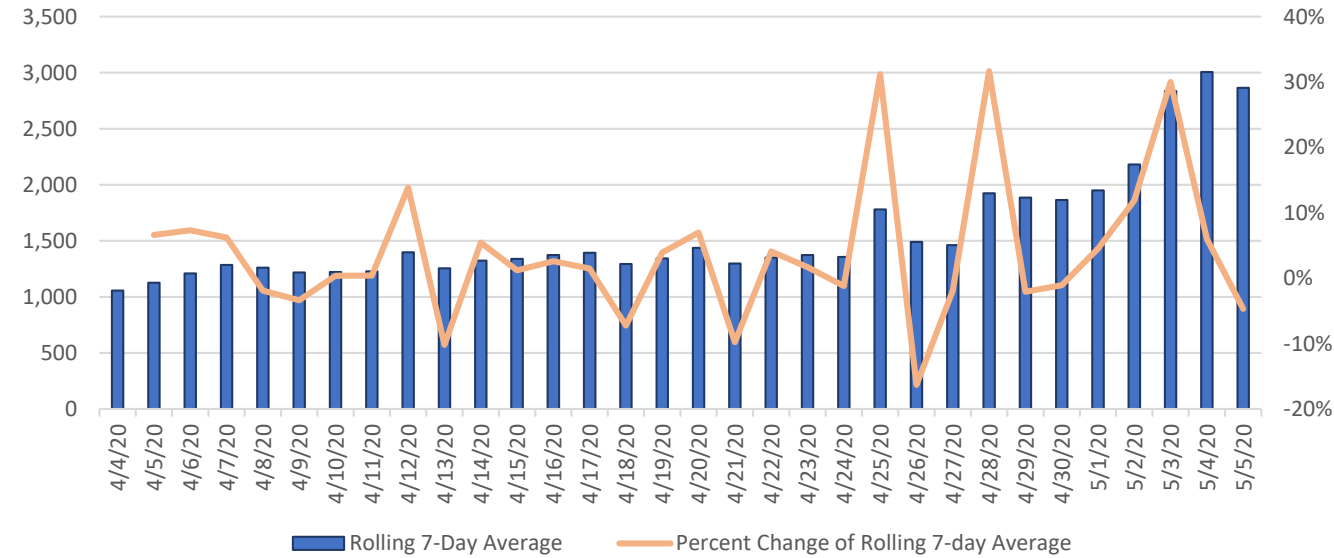
Percentage of Collisions by Street Type



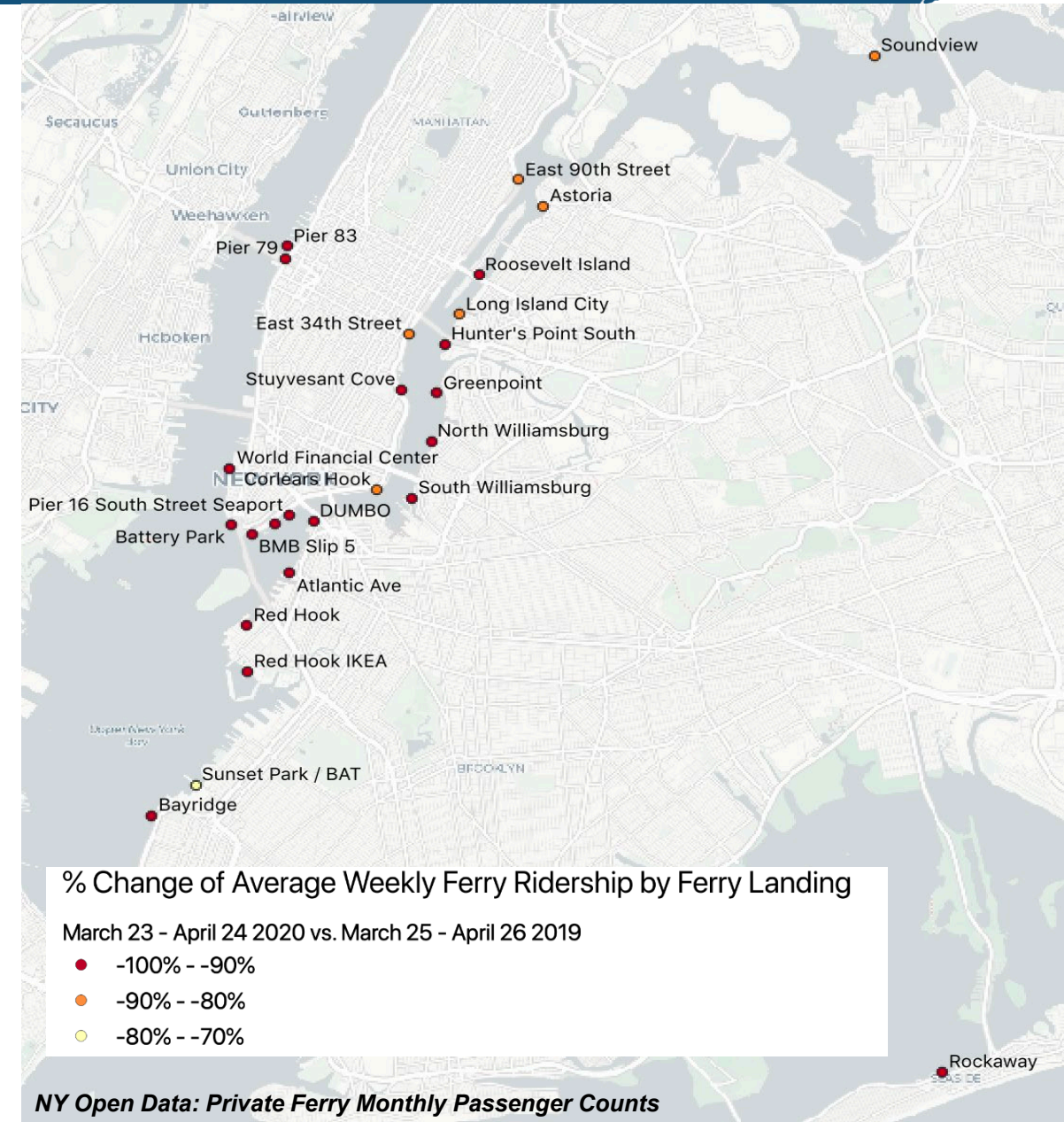
NYC Ferry

NYC Ferry Ridership

NYC Ferry Ridership (Rolling 7-day Average) April 4 – May 4 2020



- Since the beginning of April, NYC Ferry ridership slowly increased by an average of 4%.
- There was an average percent change of -93% compared to same time in 2019 vs. 2020.
- Sunset Park/BAT ferry landing saw the lowest percent change (-68%) in weekly ridership compared to the same time last year
- Most ferry stops that accommodate multiple operators saw the largest percent changes in weekly ridership.

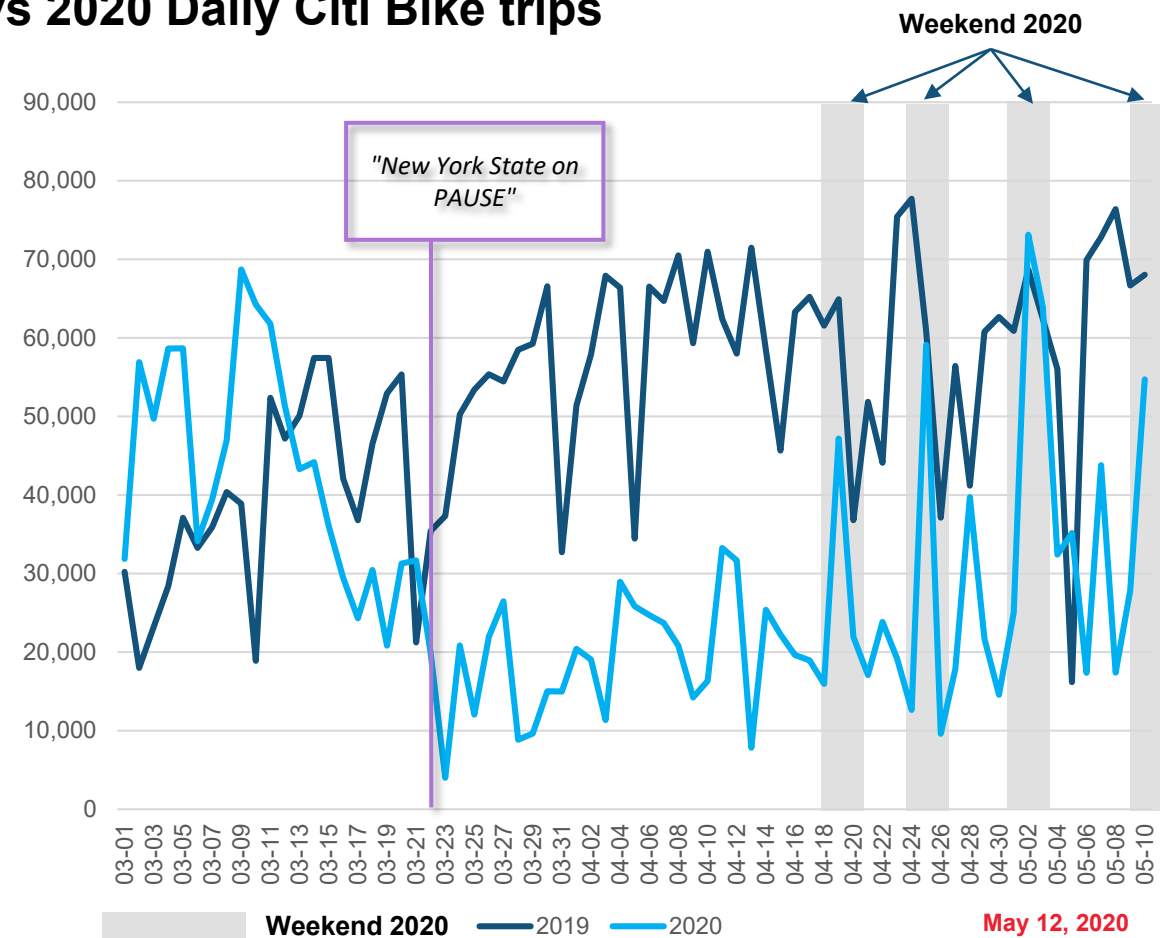
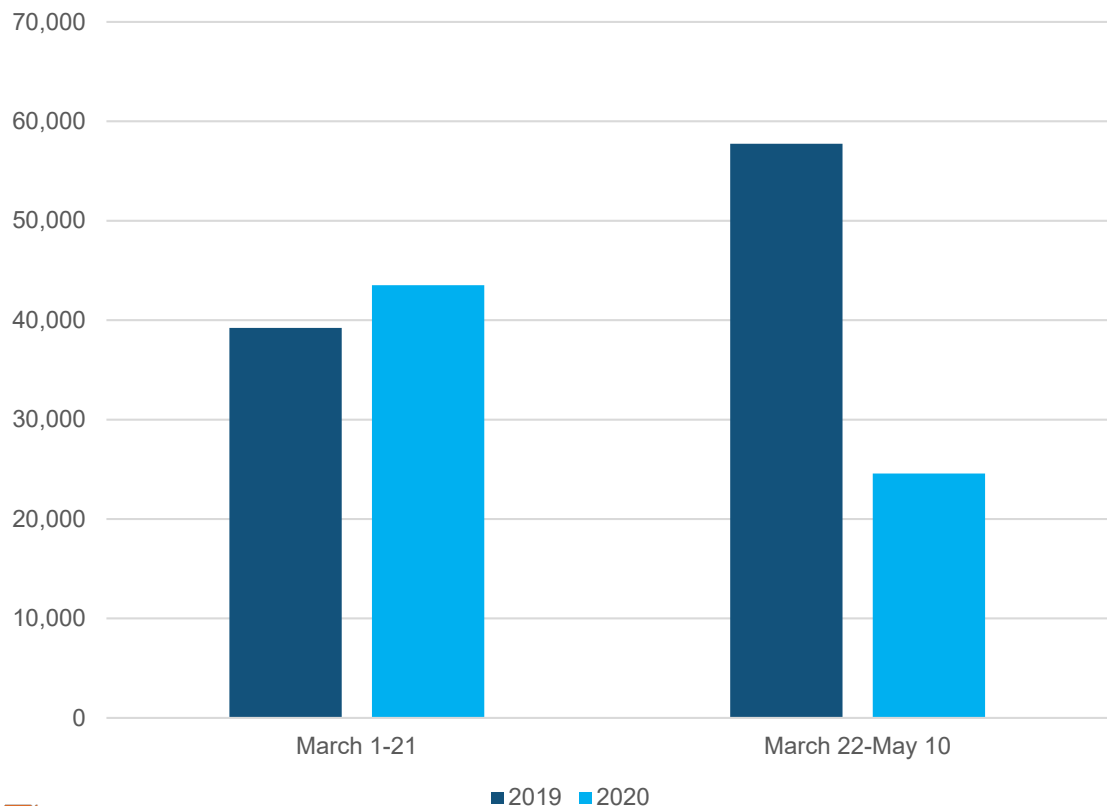


Citi Bike

Citi Bike Trip Totals

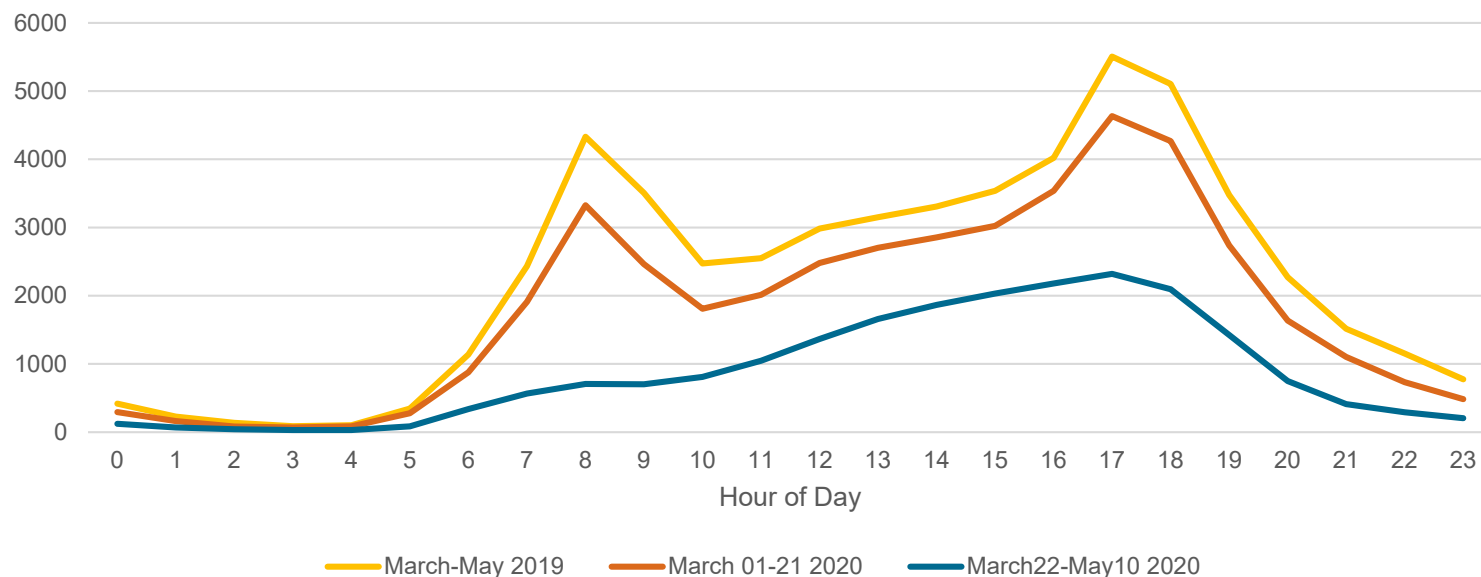
- Weather plays a lead role in ridership volume variation.
- Nevertheless, total trips are substantially lower during the PAUSE than they were over the same time period in 2019.
- At the same time, the decline in Citi Bike ridership is far less dramatic than the declines seen in most other modes.
- The weekend spike after pause in 2020 is substantial.

March 01- May 10 2019 vs 2020 Daily Citi Bike trips

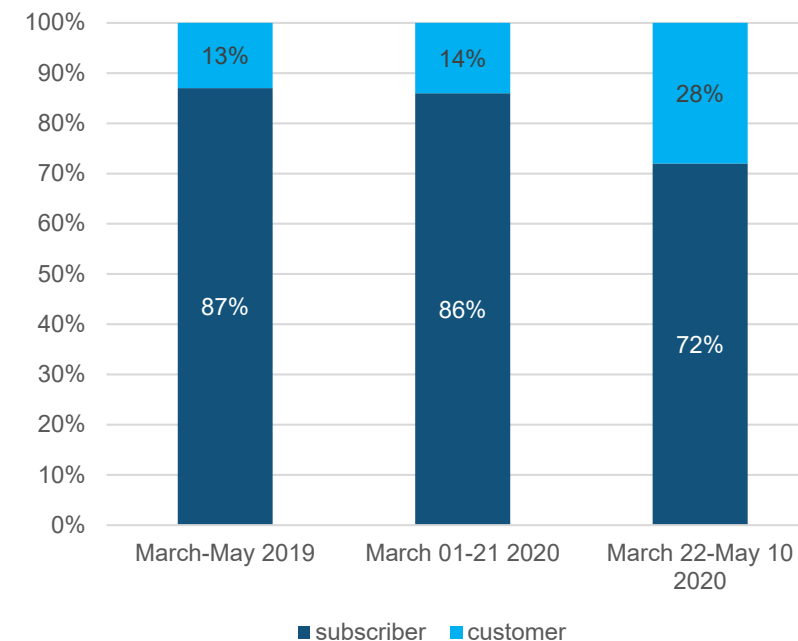


Citi Bike Overall Comparison

Average Daily Trips by Time of Day

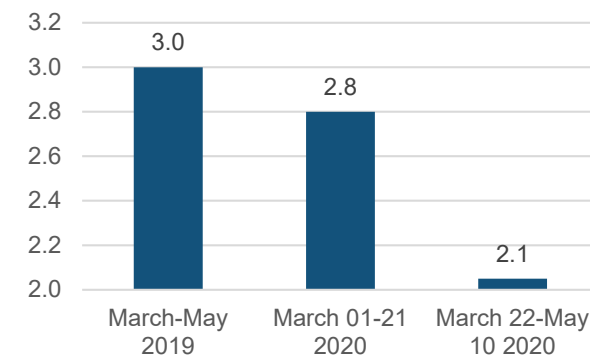


User Type Comparison



- There are fewer Citi Bike trips under the PAUSE than there were pre-PAUSE, and peak hour spikes in ridership are less pronounced.
- “Customers,” or those riding under 24-hour or 3-day passes, are an increasing share of riders compared to “subscribers,” who are annual members.
- Men are typically more frequent users, but the ratio of males to females riding under the PAUSE has gone down.

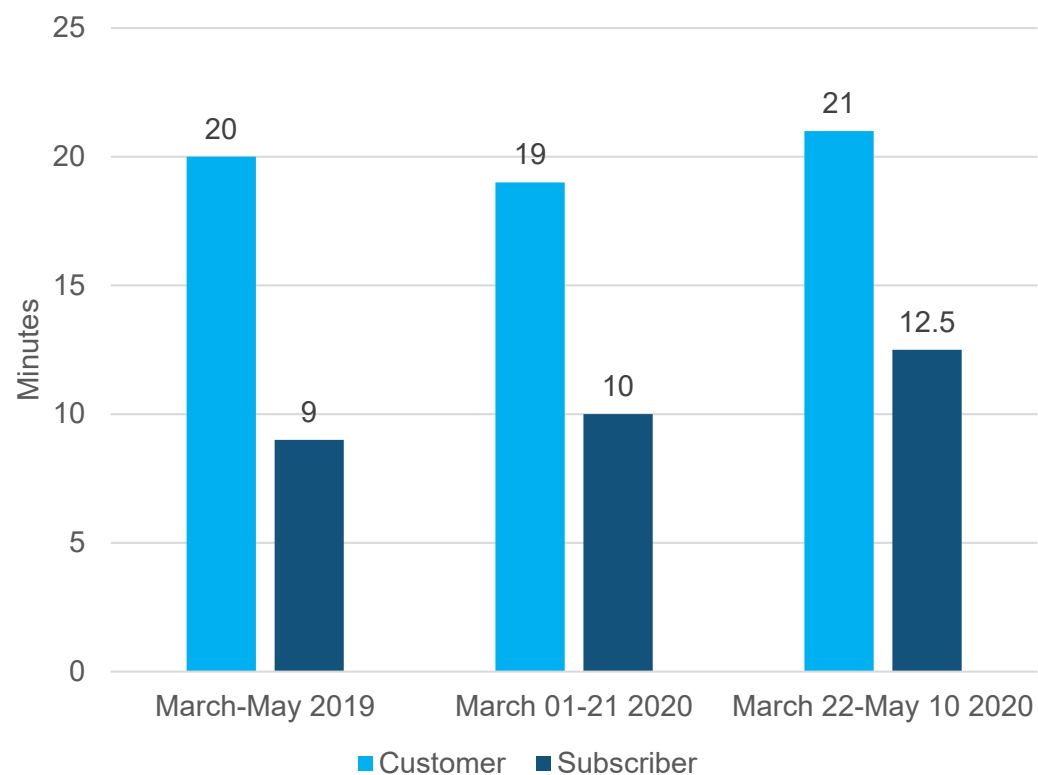
Male / Female Ratio Comparison



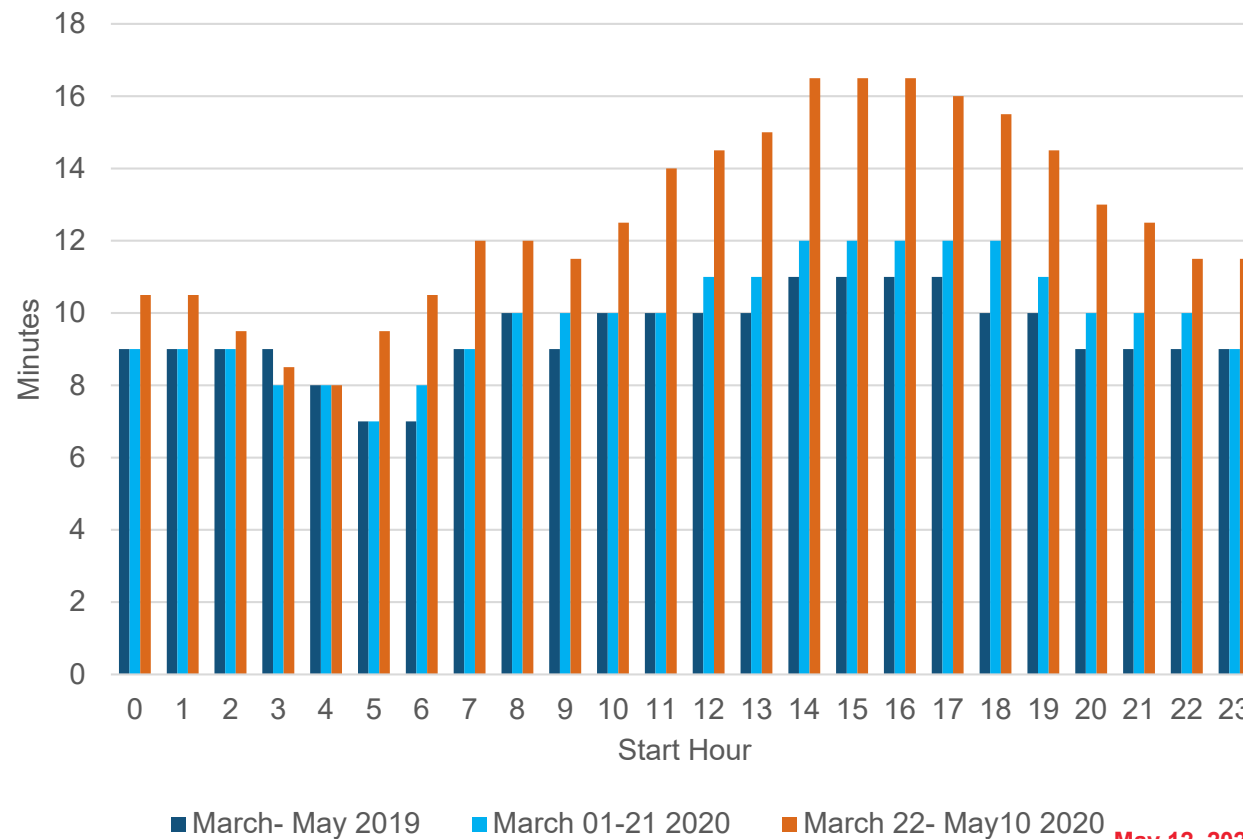
Citi Bike Trip Duration Comparison

- Average trip duration has increased post-PAUSE among both customers and subscribers.
- Morning peak hour and late afternoon trip durations have seen the greatest increase in total duration. This is occurring also in the context of reduced automobile traffic.

Average Trip Duration By User Type



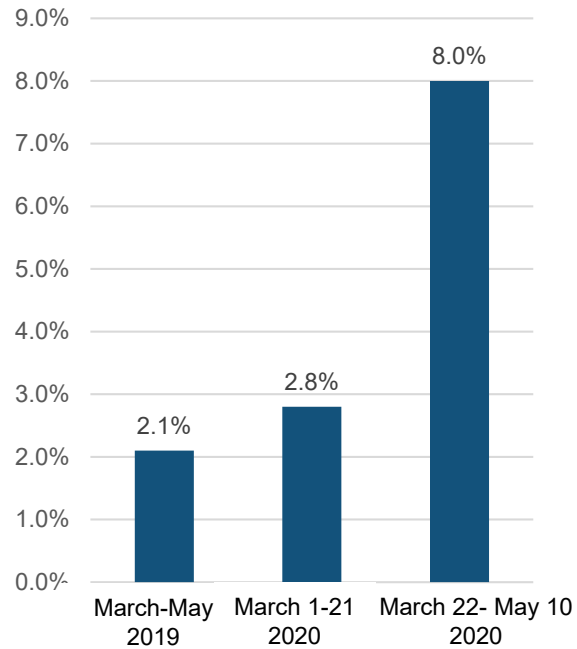
Average Trip Duration By Time of Day



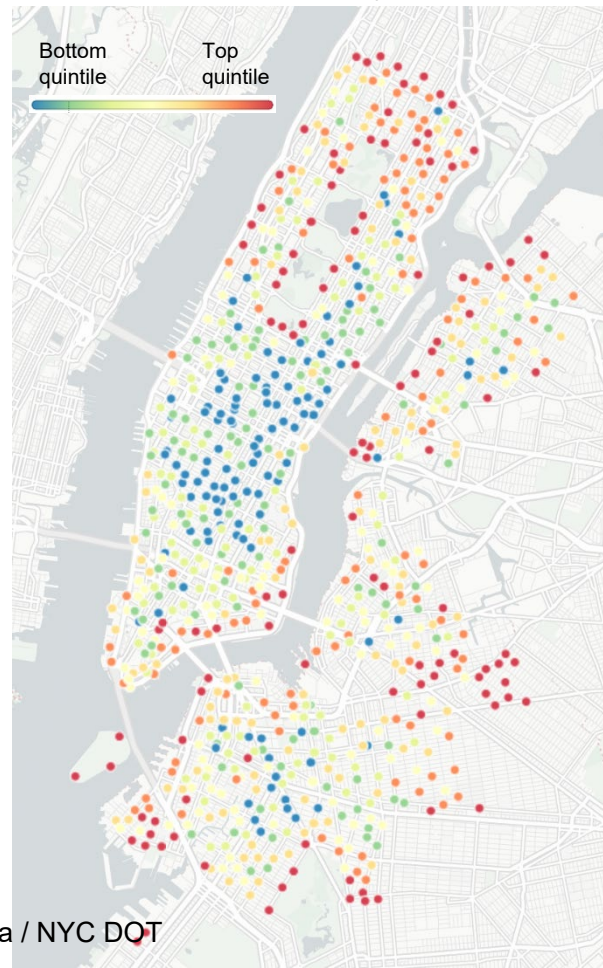
Trips with the Same Origin and Destination (O/D)

- The percent of total trips with the same origin and destination increased 4x during the PAUSE.
- Docking stations producing trips with the same O/D appear to be more evenly distributed than they were pre-COVID19, when they were almost exclusively clustered along the waterfront or adjacent to parks.

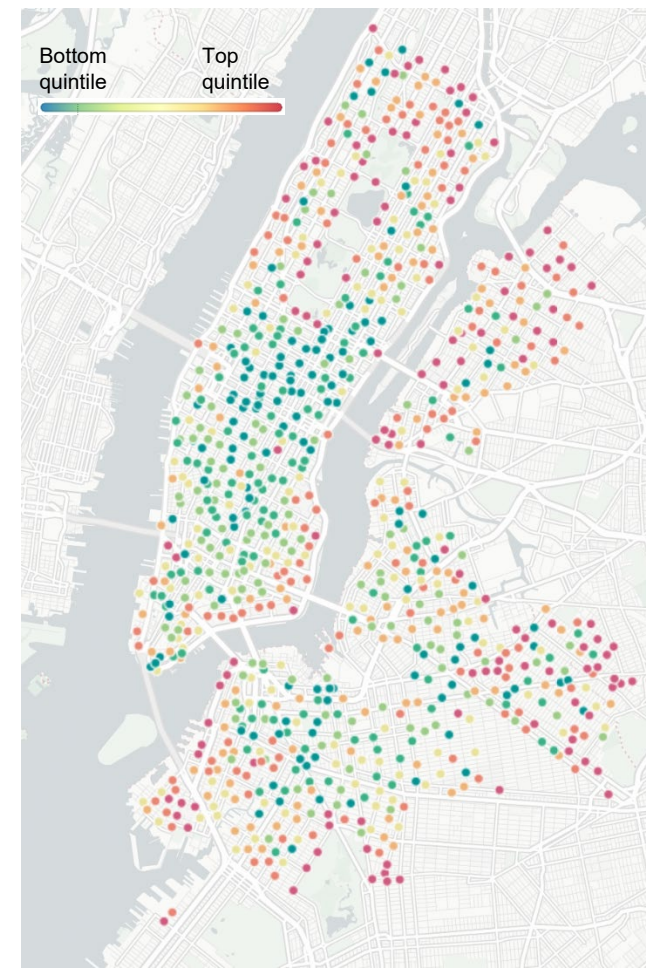
Percent of trips with the same origin and destination



Trips with the same O/D
March-May 2019



Trips with the same O/D
March 1-21 2020



Trips with the same O/D
March 22- May 10 2020



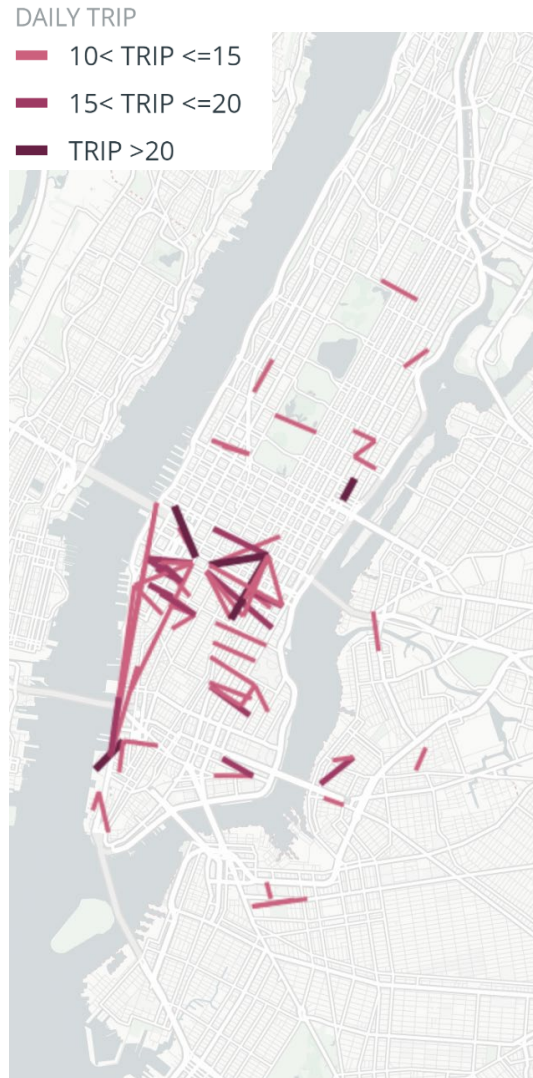
Common Origin/Destination Pairings - Weekday

Origin Destination Average Daily Trips >10

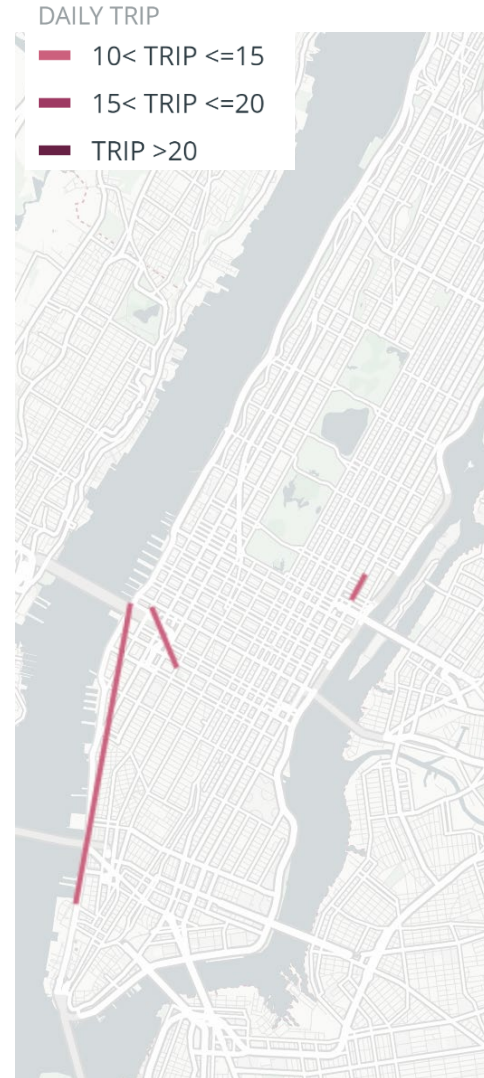
March - May 2019



March 1-22 2020



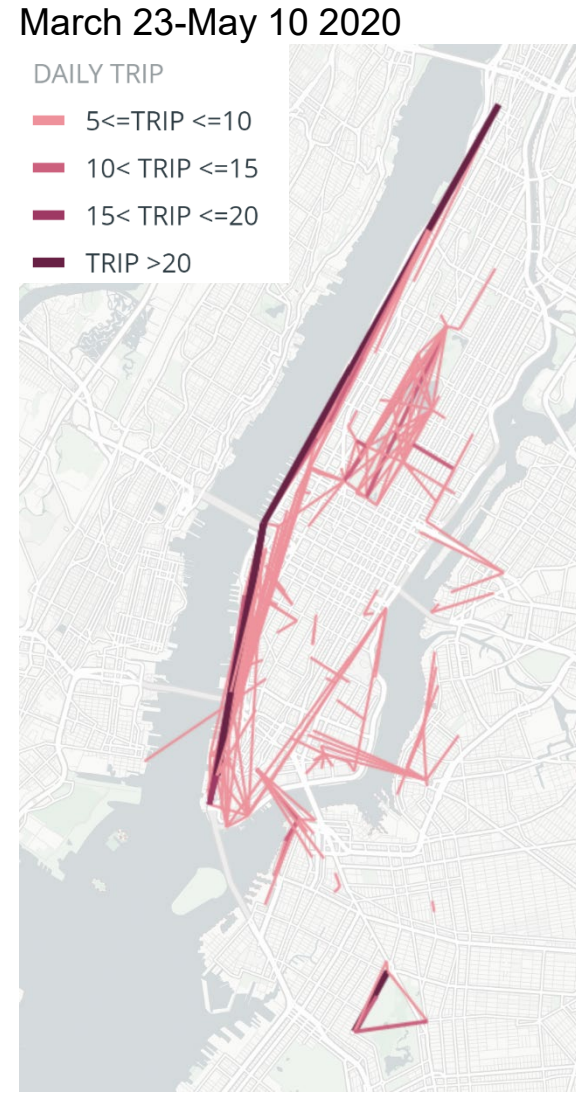
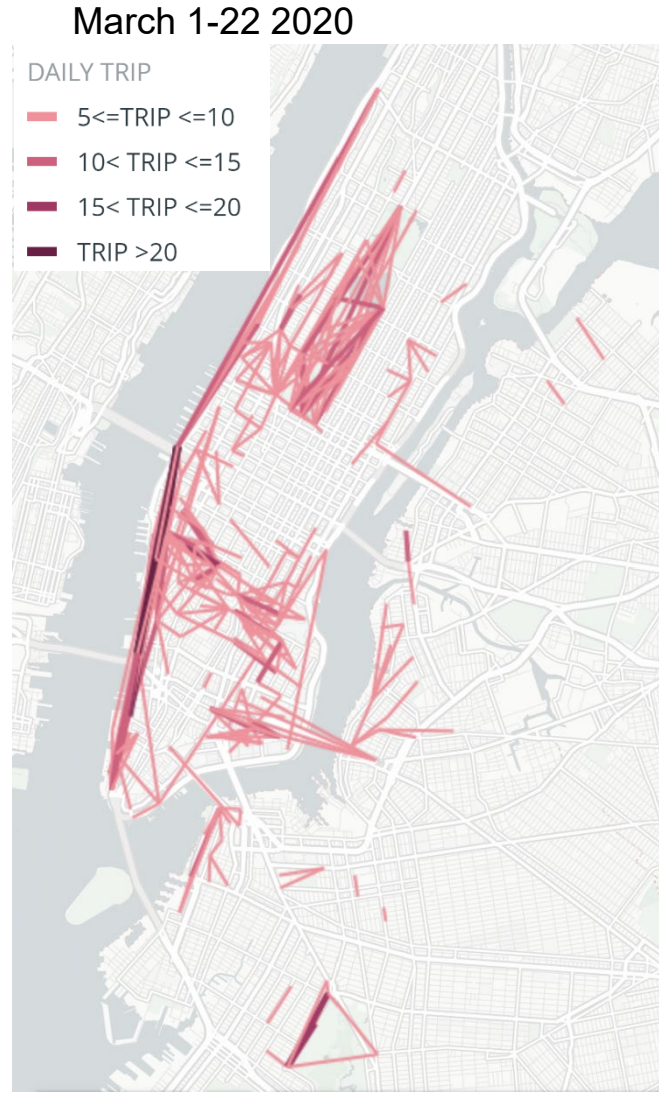
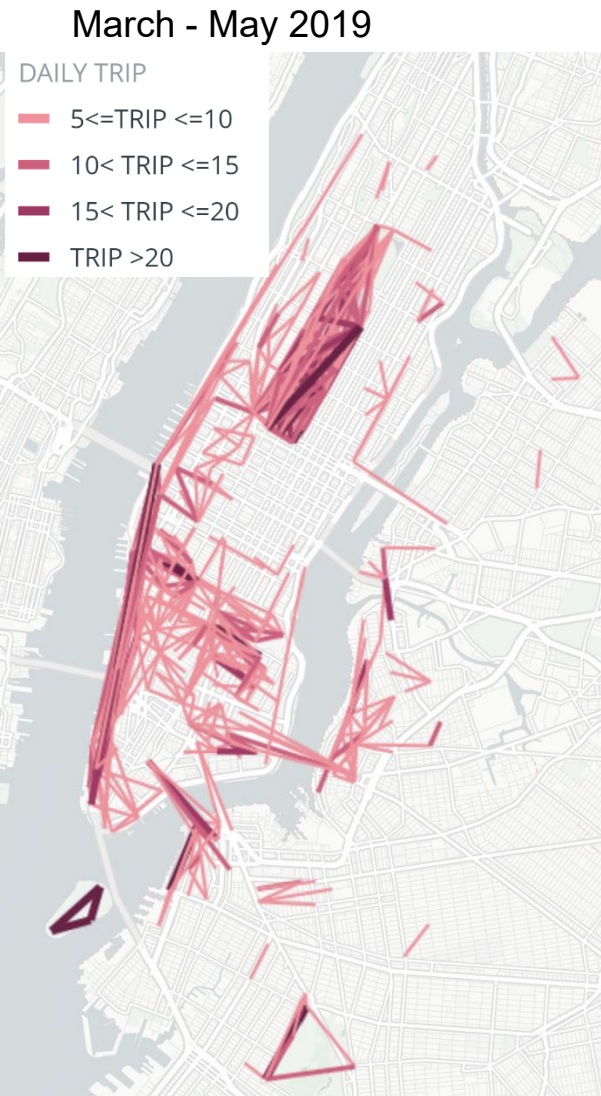
March 23-May 10 2020



- Recurrent O/D pairings were common on weekdays through the Spring of 2019, with common routes across midtown Manhattan, along the west side, in Brooklyn Heights, Fort Greene, Williamsburg, and Long Island City.
- In early March 2020, prior to the PAUSE, common trip pairings were reduced largely to cross-town Manhattan and some west side rides.
- Since the PAUSE, almost all but the west side routes have disappeared from common weekday pairings.

Common Origin/Destination Pairings - Weekend

Origin Destination Average Daily Trips >5



- Under normal conditions, weekend Citi Bike ridership routes appear more recreation- and entertainment-based.
- Common weekend origin/destination pairings have dropped off substantially under the PAUSE, but remain more prevalent than weekday trips. These, too, appear to remain oriented around recreation.

Timeline



New York COVID-19 Pandemic Timeline

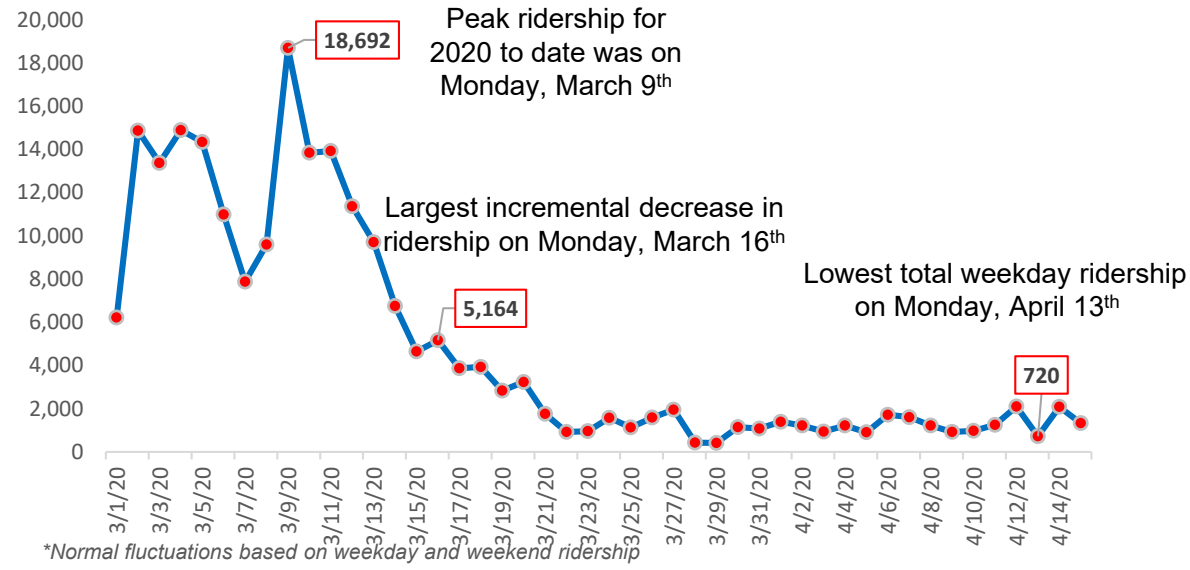
- March 1st, 2020: **First confirmed case** in New York (Manhattan healthcare worker) <https://www.wsj.com/articles/first-case-of-coronavirus-confirmed-in-new-york-state-11583111692>
- March 5th, 2020: Mayor De Blasio says that a virus fears shouldn't keep New Yorkers off the subway <https://www.nydailynews.com/coronavirus/ny-coronavirus-bill-de-blasio-coronavirus-subway-20200305-vmjdxjudbndlrjekashqs3hfou-story.html>
- March 7th, 2020: Governor Cuomo **declares state of emergency** <https://www.nytimes.com/2020/03/07/nyregion/coronavirus-new-york-queens.html>
- March 8th, 2020: City and State implement **new travel guidelines**, asking sick people to stay off transit <https://www.nbcnewyork.com/news/local/nyc-issues-new-commuter-guidelines-to-combat-coronavirus-spread/2317584/>
- March 10th, 2020: Governor Cuomo declares **containment zone in New Rochelle** from March 12th through 25th <https://www.nytimes.com/2020/03/10/nyregion/coronavirus-new-york-update.html>
- March 11th, 2020: Governor Cuomo announces **closures of CUNY and SUNY schools** from March 12th-19th, moving to online classes after that for the rest of the semester
- March 12th, 2020: Governor Cuomo announces **restrictions on mass gatherings**, directing events with more than 500 people to be cancelled or postponed and any gathering with less than 500 people in attendance to cut capacity by 50 percent. In addition, only medically necessary visits would be allowed at nursing homes. **Broadway theaters** were also shut down effective that night. <https://www.governor.ny.gov/news/during-novel-coronavirus-briefing-governor-cuomo-announces-new-mass-gatherings-regulations>
- March 15th, 2020: **NYC school closures announced.** <https://www.nytimes.com/2020/03/15/nyregion/nyc-schools-closed.html> DeBlasio announces the **closure of schools, bars, and restaurants** (except takeout/delivery) effective the morning of the 17th <https://www.nytimes.com/2020/03/15/nyregion/new-york-coronavirus.html>
- March 18th: Governor Cuomo announces that **50% of non-essential employees** must work from home
- March 19th: The Governor announces that **75% of non-essential employees** must work from home. <https://www.thestreet.com/lifestyle/health/ny-governor-cuomo-workers-must-stay-h>
- March 20th: Governor Cuomo announces **statewide stay at home rules**, effective the evening of the 22nd. **100% of non-essential workers** must stay home. <https://www.npr.org/sections/coronavirus-live-updates/2020/03/20/818952589/coronavirus-n-y-gov-cuomo-says-100-of-workforce-must-stay-home>, travel on transit only when necessary
- March 23rd: NYC Ferry modifies weekday service
- March 25th: MTA announces service reduction to **Essential Service** plan <https://abc7ny.com/6047040/>
- March 27th: The Governor halts **non-essential construction** <https://thecity.nyc/2020/03/cuomo-calls-off-non-essential-construction-statewide.html>
- March 30th: Staten Island Ferry reduces service to every hour
- April 30th: Governor Cuomo announces **impending overnight subway shutdowns** from 1:00 am – 5:00 pm for enhanced sanitization procedures. <https://www.nytimes.com/2020/04/30/nyregion/subway-close-cuomo-coronavirus.html>
- May 6th: Nightly 1am-5am subway shutdown begins

APPENDIX

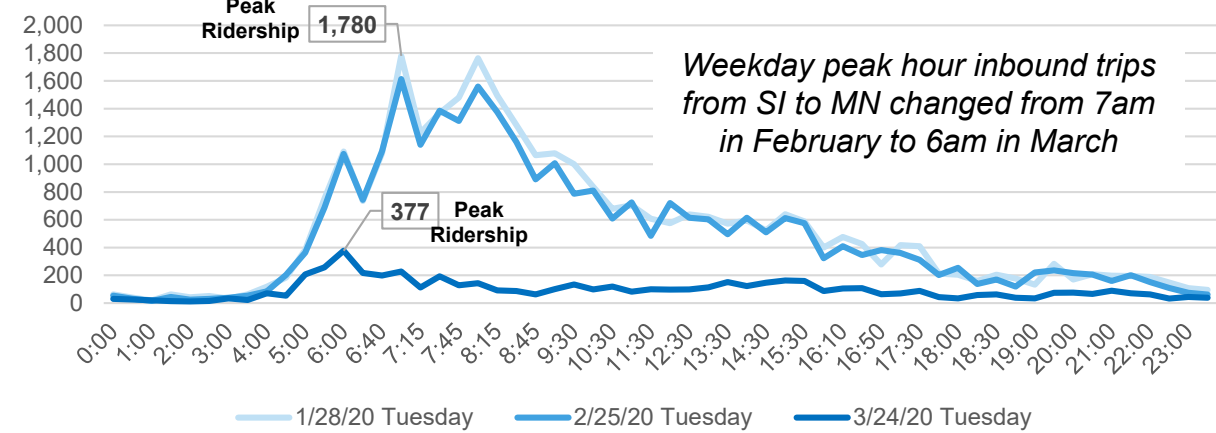
The following slides have appeared in previous reports and may contain updated information but no new trends

Ferry Ridership

NYC Ferry Daily Ridership: 3/1/20 - 4/14/20

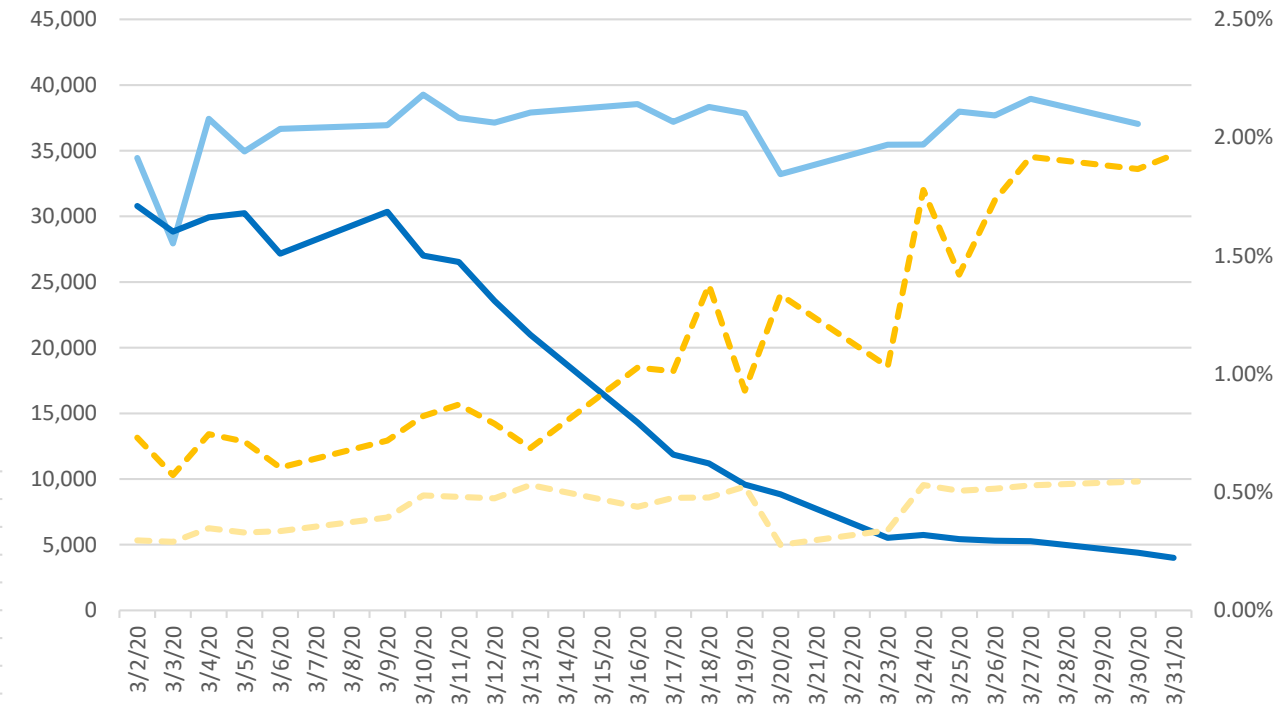


2020 Staten Island Ferry Inbound Weekday Ridership by Service

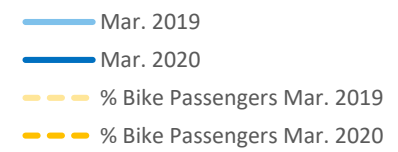


Staten Island Ferry Weekday Total Ridership: March 2019 vs. March 22

Staten Island Ferry Weekday Total Ridership & Percentage of Weekday Bike Passengers on the Staten Island Ferry: March 2019 vs. March 2020



While overall ridership has plummeted, the percent of passengers travelling with a bike increased.

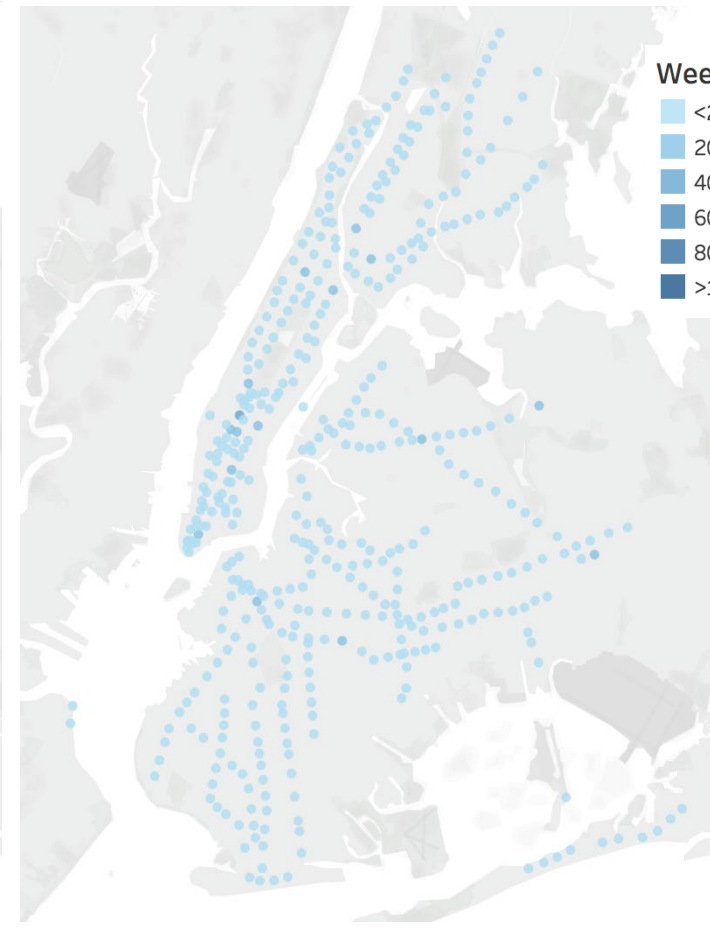
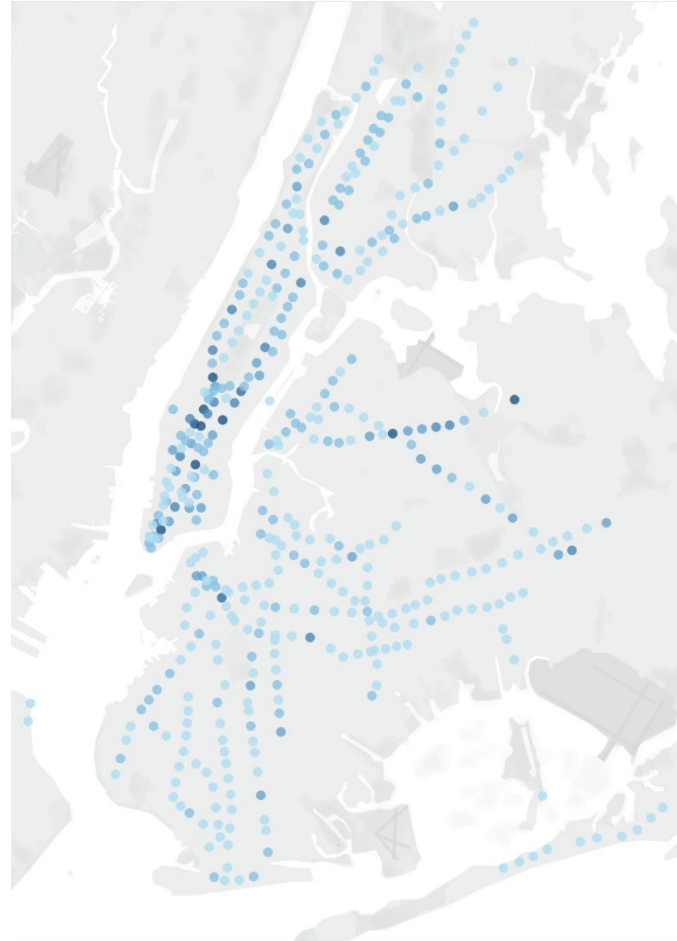
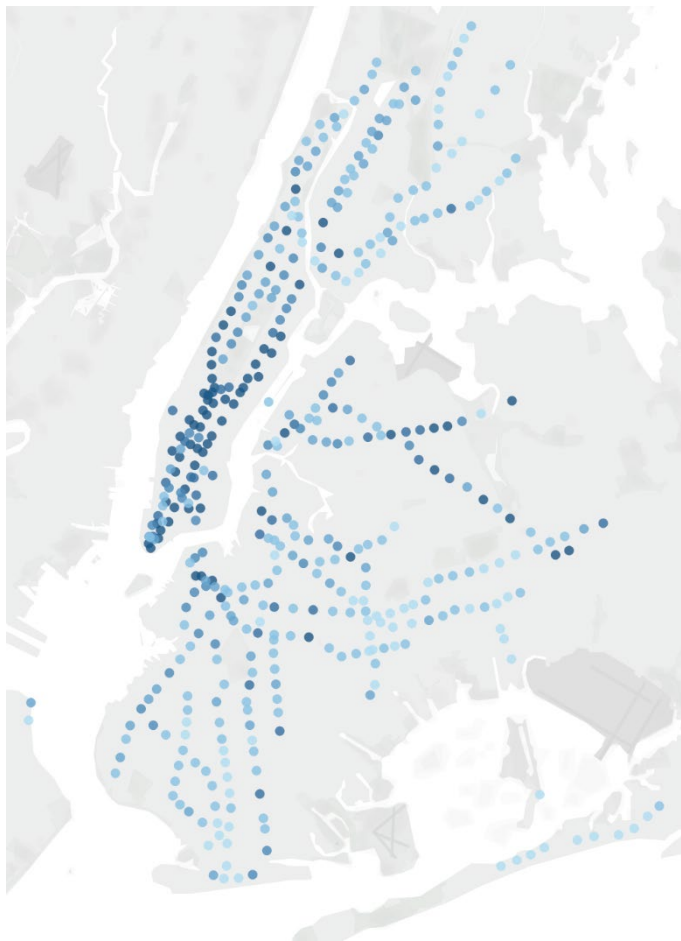


MetroCard Swipes: Week of Jan 4-10 vs Mar 14-20 vs Apr 25- May 1

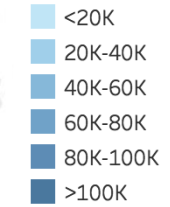
January 4-10 2020

March 14-20 2020

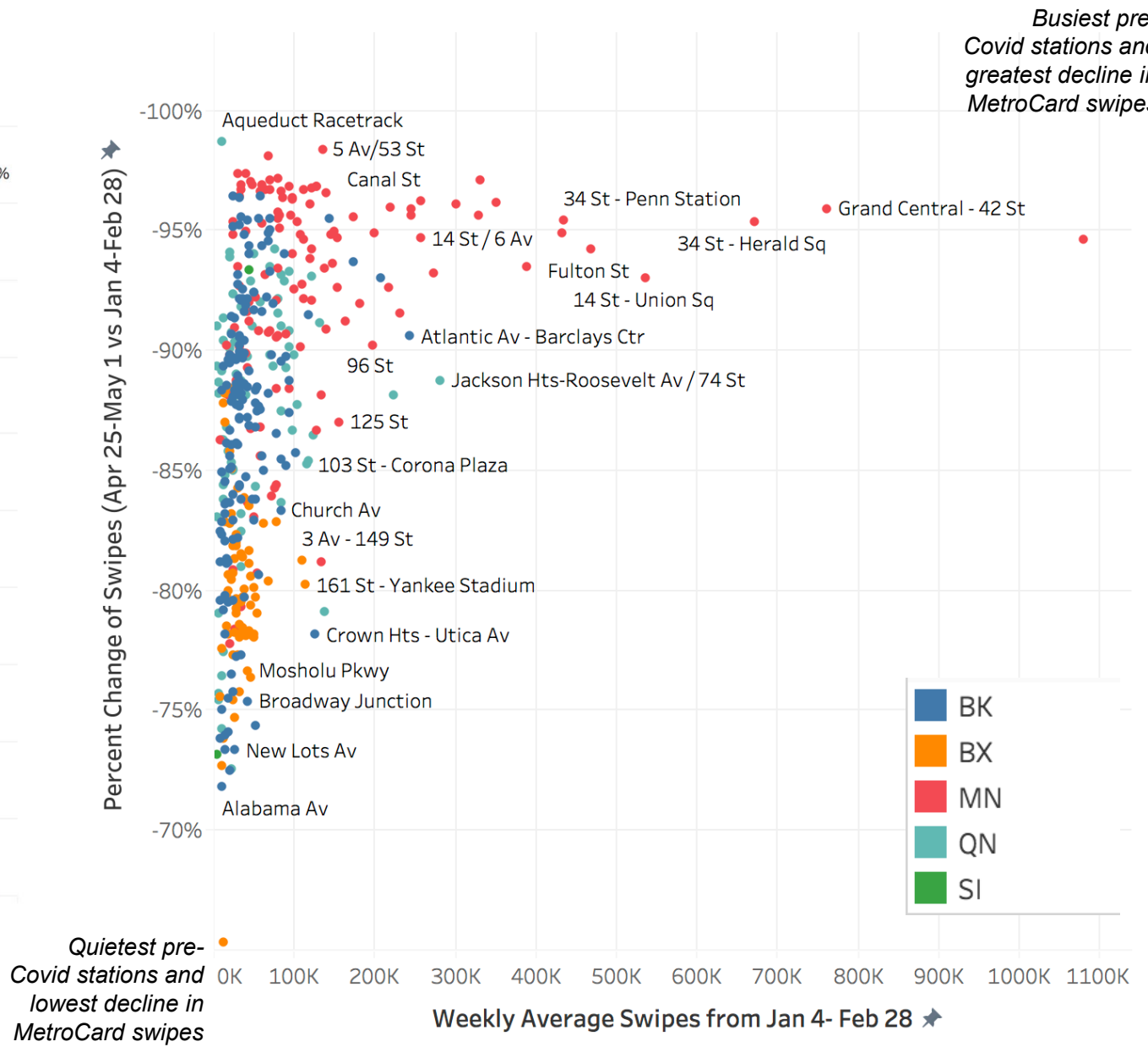
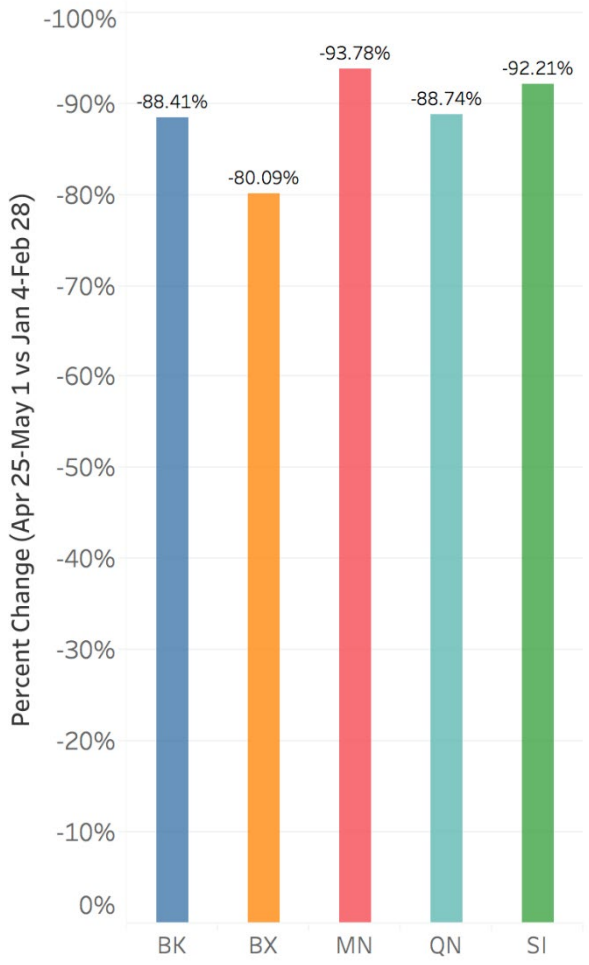
April 25-May 1 2020



Weekly MetroCard Swipes by Station



Degrees of Ridership Change by Station Activity



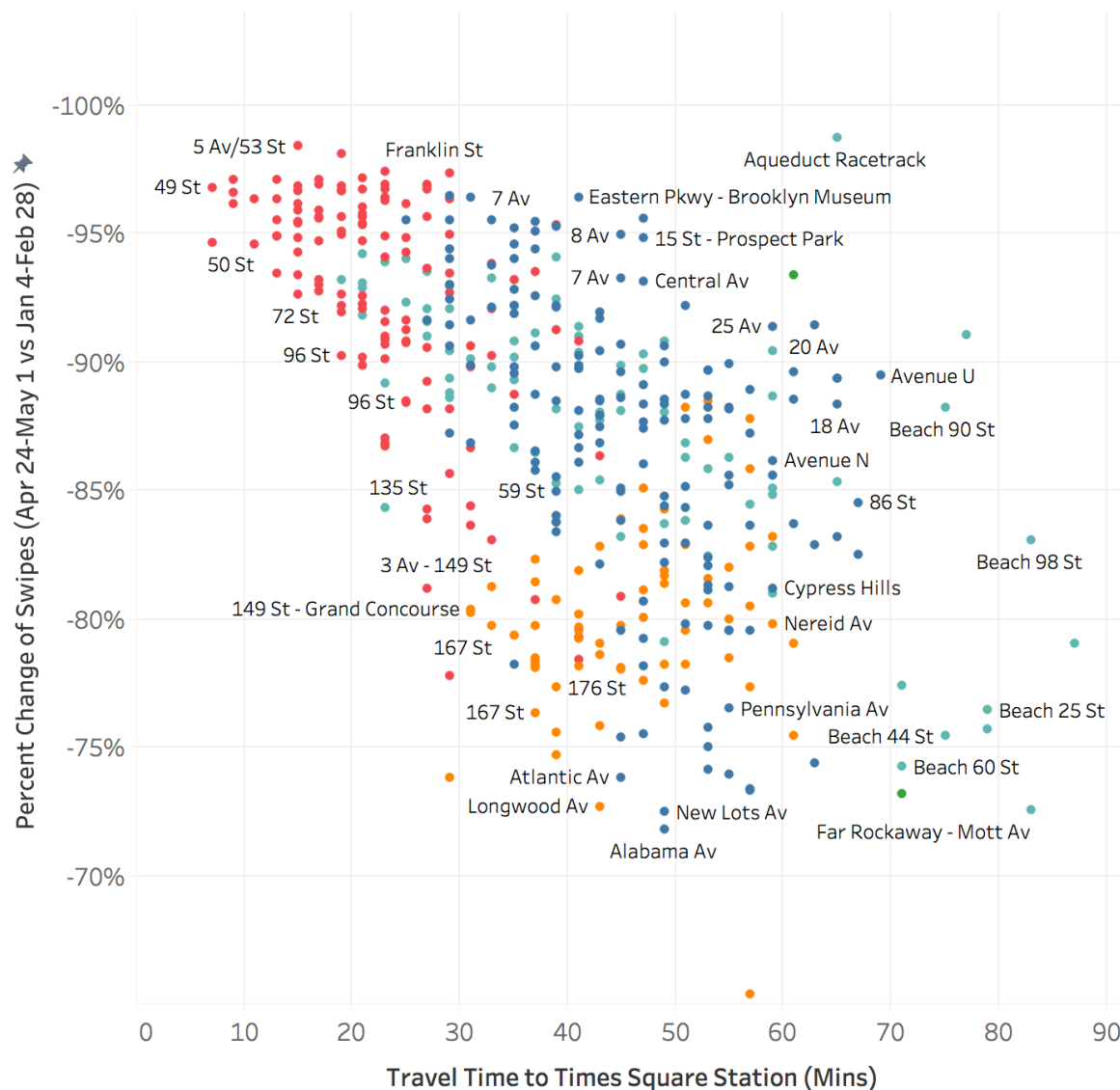
The scatter plot compares the average station activity with the scale of its ridership decline.

Overall, busier stations saw more dramatic declines, particularly in the central business districts.

In the Bronx, relatively quiet stations on average saw less dramatic declines; a greater share of its riders continued riding.

Change is measured by comparing the weekly average of January 4 – February 28th against the week of Apr 25-May 1.

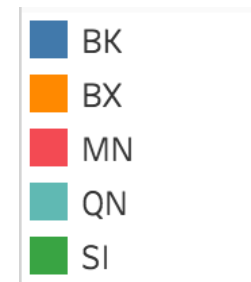
MetroCard Swipes Percent Change by Distance to The Core



The scatter plot shows the relationship between ridership declines, and distance to the Manhattan Core (travel time to Times Square, under normal AM peak subway schedules)

The stations furthest from the Core have generally seen the least amount of ridership decline.

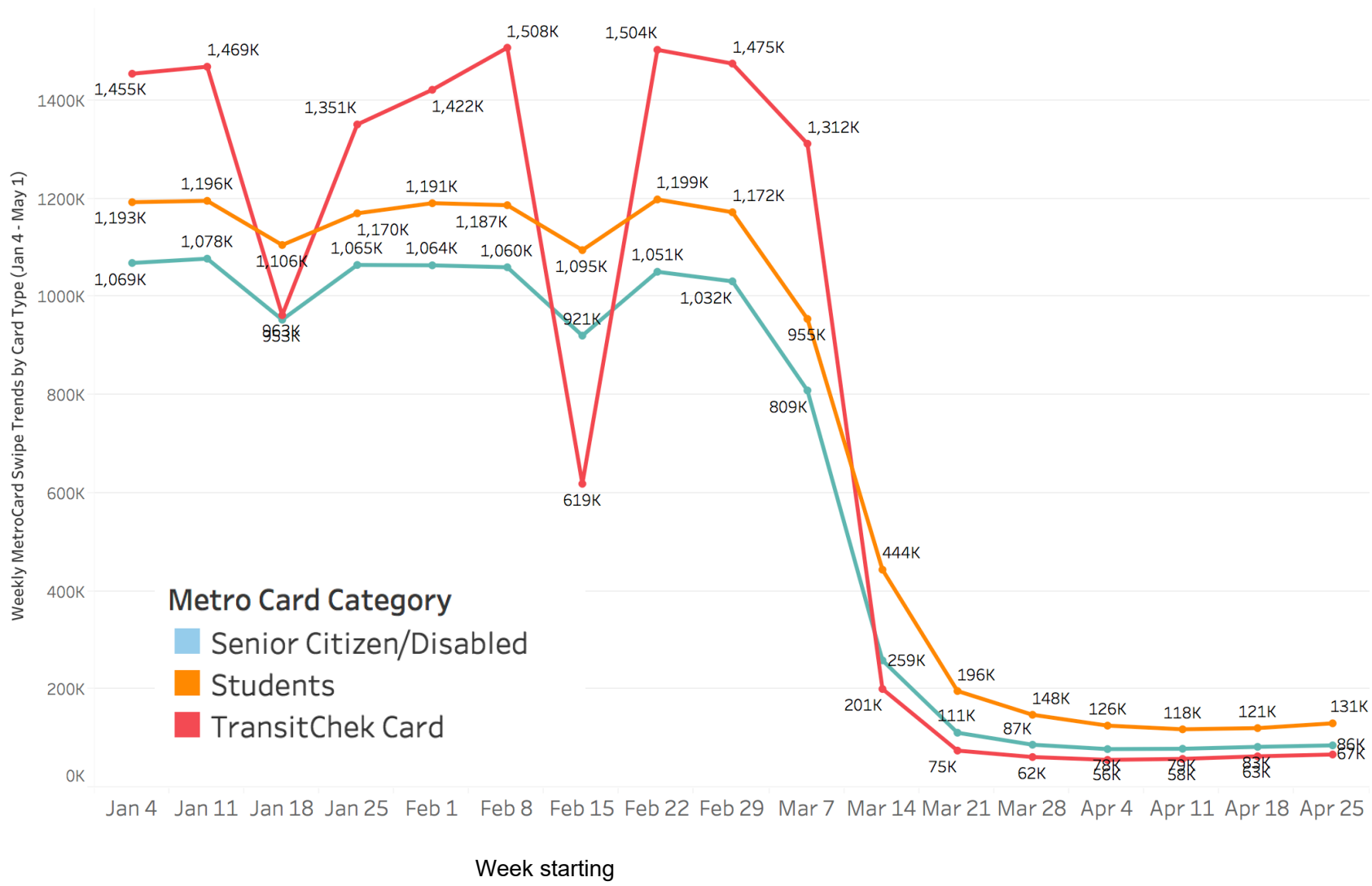
Change is measured by comparing the weekly average of January 4 – February 28th against the week of April 25-May 1.



<https://public.tableau.com/profile/dcptransportation#!/view/home/MetroCardSwipes-Distance/Dashboard1>

MetroCard Swipes by Card Type: TransitChek/ Students/ Senior & Disabled

MetroCard Swipes by Card Types (Jan 4-May 1)



Though drastically reduced over typical time periods, there were still more than 120,000 MetroCard swipes by reduced-fare cards for senior citizens, and people with disabilities, the week of April 25-May 1.

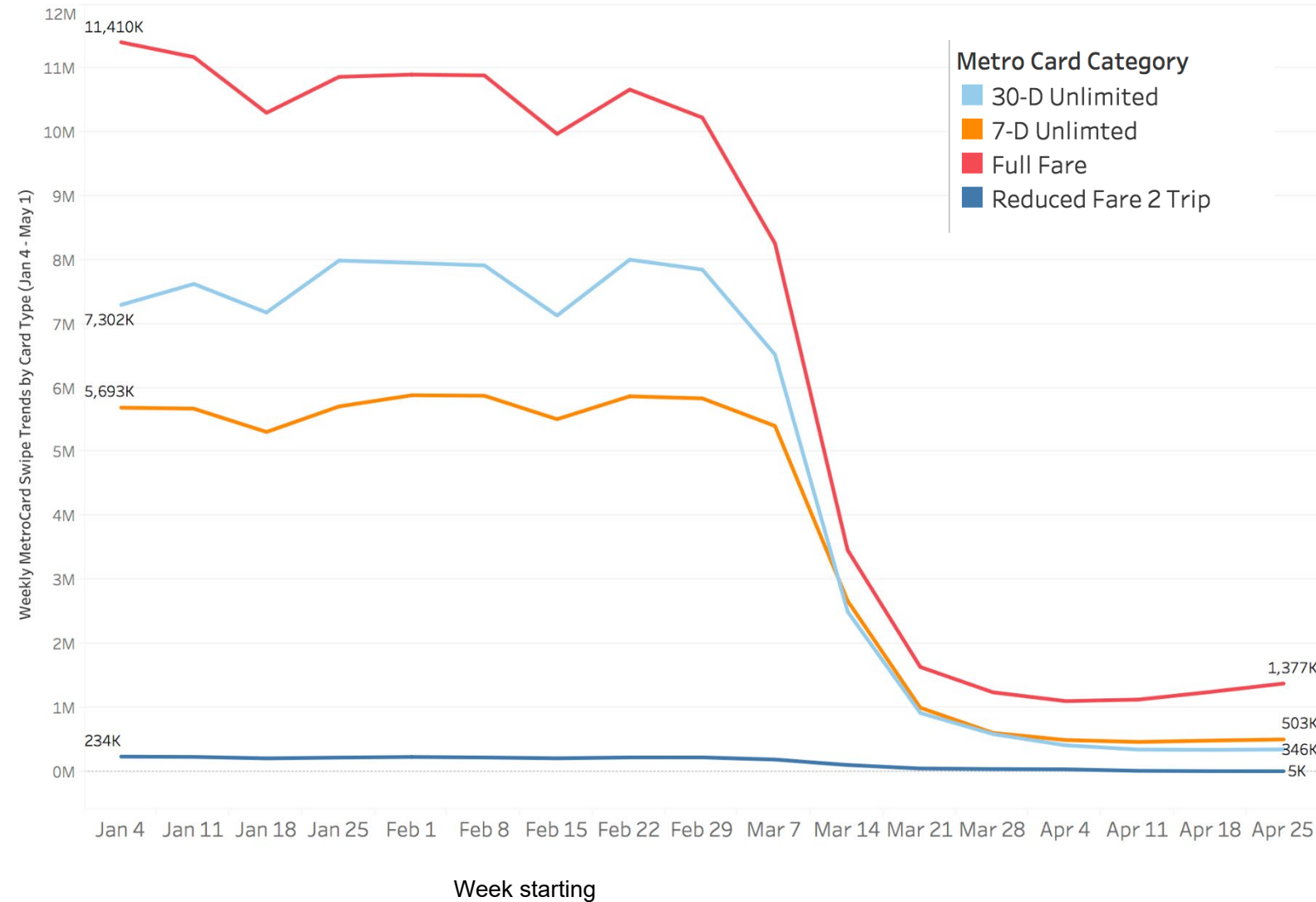
During this same PAUSE period, there were more than 50,000 MetroCard swipes by student cards.

Interactive dashboard for these and other types of MetroCard swipes:
<https://public.tableau.com/profile/dcptransportation#!/vizhome/MetroCardSwipes-CardTypes/CardTypes?publish=yes>

MetroCard Swipes by Card Type: Full Fare/ Unlimited



MetroCard Swipes by Card Types (Jan 4-May 1)

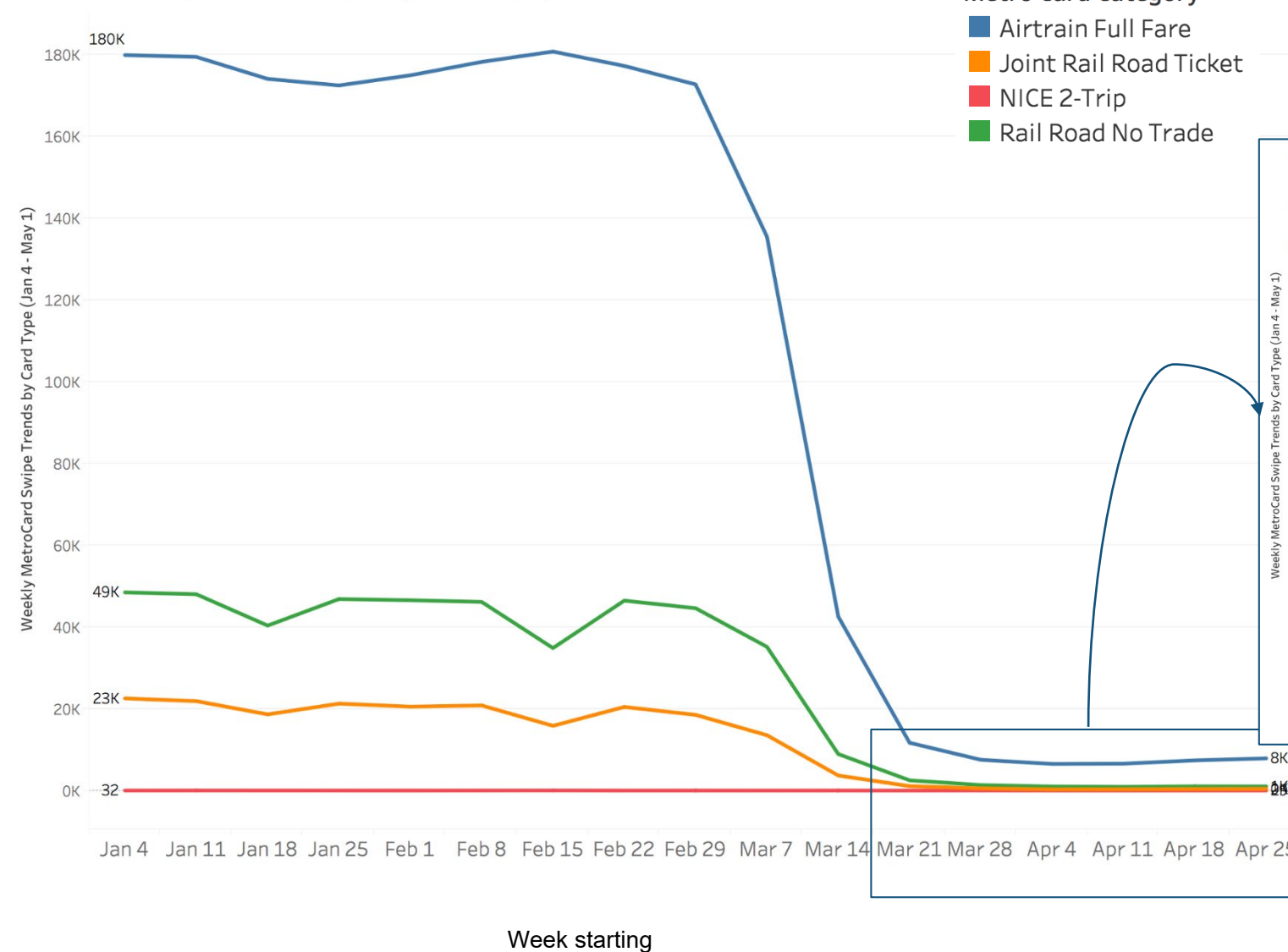


Full Fare MetroCard swipes have seen an increase, along with 30-day Unlimited, 7-Day Unlimited, and Reduced Fare 2 Trip MetroCard swipes.

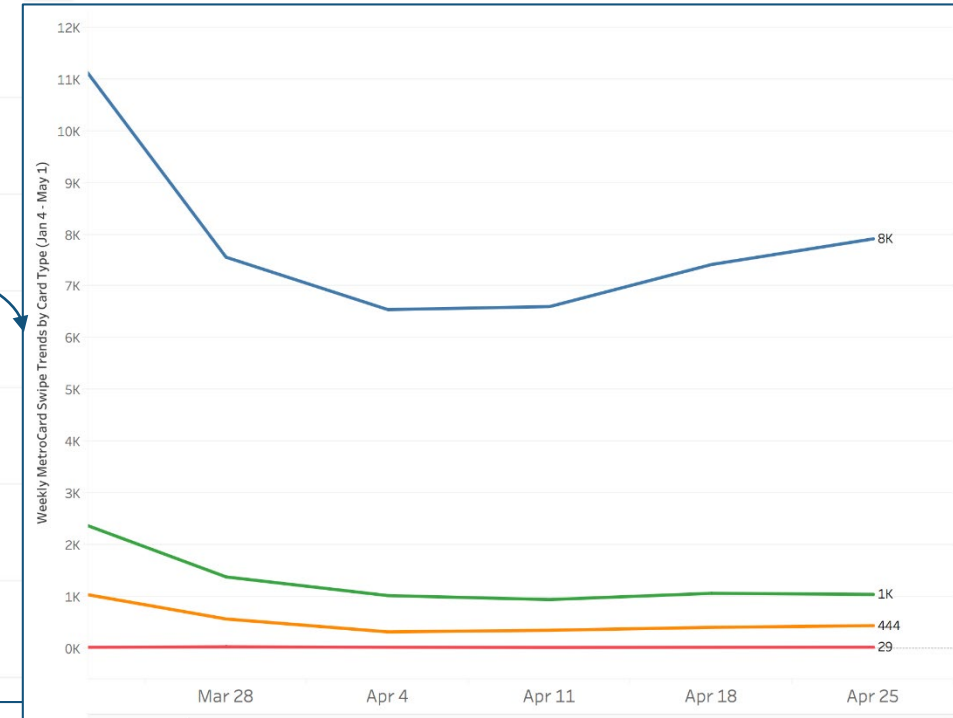
Interactive dashboard for these and other types of MetroCard swipes:
<https://public.tableau.com/profile/dcptransportation#!/vizhome/MetroCardSwipes-CardTypes/CardTypes?publish=yes>

MetroCard Swipes by Card Type: AirTrain/ Rail Road/ NICE Bus

MetroCard Swipes by Card Types (Jan 4-May 1)

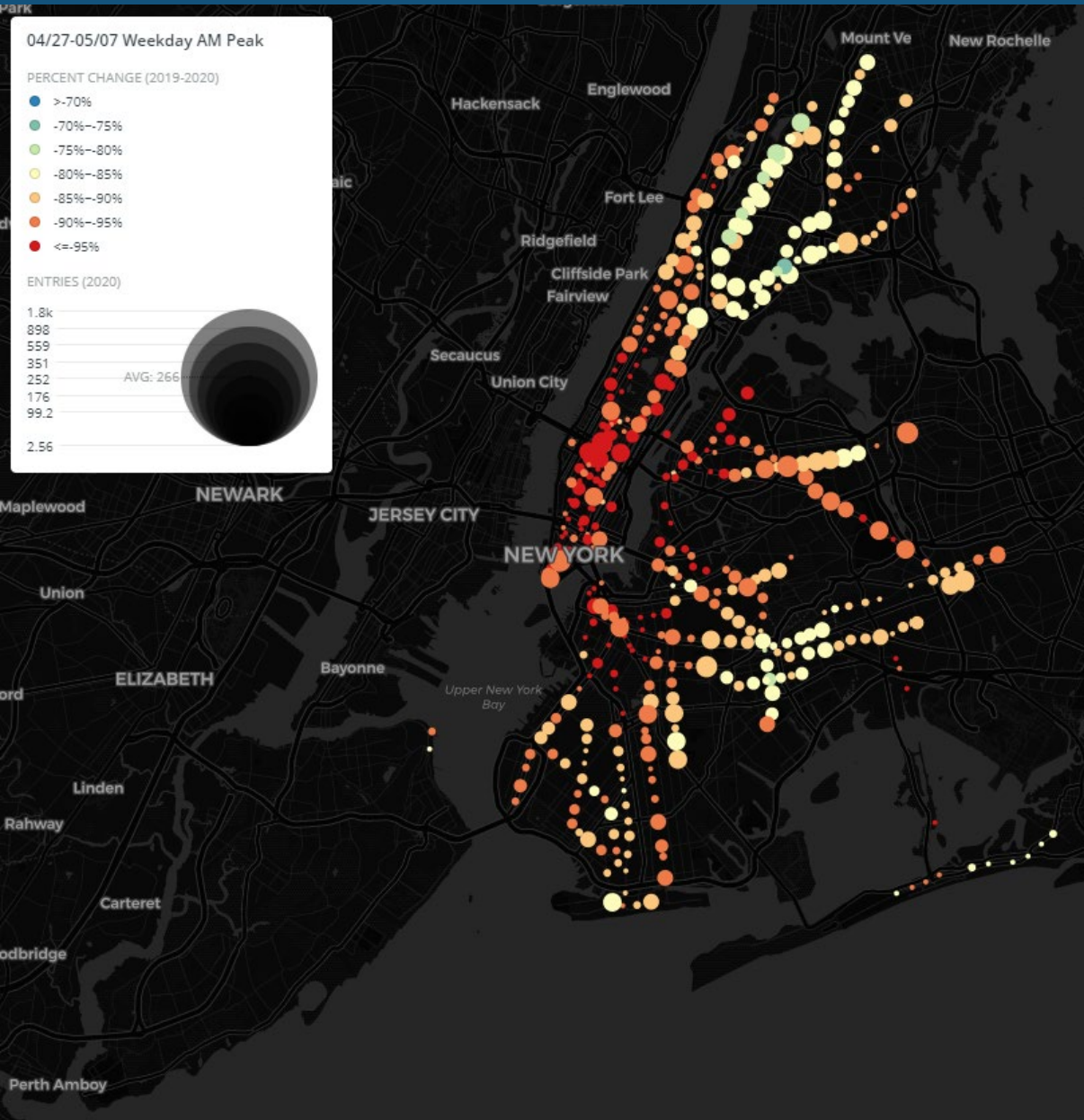


AirTrain MetroCard swipes have seen an increase.



Interactive dashboard for these and other types of MetroCard swipes:
<https://public.tableau.com/profile/dcptransportation#!/vizhome/MetroCardSwipes-CardTypes/CardTypes?publish=yes>

AM Peak Weekday Turnstile Data: Apr 27-May 07 2020 vs 2019



AM peak hour trips generally indicate where people are commuting *from*:

- The largest AM peak ridership declines are observed in the Manhattan Core and Inner Ring, and along the B/Q and E train lines.

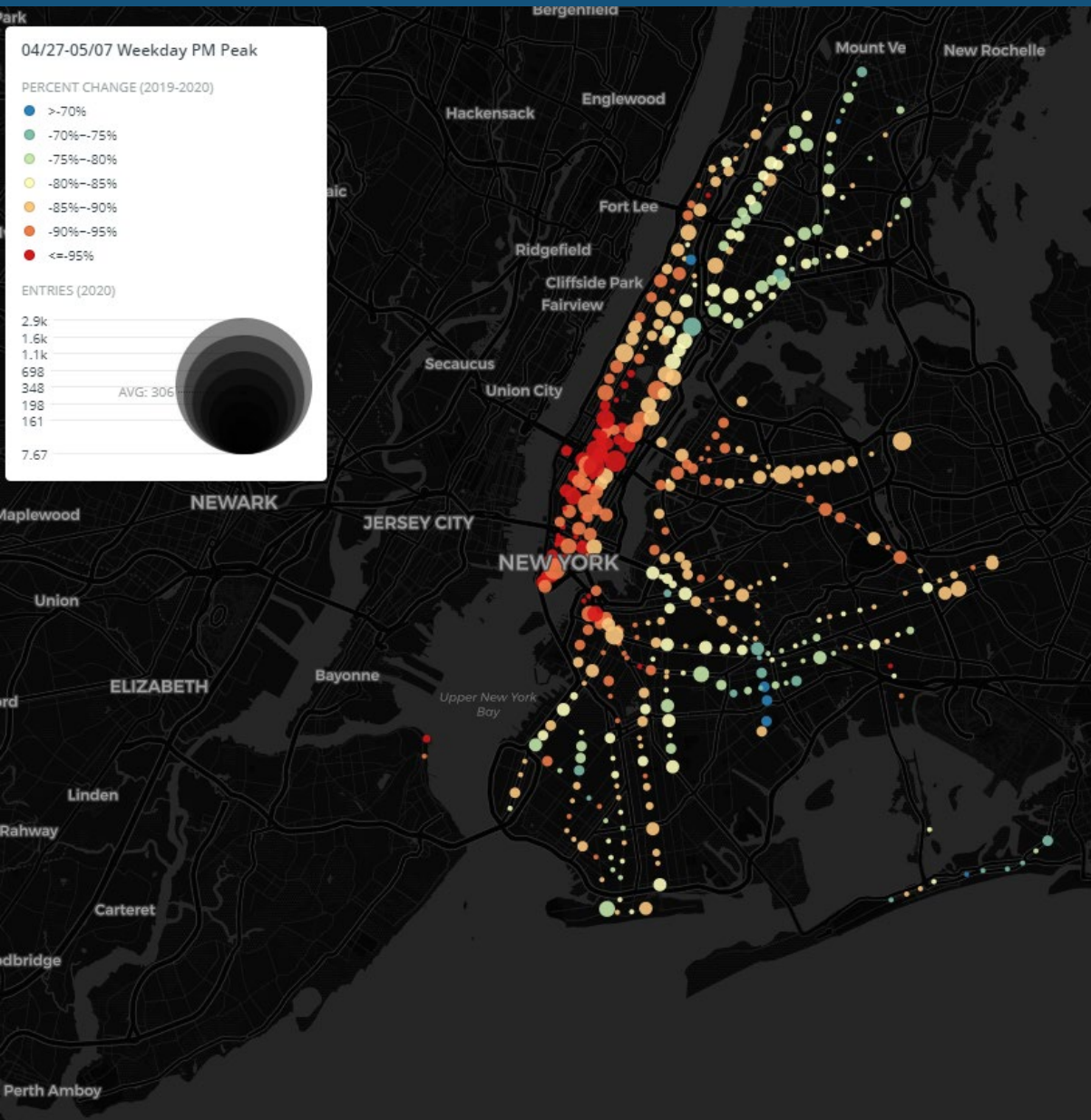
Turnstile Data:

- MTA turnstile data map compares weekday ridership during the fifth week of April and first week of May in 2020 vs those same weeks in 2019. It considers riders only travelling during the AM peak 4-hour travel window*.
- Size is the actual ridership during the fifth week of April and first week of May in 2020 and the color is the percent change.
- MetroCard Swipe/Fare data is the cleaned weekly ridership data provided by MTA for each station. Although turnstile data is also published by MTA, it is the raw cumulative entry register data for each turnstile recorded every 4 hours. Turnstile data can be affected by broken turnstile, maintenance, register reset, etc. and thus **requires extra caution when using the data**.

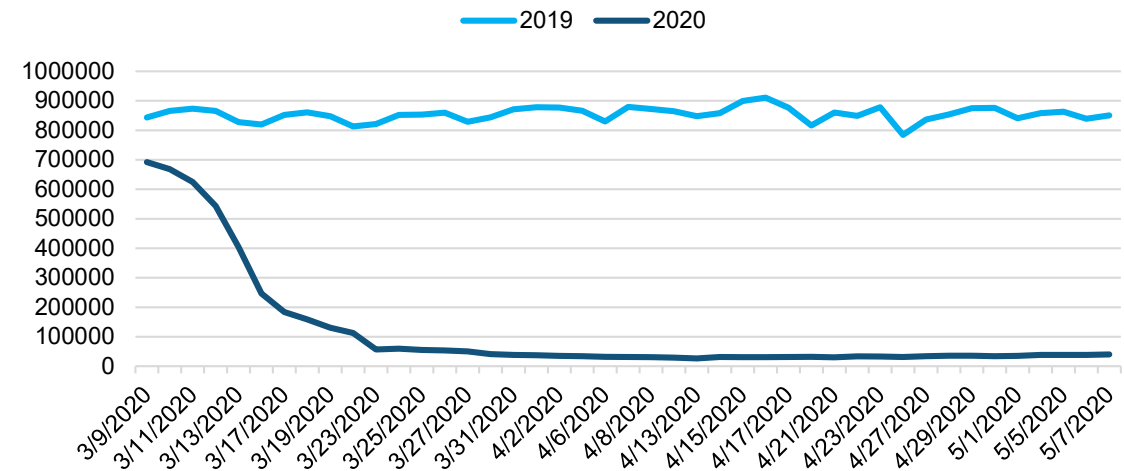
*the 4-hour window of aggregated data varies by station but the map reflects whichever window encompassed the typical morning peak.

Data sources: MTA Turnstile data (<http://web.mta.info/developers/turnstile.html>)

PM Peak Weekday Turnstile Data: Apr 27-May 07 2020 vs 2019



PM Peak Entry in CBD



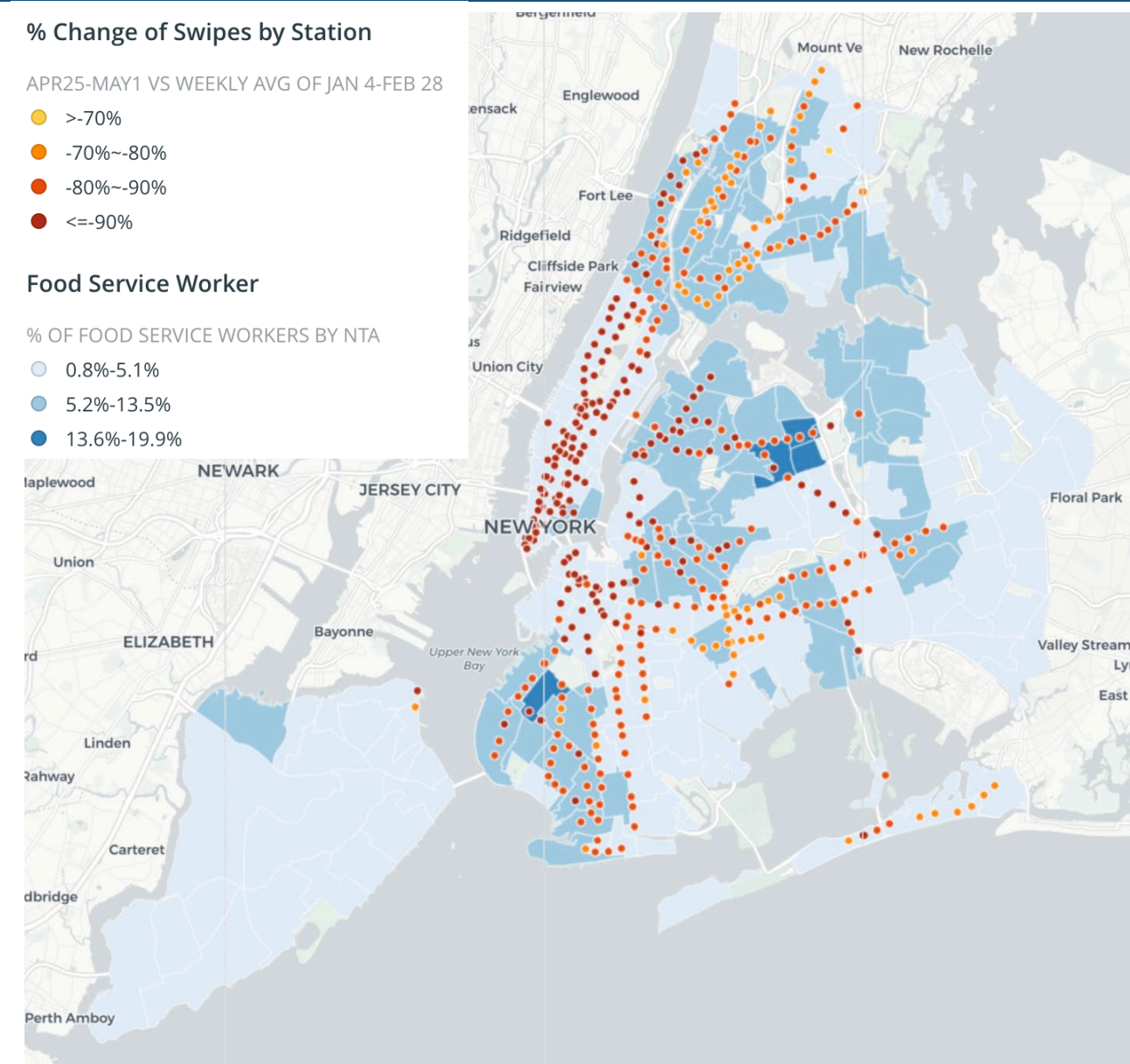
PM peak hour trips generally indicate where people are commuting to:

- The CBD area has seen the largest decreases in weekday entries during the PM peak 4-hour window*. The ridership has dropped approximately 95%.
- However, the CBD stations continue to have the highest ridership across the city, with about 38,000 entries per 4 hours in total in the PM peak.

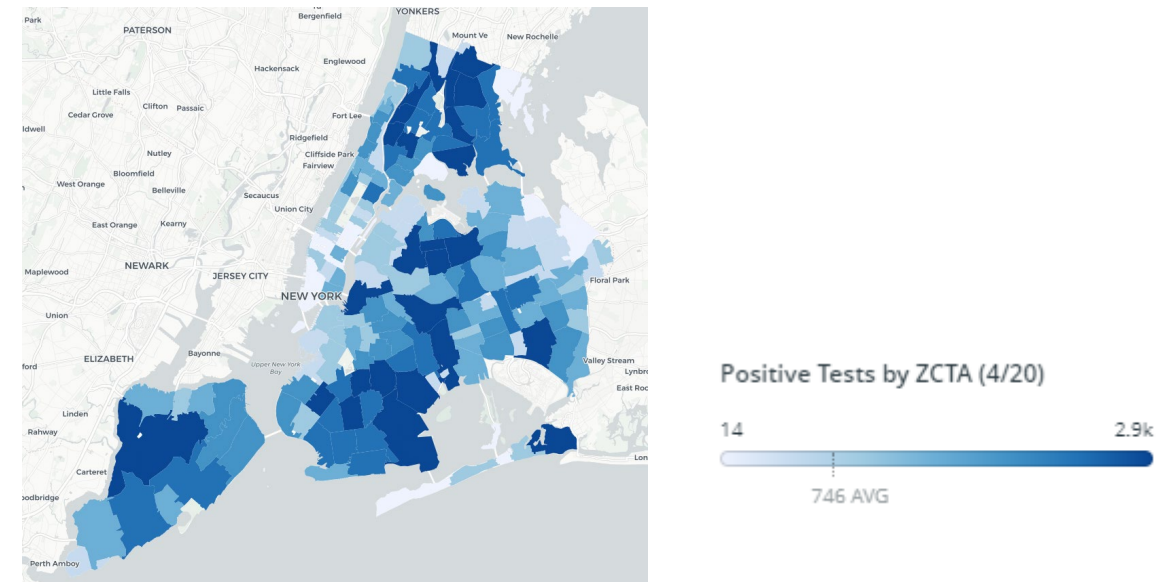
*the 4-hour window of aggregated data varies by station but the map reflects whichever window encompassed the typical morning peak.

Data sources: MTA Turnstile data (<http://web.mta.info/developers/turnstile.html>)

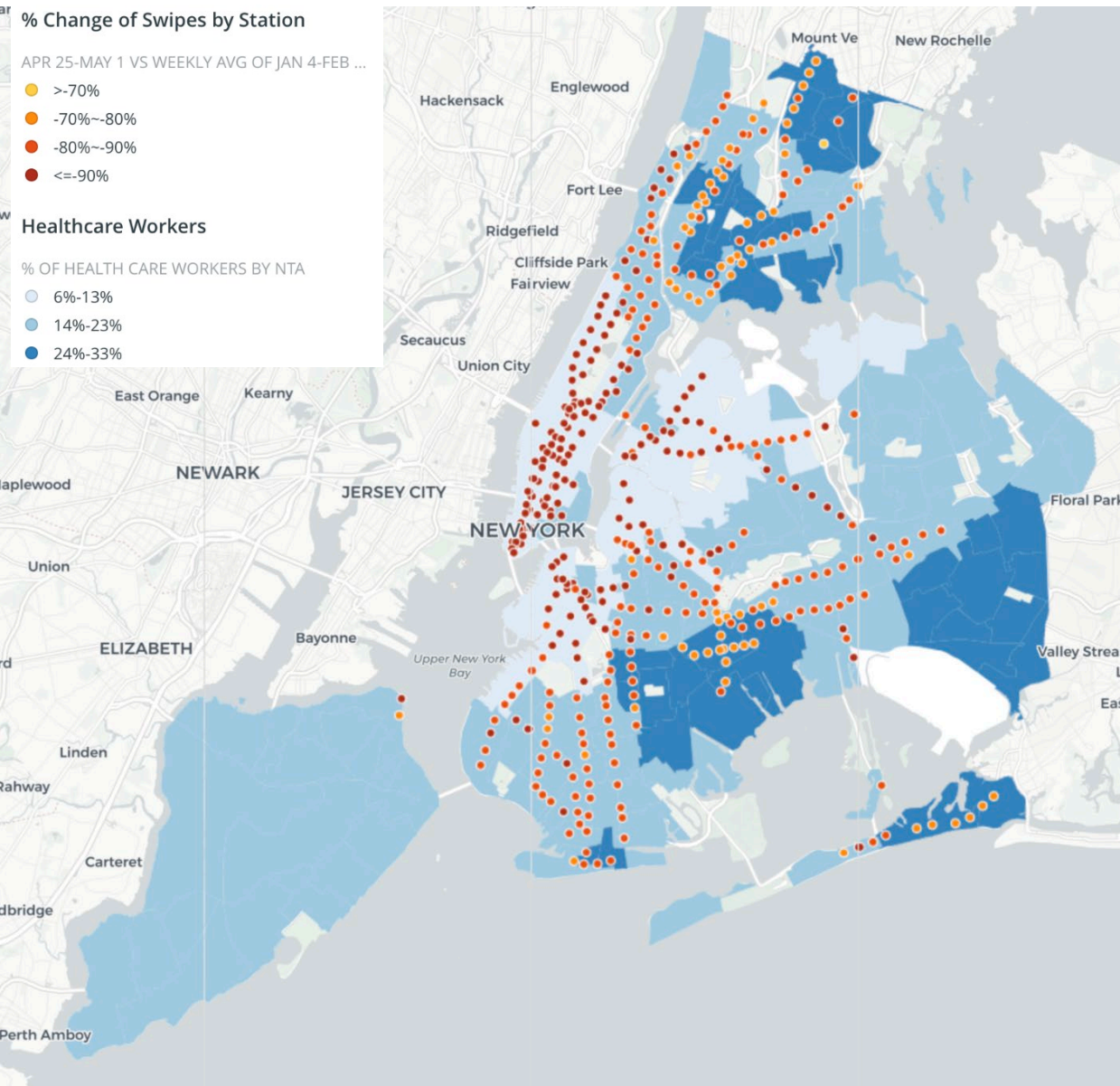
MetroCard swipes and where food service workers live



- Areas where concentrations of food workers live do not appear to be connected with higher rates of subway ridership under the pandemic.
- Nevertheless, we do see concentrations of food workers in the same neighborhoods as, or adjacent to, concentrations of confirmed positive COVID19 cases.
- Corona, Queens and Borough Park, Brooklyn are particularly notable. More detail is shown in a subsequent slide.



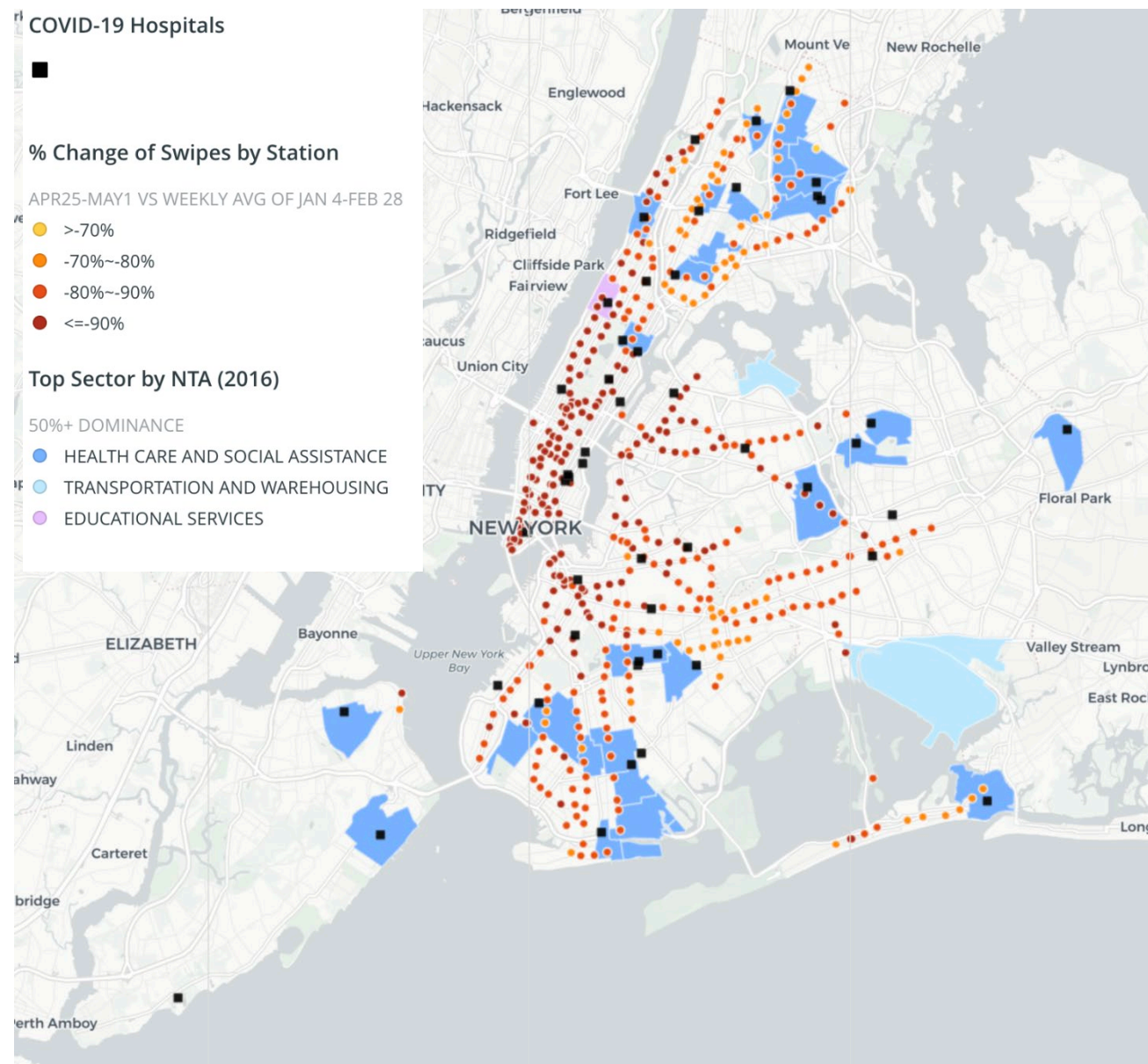
MetroCard swipes and where healthcare workers live



- We're beginning to explore the economic and demographic landscape of where subway ridership is relatively high.
- Certain neighborhoods of the city have particularly high rates of the workforce employed in essential industries.
- Parts of the Bronx, eastern Queens, and eastern Brooklyn have up to a third of all workers employed in healthcare. These areas coincide with areas where subway ridership declines have been less dramatic.
- Healthcare workers may be employed in hospitals, or may be continuing to report to work at nursing homes, as home health aides, or in other medical settings.

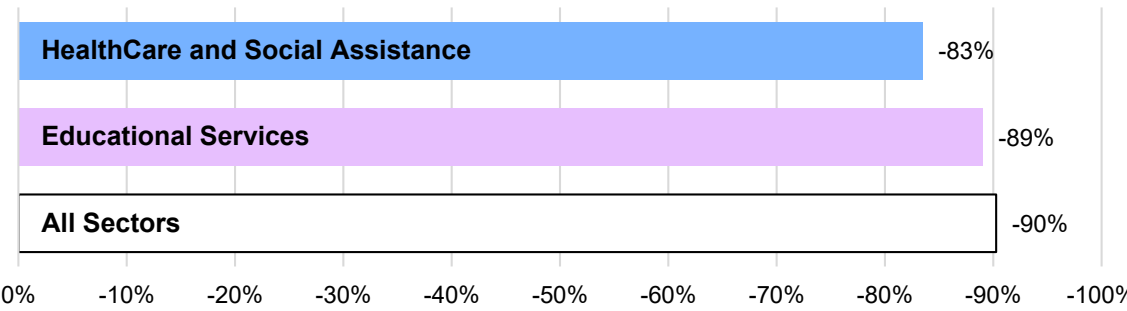
Data sources: MTA Fare Data (<http://web.mta.info/developers/fare.html>); 2014-2018 ACS, healthcare & social assistance workers over total employed civilians over 16 years old Table number: S2403INDUSTRY BY SEX FOR THE CIVILIAN EMPLOYED POPULATION 16 YEARS AND OVER

MetroCard Swipes and Healthcare Jobs – Place of Work



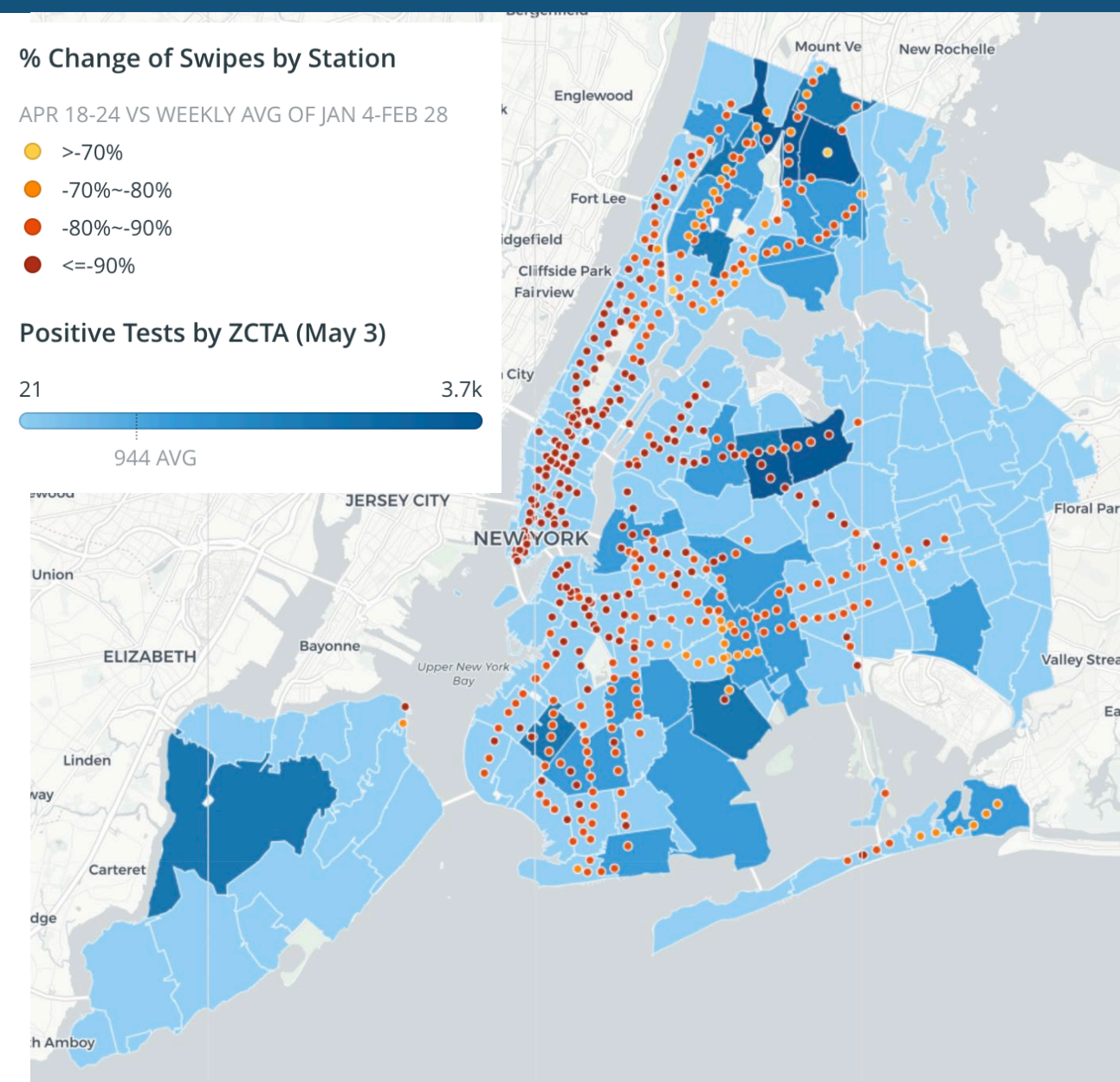
- This map shows neighborhoods where more than half of the jobs within the neighborhood are within a single sector. Most of these are in healthcare or social assistance.
- These neighborhoods contain or are near hospitals that are currently accepting suspected COVID19 patients.
- As essential workers continue to travel to work, subway ridership declines have been extreme, but still less pronounced, in many of these neighborhoods.

% Change of Subway Swipes by Dominant Sectors in NTAs



Data sources: MTA Fare Data (<http://web.mta.info/developers/fare.html>); DCP Housing Economic Development division, QCEW 2016 (3rd Quarter), geocoded private, non-headquartered firms

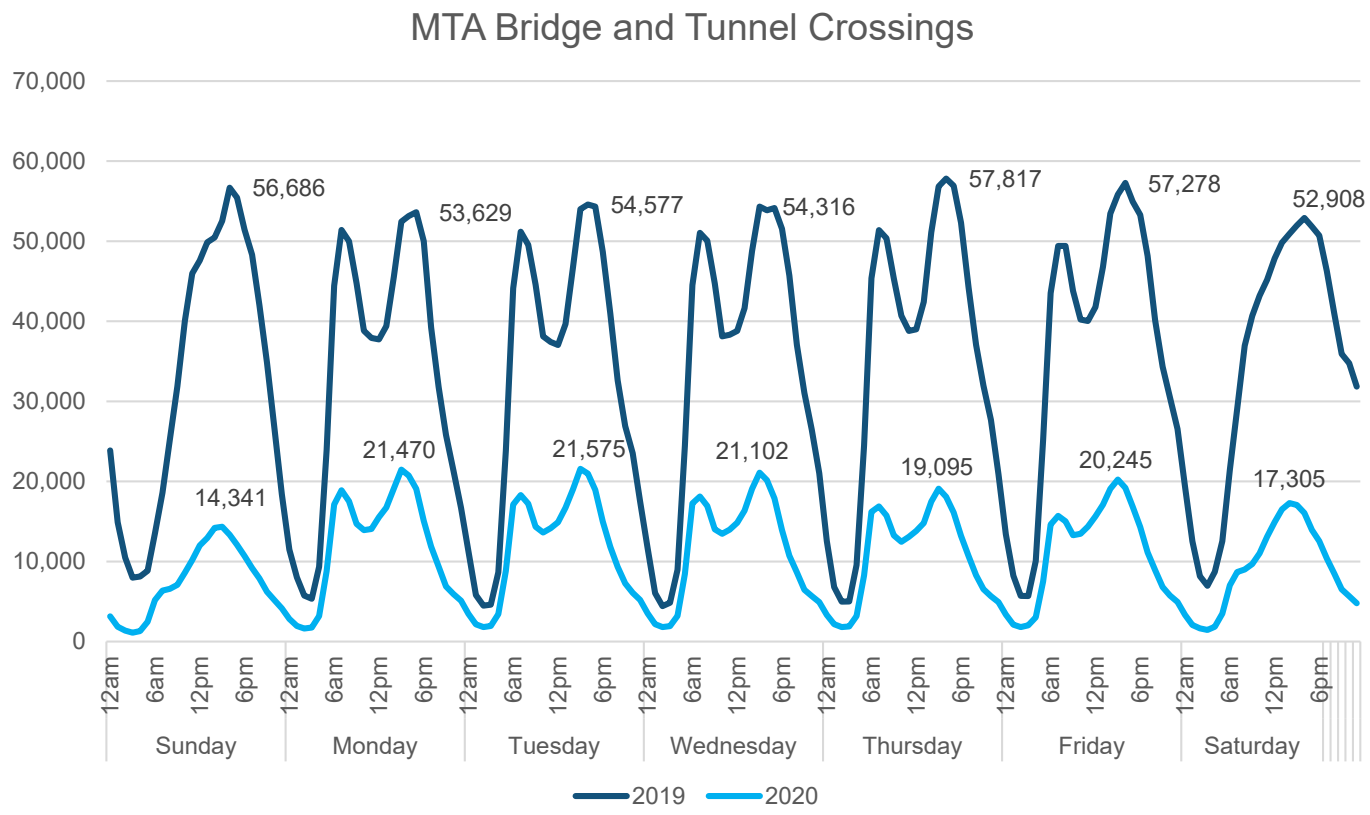
Transit Ridership and COVID19 Positive Tests



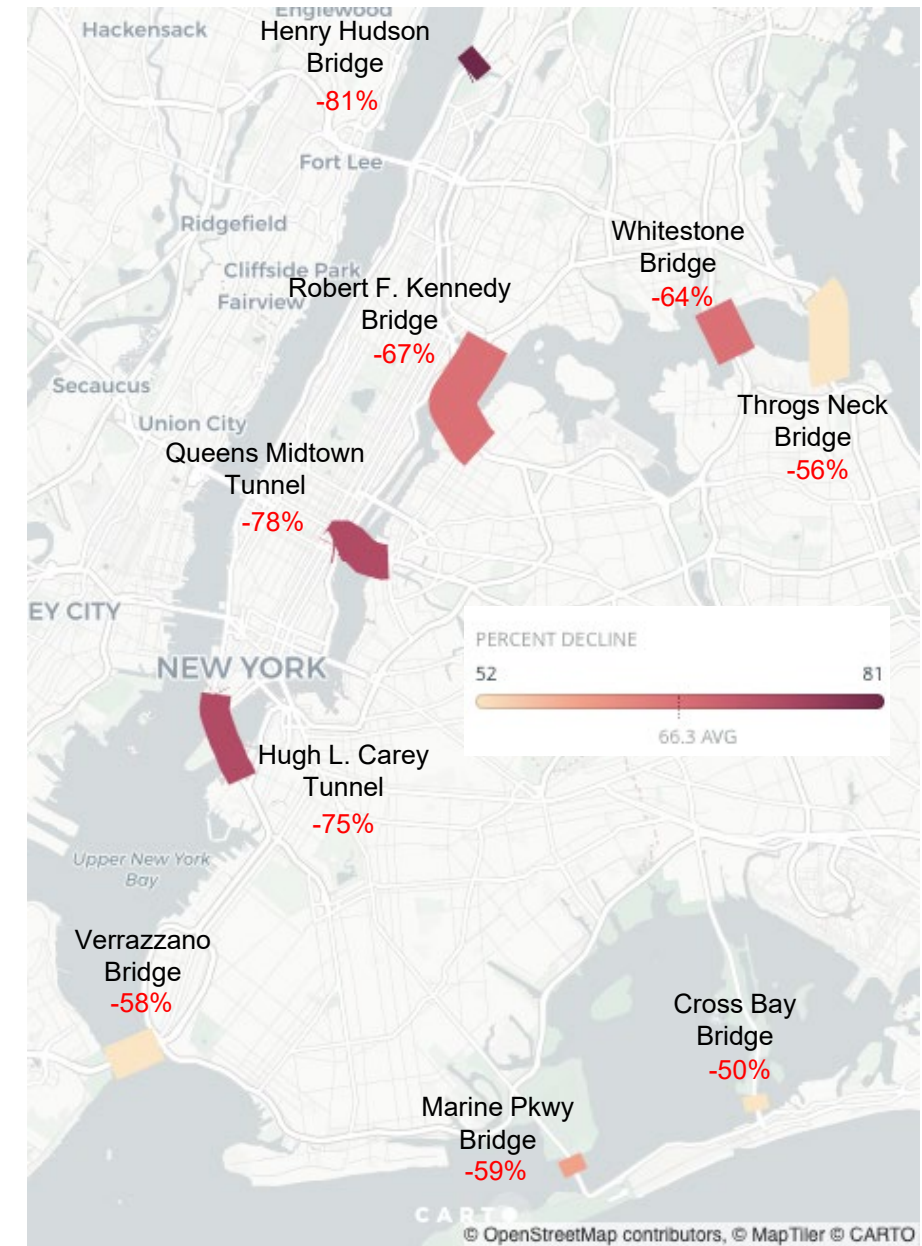
- Some neighborhoods in the city with the lowest decline in subway ridership also show the highest numbers of confirmed positive COVID19 cases.
- Areas with the highest number of confirmed cases (shown in dark blue) and the least change in ridership (shown in lighter orange) include Borough Park and East New York in Brooklyn, and the Morris Heights and Williamsbridge areas in the Bronx.

Roads

MTA Bridge and Tunnel Crossings



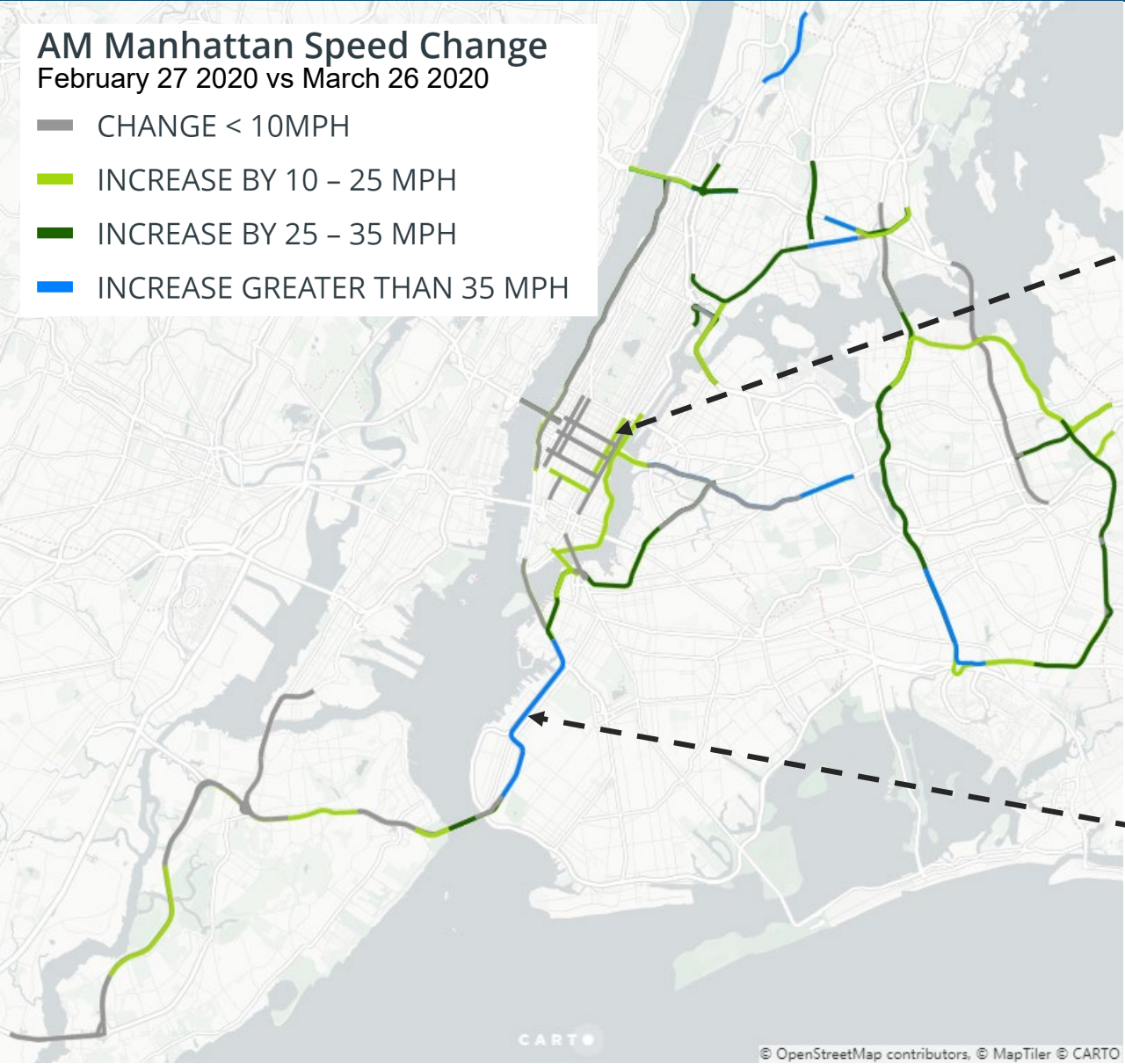
- Traffic volumes at all MTABT crossings during the first full week in April 2020 are down by over 50 percent from what they were the same week in 2019.
- The map at the right shows the percentage decline in volume for each bridge on Wednesday of the corresponding week.



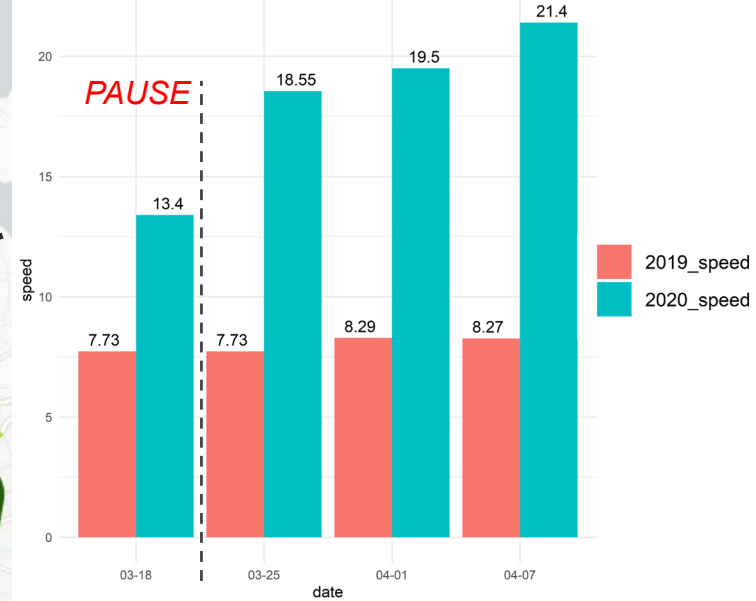
NYC AM Peak Road Speed Change

AM Manhattan Speed Change February 27 2020 vs March 26 2020

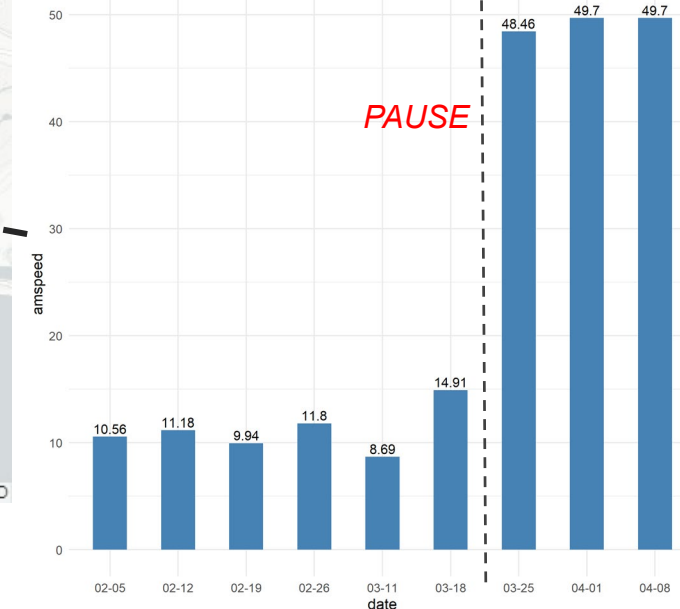
- CHANGE < 10MPH
- INCREASE BY 10 – 25 MPH
- INCREASE BY 25 – 35 MPH
- INCREASE GREATER THAN 35 MPH



MN 2nd Ave btwn 57th and 23rd streets (SB)



BK BQE btwn N7th and 9th streets (NB)



AM Peak (6:30-9:30)

Since the stay at home order was put in place, there has been an average 57% increase in speeds* for the roads shown on the map.

Manhattan's 2nd Avenue speeds averaged more than 21mph on April 7 2020 versus only 8mph one year ago.

Speeds on the BQE jumped from about 15mph to nearly 50mph pre- and post-PAUSE (3/22/2020).

* $(\text{Weighted speed} = \frac{\text{Sum}(\text{speed } 1\text{st} * \text{length } 1\text{st} + \dots + \text{speed } n\text{th} * \text{length } n\text{th})}{\text{Sum}(\text{length } 1 + \dots + \text{length } n\text{th})})$

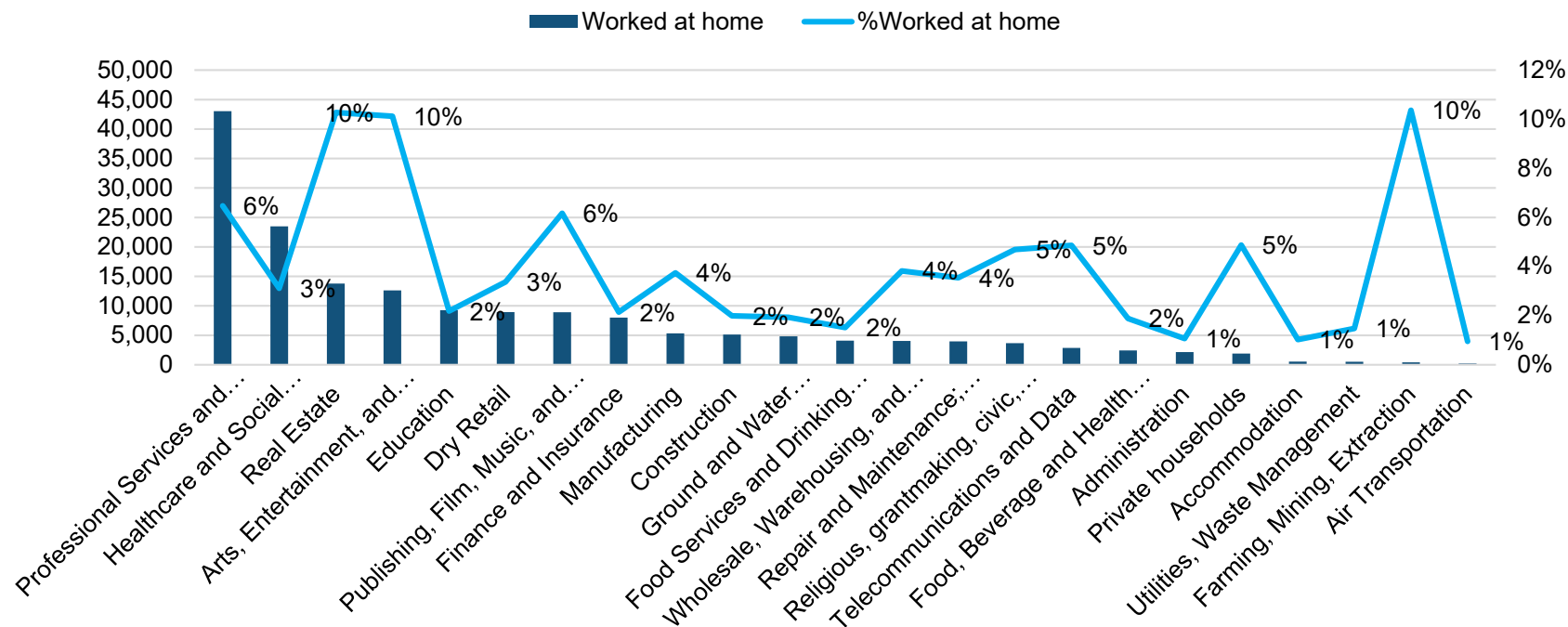
Interactive map: [NYC Road Speed Change\(03-26 vs 02-27\)](#)

Data Source: NYC DOT

Pre-COVID19 Working at Home by Industry

Professional Services and Management, Healthcare and Social Assistance, Finance and Insurance have the highest numbers of workers working at home, while **Real Estate** and **Arts, Entertainment, and Recreation** have the highest percentages of workers who worked at home.

Workers Who Worked at Home by Industry

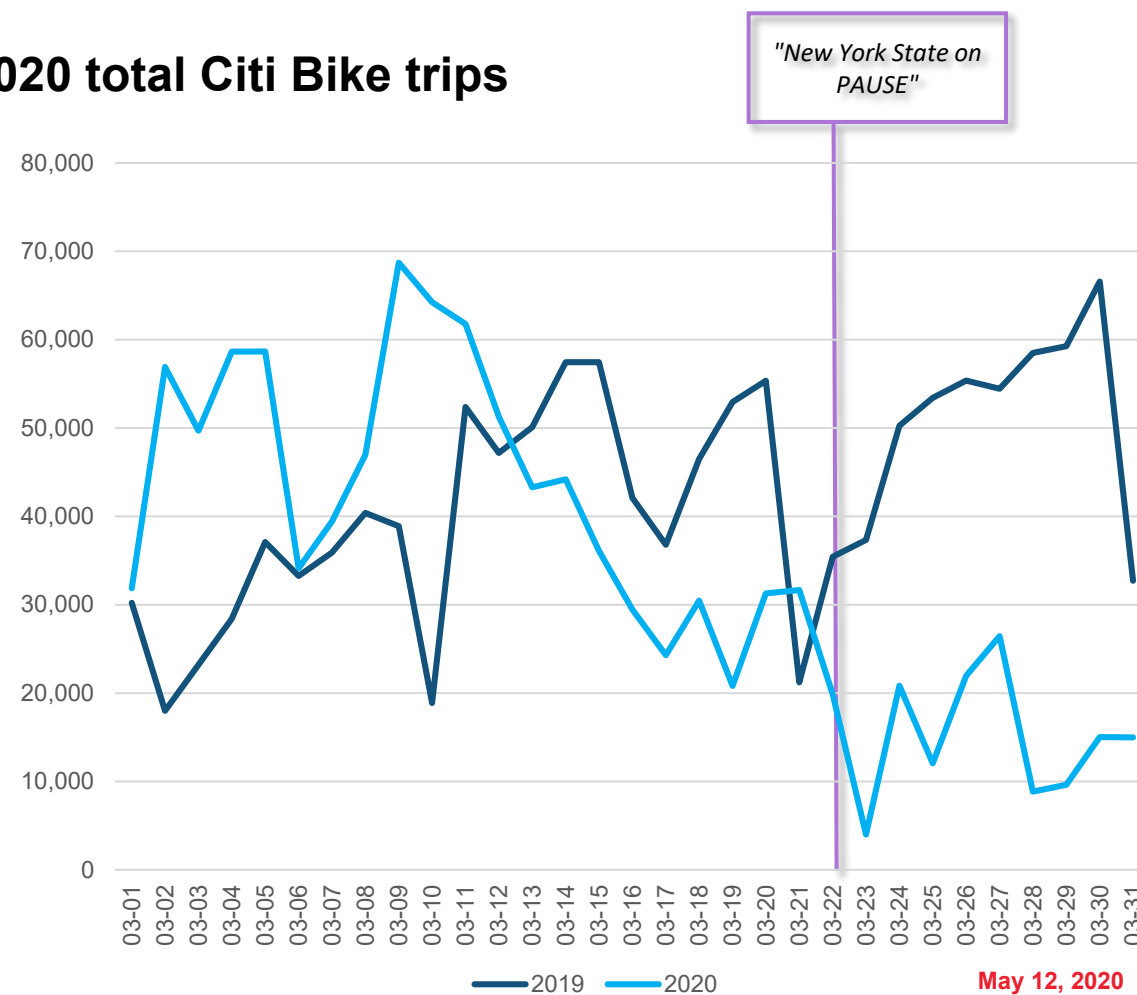
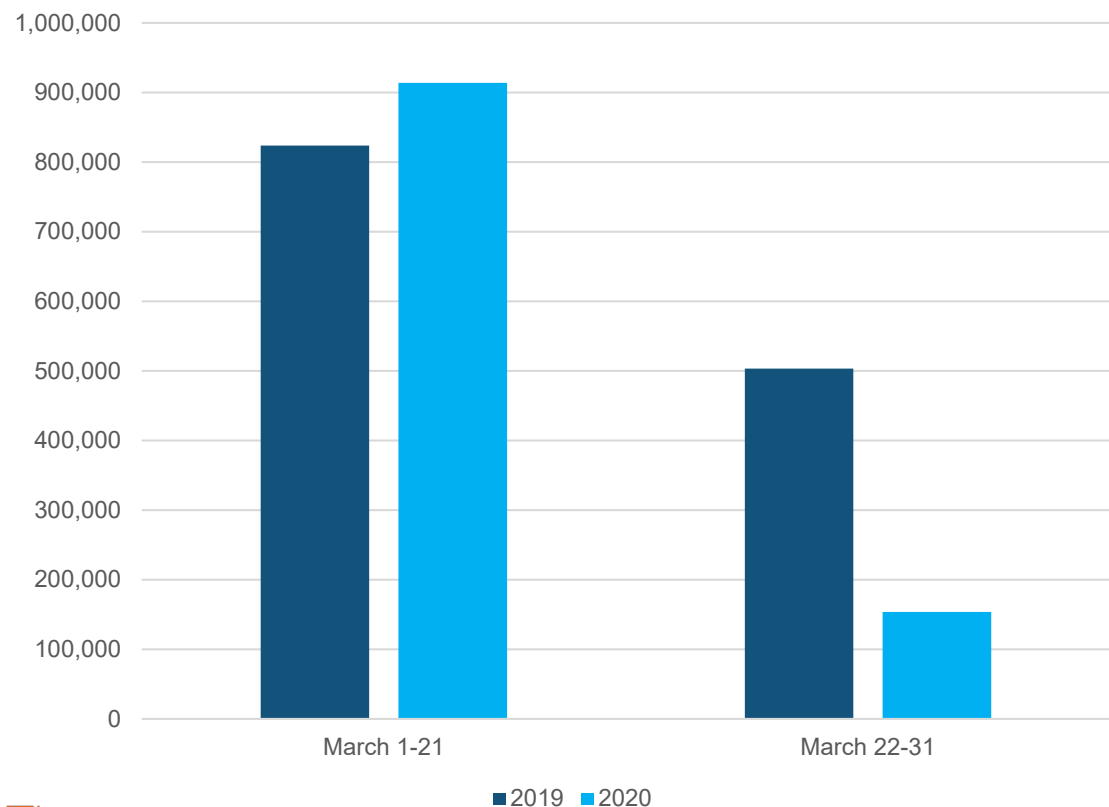


Industry	Worked at home	%Worked at home
Professional Services and Management	43,042	6%
Healthcare and Social Assistance	23,498	3%
Real Estate	13,786	10%
Arts, Entertainment, and Recreation	12,613	10%
Education	9,269	2%
Dry Retail	8,940	3%
Publishing, Film, Music, and Broadcasting	8,918	6%
Finance and Insurance	8,016	2%
Manufacturing	5,344	4%
Construction	5,120	2%
Ground and Water Transportation	4,820	2%
Food Services and Drinking Places	4,105	2%
Wholesale, Warehousing, and Storage	4,041	4%
Repair and Maintenance; Laundry	3,974	4%
Religious, grantmaking, civic, professional, and similar organizations	3,660	5%
Telecommunications and Data	2,857	5%
Food, Beverage and Health Retail	2,433	2%
Administration	2,156	1%
Private households	1,893	5%
Accommodation	532	1%
Utilities, Waste Management	527	1%
Farming, Mining, Extraction	406	10%
Grand Total*	170,161	3.7%

Citi Bike Trip Totals

- The week of March 2020 saw higher daily ridership totals than the first week of March 2019.
- Following a peak of nearly 70,000 riders on March 10, 2020, ridership steadily declined.
- With the exception of one poor weather day in March 2019, daily ridership totals from March 11 were lower in 2020 than they were in 2019.
- Weather plays a lead role in daily variations.

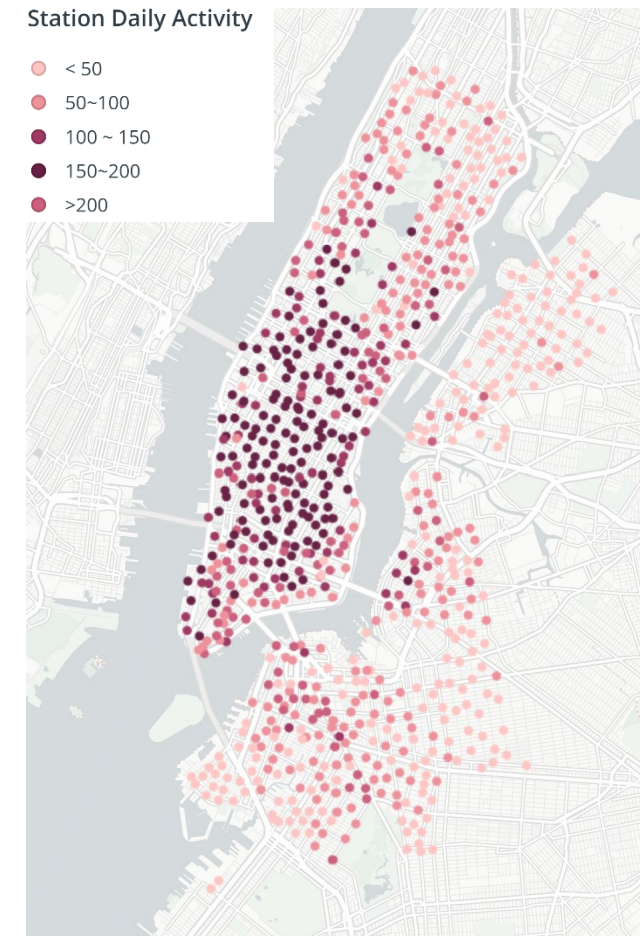
March 2019 vs March 2020 total Citi Bike trips



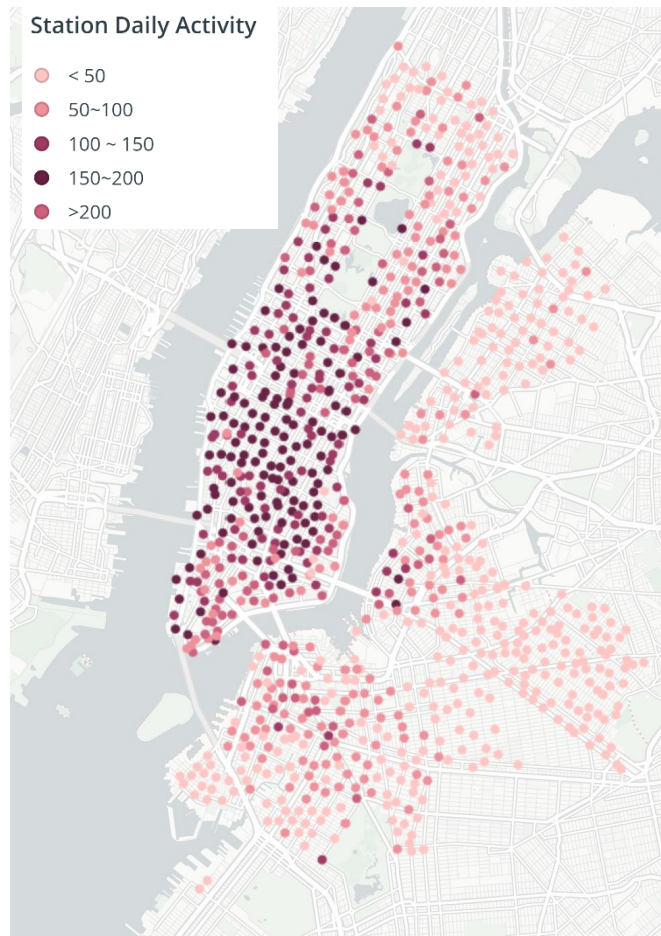
Overall Citi Bike Station Daily Activity

Station Activity : Pick ups & Drop offs

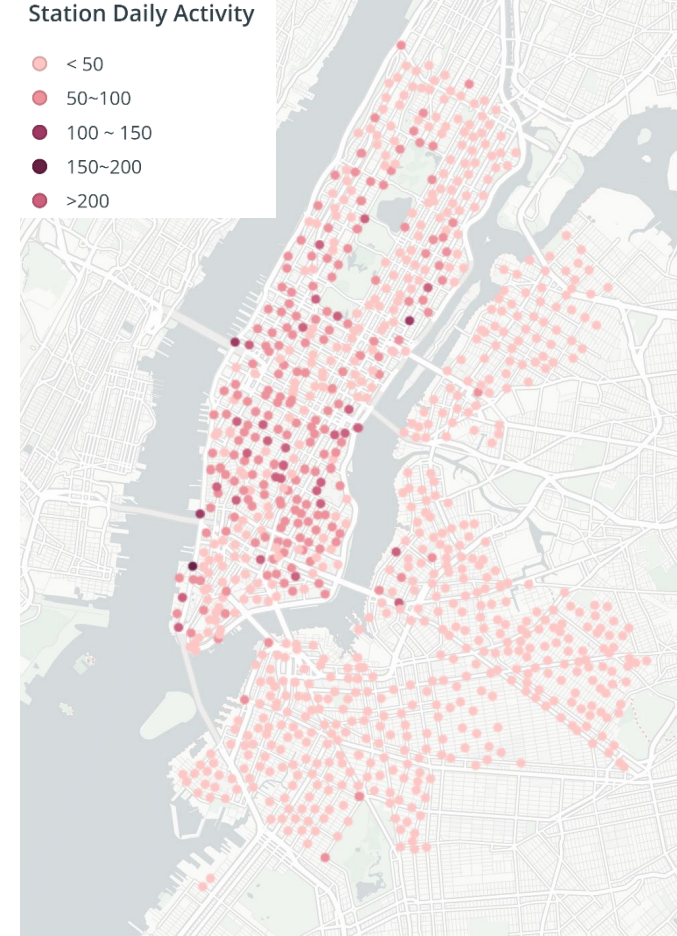
March 1-31 2019



March 1-21 2020



March 22-31 2020



- Early March ridership patterns were similar in 2019 and 2020
- Average daily activity at each docking station dropped dramatically post-PAUSE

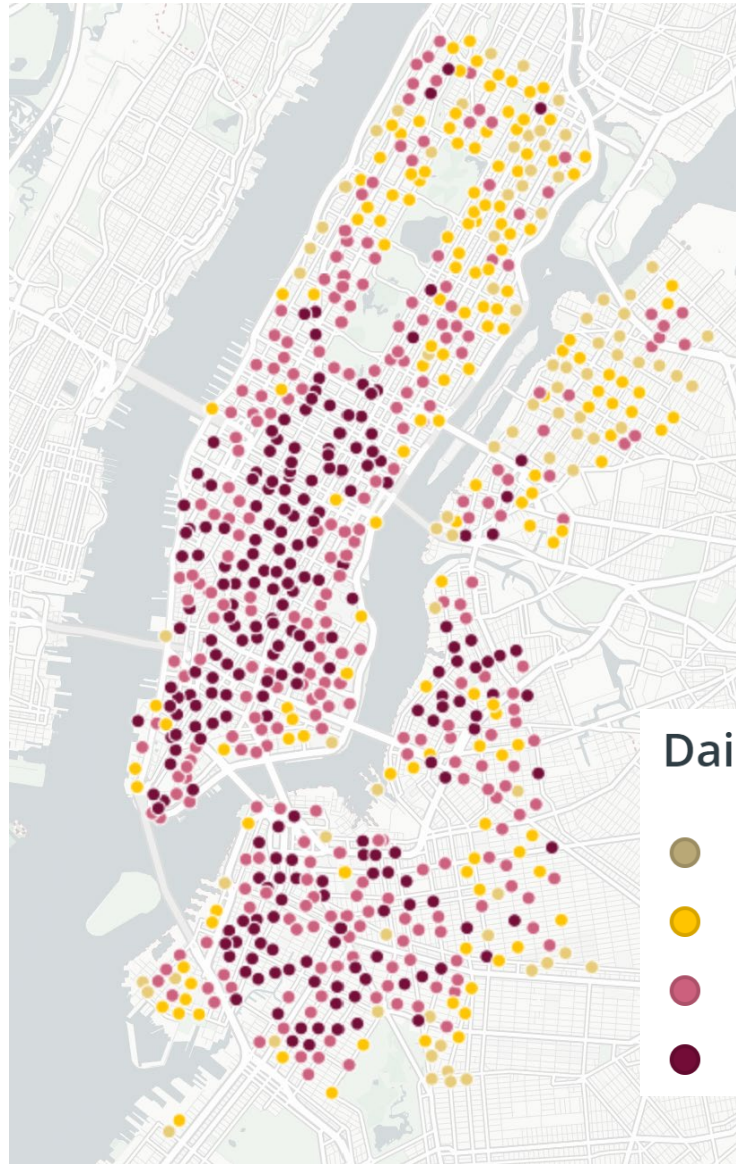
Citi Bike Station Daily Activity Change After Pause VS. 2019

Station Activity : Pick ups & Drop offs

Average Daily Activity Change by Station (Mar-22 ~ Mar-31 2020 vs. March 2019)

Top 10: Average daily change in bike pick-ups and drop-offs

(Grand Central) Pershing Square North	-618
(Penn Station) 8 Ave & W 31 St	-474
Broadway & E 22 St	-406
E 17 St & Broadway	-388
W 21 St & 6 Ave	-387
8 Ave & W 33 St	-373
E 47 St & Park Ave	-335
Broadway & E 14 St	-326
W 38 St & 8 Ave	-319
W 31 St & 7 Ave	-315



- Under the PAUSE, average daily station activity is less than half of what it was in March 2019.
- Stations on the periphery have seen the least amount of change.

Daily Activity Percentage Change

- > -30%
- -30% ~ -50%
- -50% ~ -70%
- -70% ~ -90%

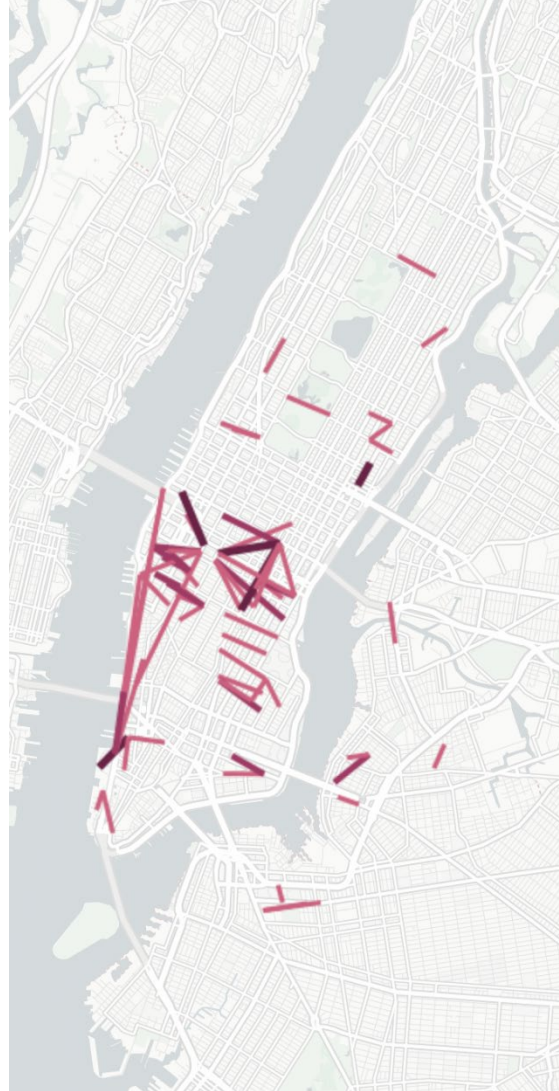
Origin Destination Trends- weekday

Origin Destination Average Daily Trips >10

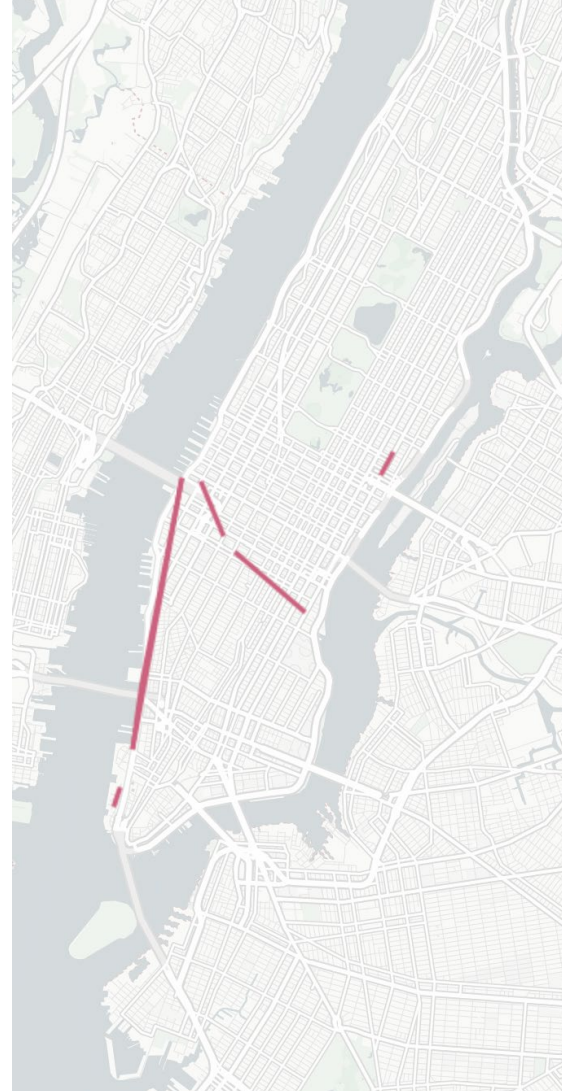
March 1-31 2019



March 1-21 2020



March 22-31 2020



- Recurrent O/D pairings in March of 2019 were less frequent in the first few weeks of March 2020 and disappeared almost entirely under the PAUSE.
- Certain cross-town routes, and the west side greenway remain as O/D pairings that saw an average of more than 10 trips per day under the PAUSE.

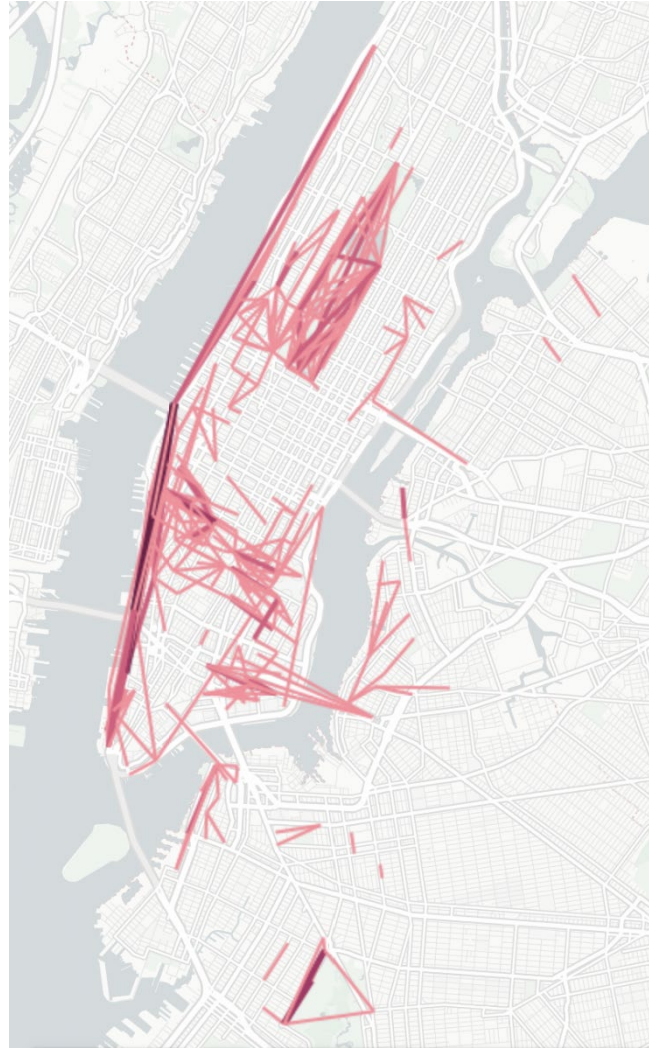
Origin Destination Trends- Weekend

Origin Destination Average Daily Trips >5

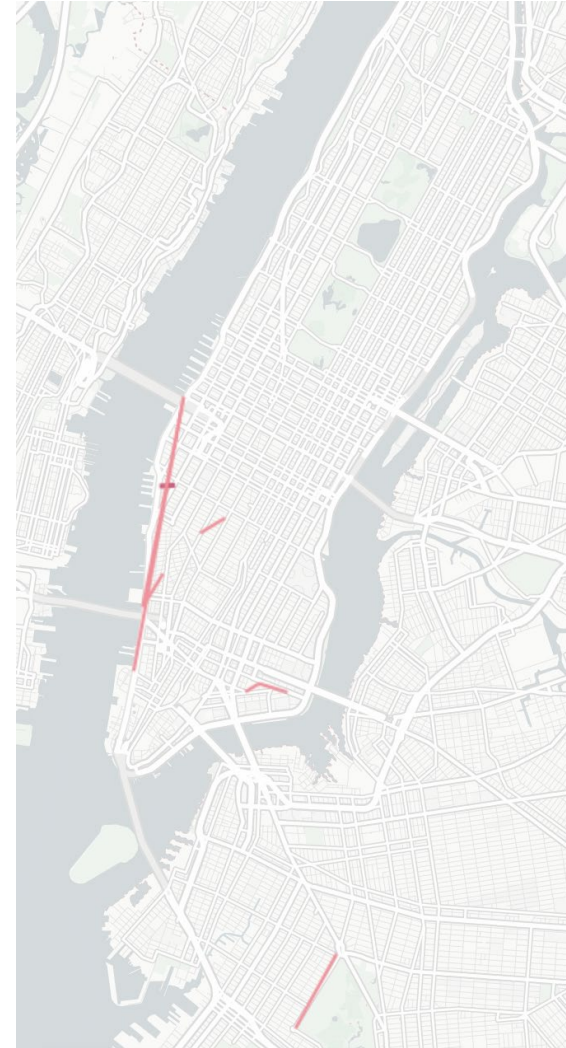
March 1-31 2019



March 1-22 2020



March 23-31 2020



- Under normal conditions, weekend Citi Bike ridership routes appear more recreation- and entertainment-based.
- Under the PAUSE, the most common weekend O/D pairings include the same West Side Greenway route as appears during weekdays, and the route along Prospect Park West, in Brooklyn.

COVID-19 Hospital Station Activity Analysis

- We assumed a 1000' walk distance threshold to find a Citi Bike for any journey that starts or ends at a hospital. There are 32 Citi Bike stations in range.
- The average number of daily Citi Bike drop-offs and pick-ups was much lower in March 2020 vs March 2019, and the morning peak has shifted from 8am to 7am. The distribution of trips across the day is also much smoother than it was over the same period in 2019.

2020 After-Pause

+

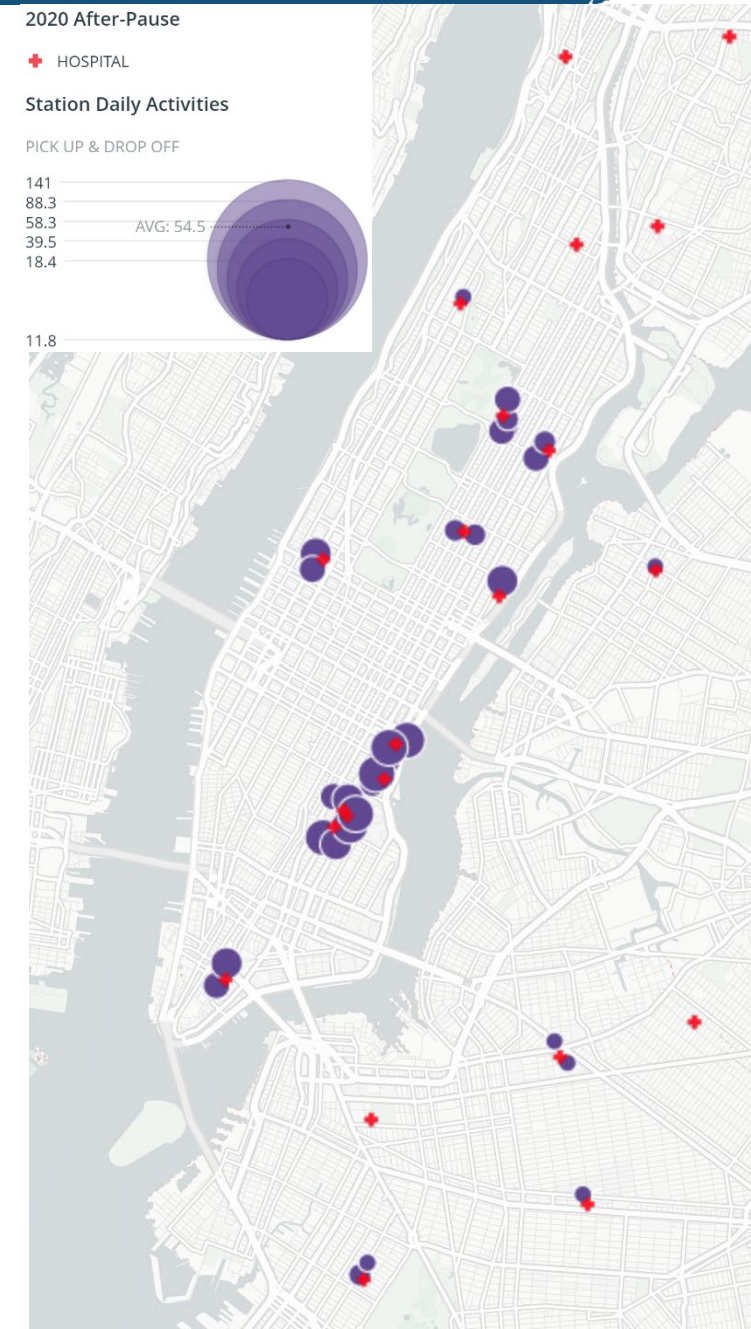
Station Daily Activities

PICK UP & DROP OFF

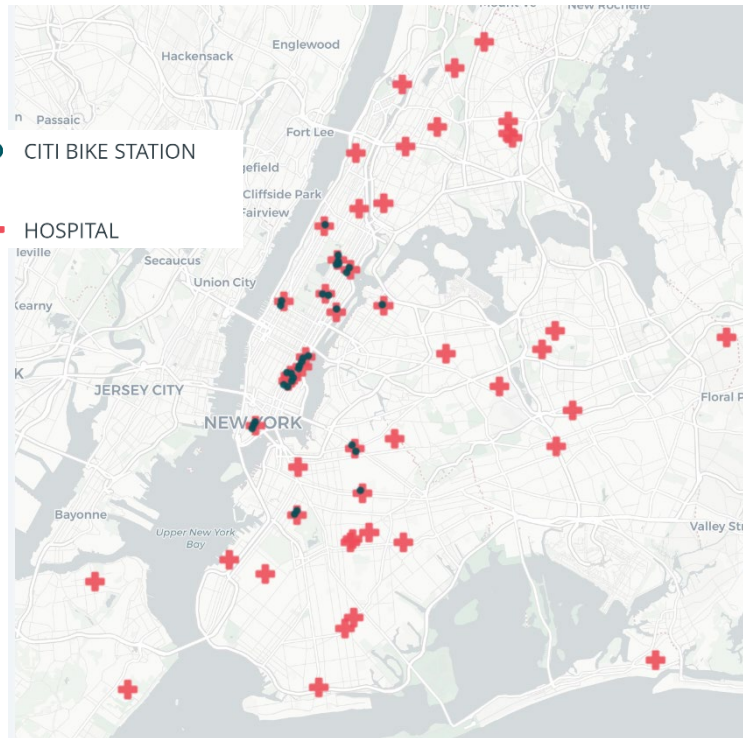
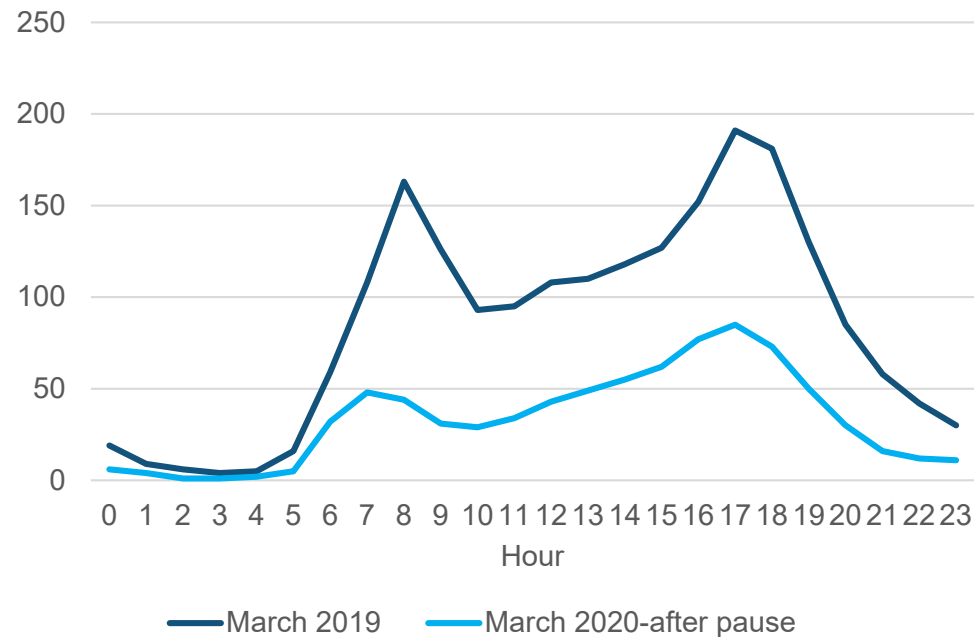
141
88.3
58.3
39.5
18.4

AVG: 54.5

11.8



Average Daily Drop offs & Pick ups from stations within range of hospitals



Workforce



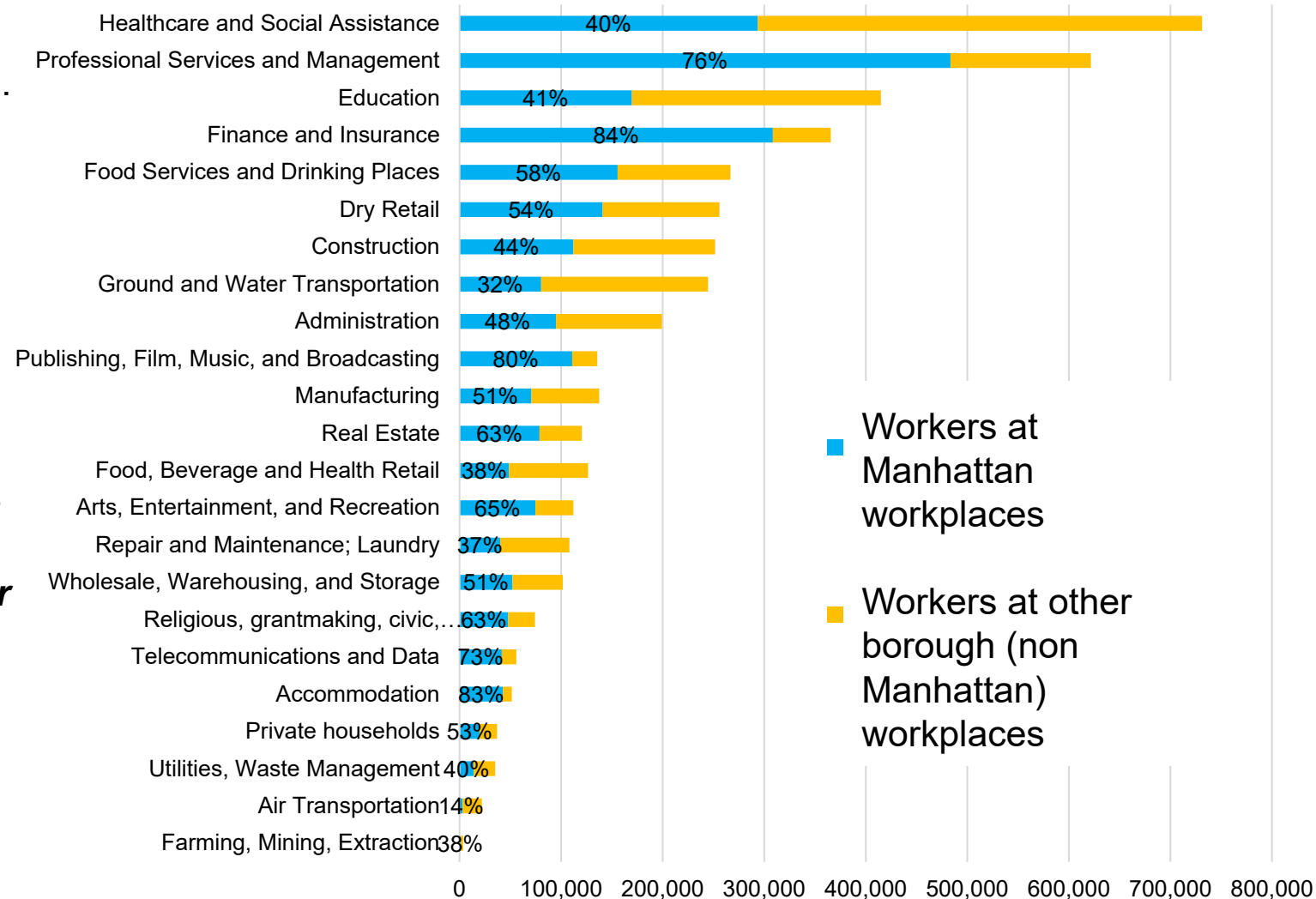
Looking at how workers commuted pre-COVID may help inform our planning around a shift from PAUSE to “GO”.

- What industries tend to cluster in the Manhattan Core, where transportation capacity constraints may be most pronounced?
- Pre-COVID, how did commutes vary by different economic sectors? What sectors tend to commute by what modes? And to where?
- Who will the first wave of commuters post-PAUSE be? Based on past patterns, what are their commute preferences likely to be?
- What economic sectors are best able to continue teleworking?

According to ACS PUMS data, **Healthcare and Social Assistance** is the largest employment sector in NYC, with more than 750,000 workers. Forty percent of these workers work in Manhattan.

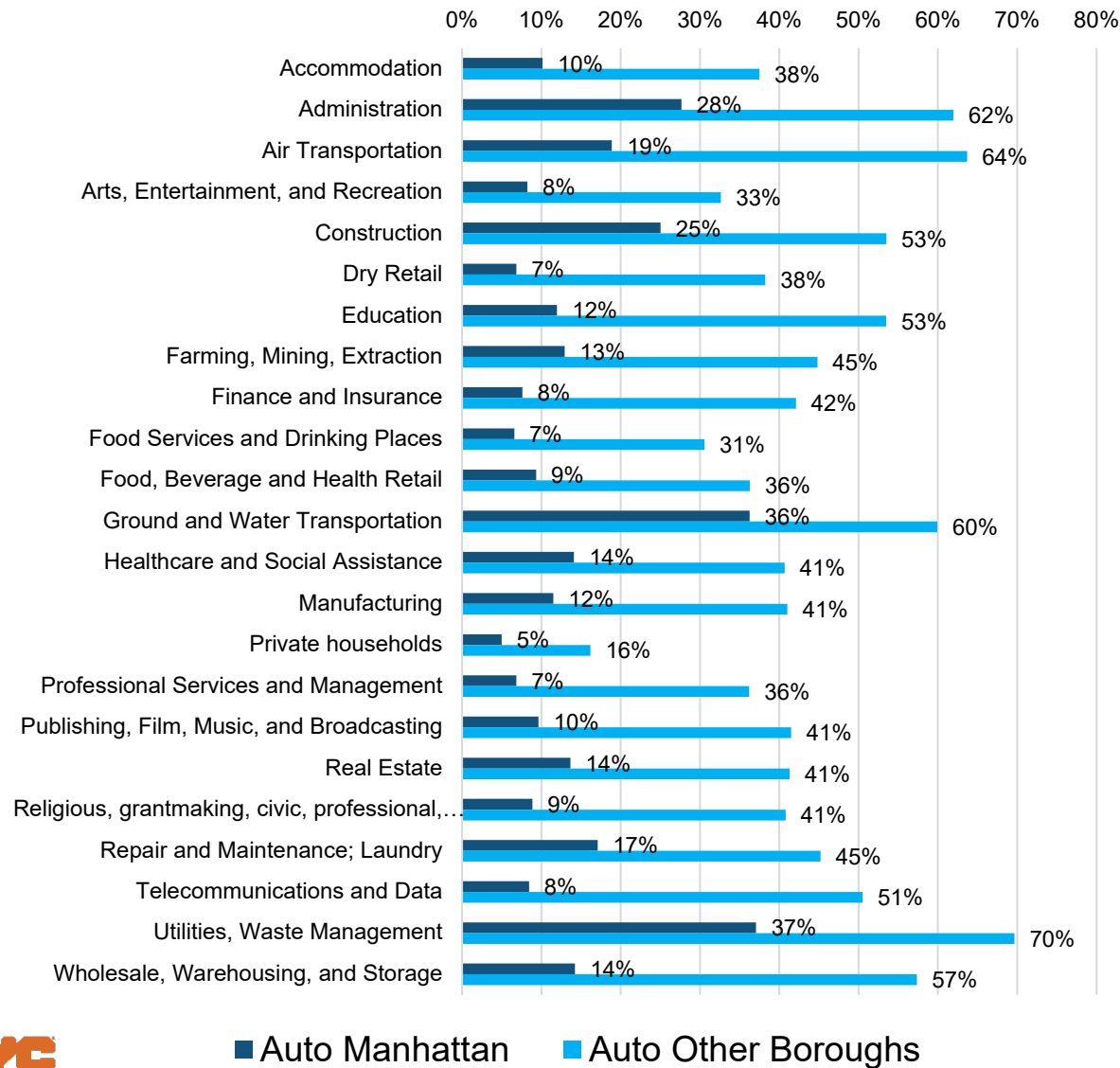
Finance and Insurance (84%), **Accommodation (83%)**, **Professional Services and Management (76%)** have the highest percentages of workers commuting to Manhattan; whereas **Air Transportation (14%)**, and **Ground and Water Transportation (32%)** have the least.

Workers by Industry by Place of Work



Pre-COVID Commute Patterns by Industry: Automobile

**Percentage of Commute Trips by Auto
(Manhattan-bound vs. Other Borough-bound)**



Workers in some industries tend to commute by car more than others, including ***Utilities, Warehousing and Storage, Administration, Air Transportation, and Ground and Water Transportation.***

The destination has shown a great impact on the percentage of driving to work across all industries. Manhattan-bound commute trips are usually much less likely made by car (**12% overall**) than commute trips to other boroughs (**45% overall**).

However, the impact of work destination on driving to work is least on ***Ground and Water Transportation, and Utilities, Warehousing and Storage.***

Data source: 2014-2018 PUMS.

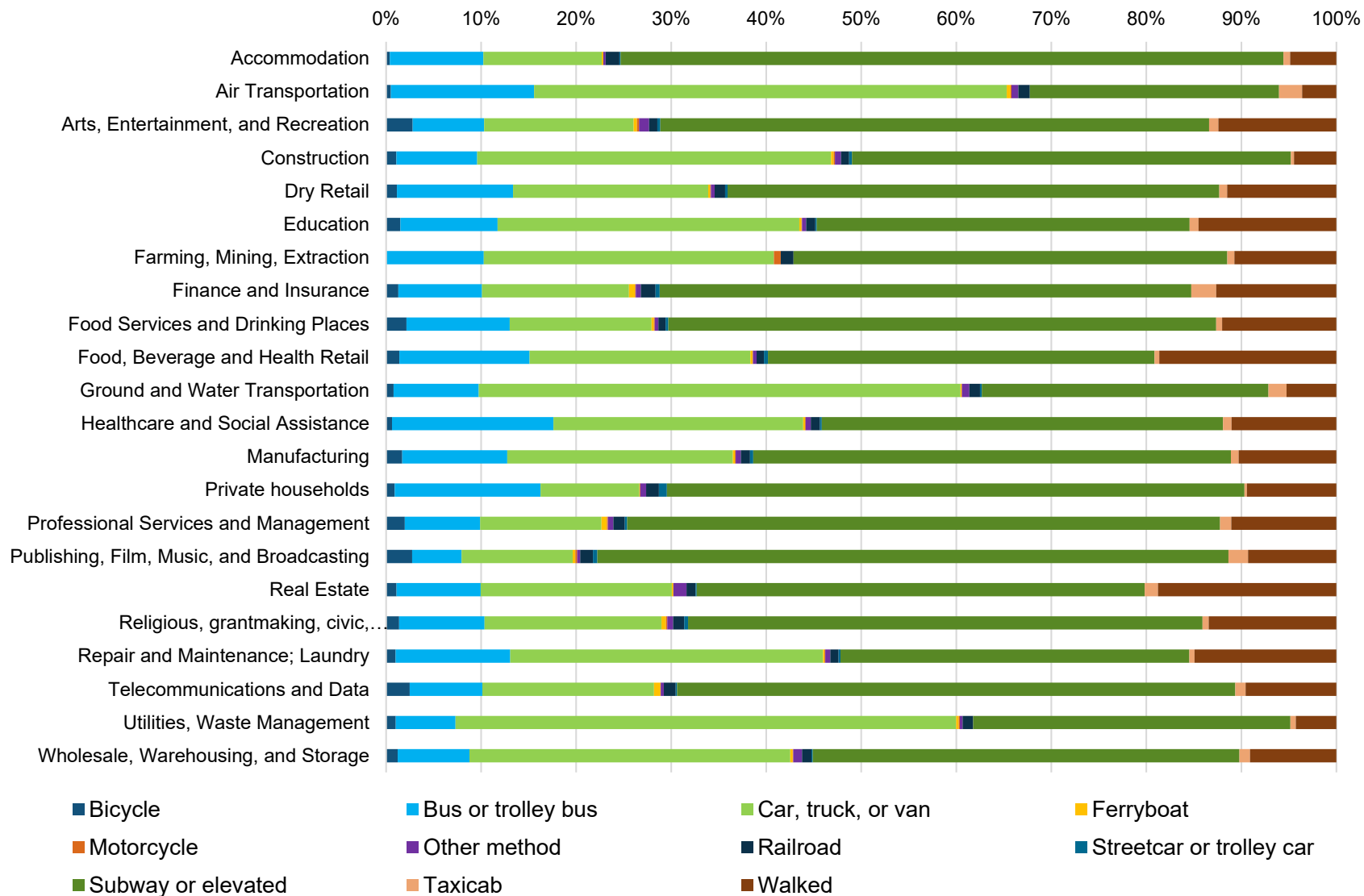
Note: Universe is all workers in NYC, who lived in the region (CT, NJ, NY, PA).

Pre-COVID19 Commute Mode by Industry



Means of Transportation to Work by Industry

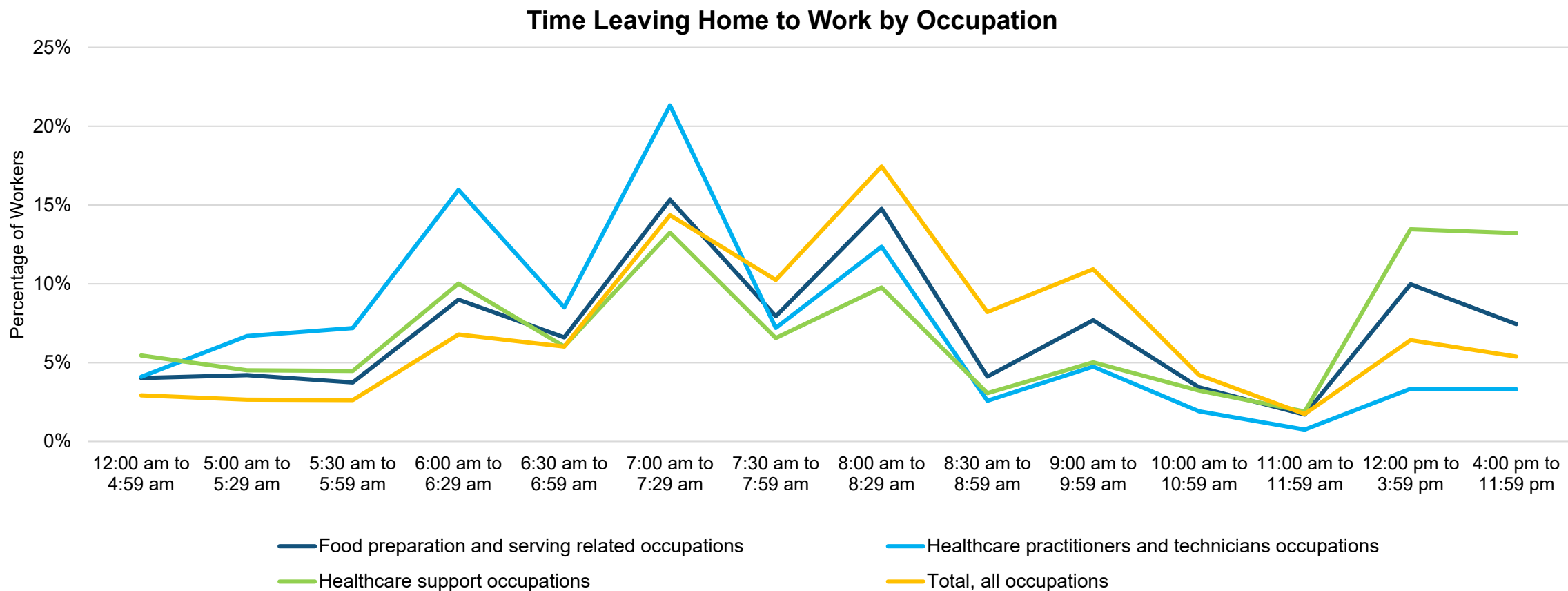
(Universe: Workers who didn't work at home)



- Subway is the primary commute mode for most industries, except **Air Transportation, Ground and Water Transportation, and Utilities, Waste Management**, which are predominated by Auto.
- **Healthcare and Social Assistance** has the highest percentage of workers commuting by bus.

Pre-COVID19 Time Leaving Home to Work

- Compared to all occupations, this subset of essential worker occupations skews towards earlier departures for work, with **Healthcare Practitioners and Technicians** demonstrating the greatest tendency.
- A significant share of **Healthcare Support** and **Food Service** workers leave home to work in the afternoon.



Data source: 2012-2016 CTPP Table A102215 - Occupation (25) by Time leaving home (17) (Workers 16 years and over). Universe: NYC resident workers.

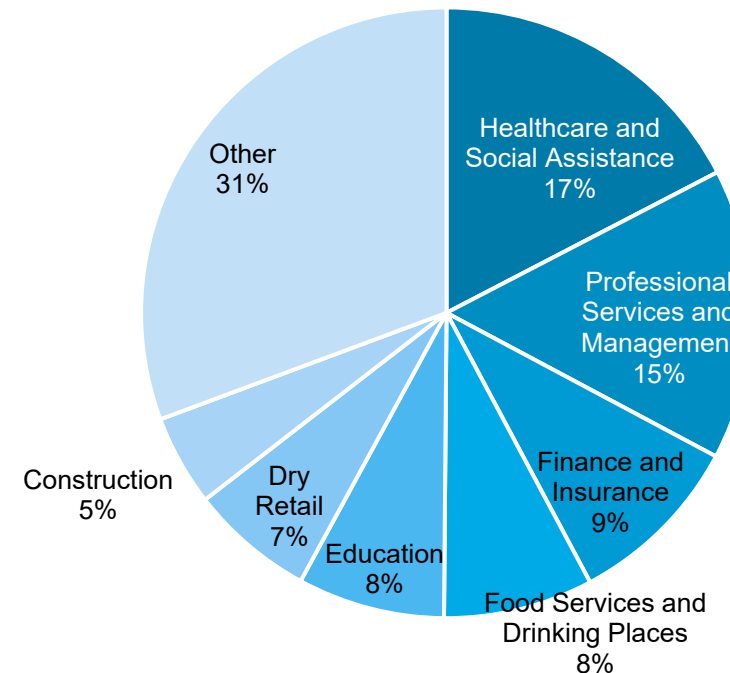
May 12, 2020

Pre-COVID19 Public Transportation Commuters by Industry

Industry	% Workers Using Public Transportation
Accommodation	81%
Private households	74%
Food Services and Drinking Places	69%
Publishing, Film, Music, and Broadcasting	67%
Professional Services and Management	66%
Telecommunications and Data	64%
Finance and Insurance	63%
Dry Retail	63%
Religious, grantmaking, civic, professional, and similar organizations	61%
Manufacturing	60%
Arts, Entertainment, and Recreation	59%
Healthcare and Social Assistance	58%
Construction	55%
Food, Beverage and Health Retail	55%
Wholesale, Warehousing, and Storage	51%
Farming, Mining, Extraction	50%
Education	49%
Real Estate	49%
Repair and Maintenance; Laundry	48%
Air Transportation	42%
Utilities, Waste Management	40%
Ground and Water Transportation	40%

- **Food Services and Drinking Places** are among the industries with highest percentage of workers commuting by public transportation.
- Although **Healthcare and Social Assistance** only has average share of workers commuting by public transportation, it makes up 17% of public transportation commuters, which is the highest among all industries.

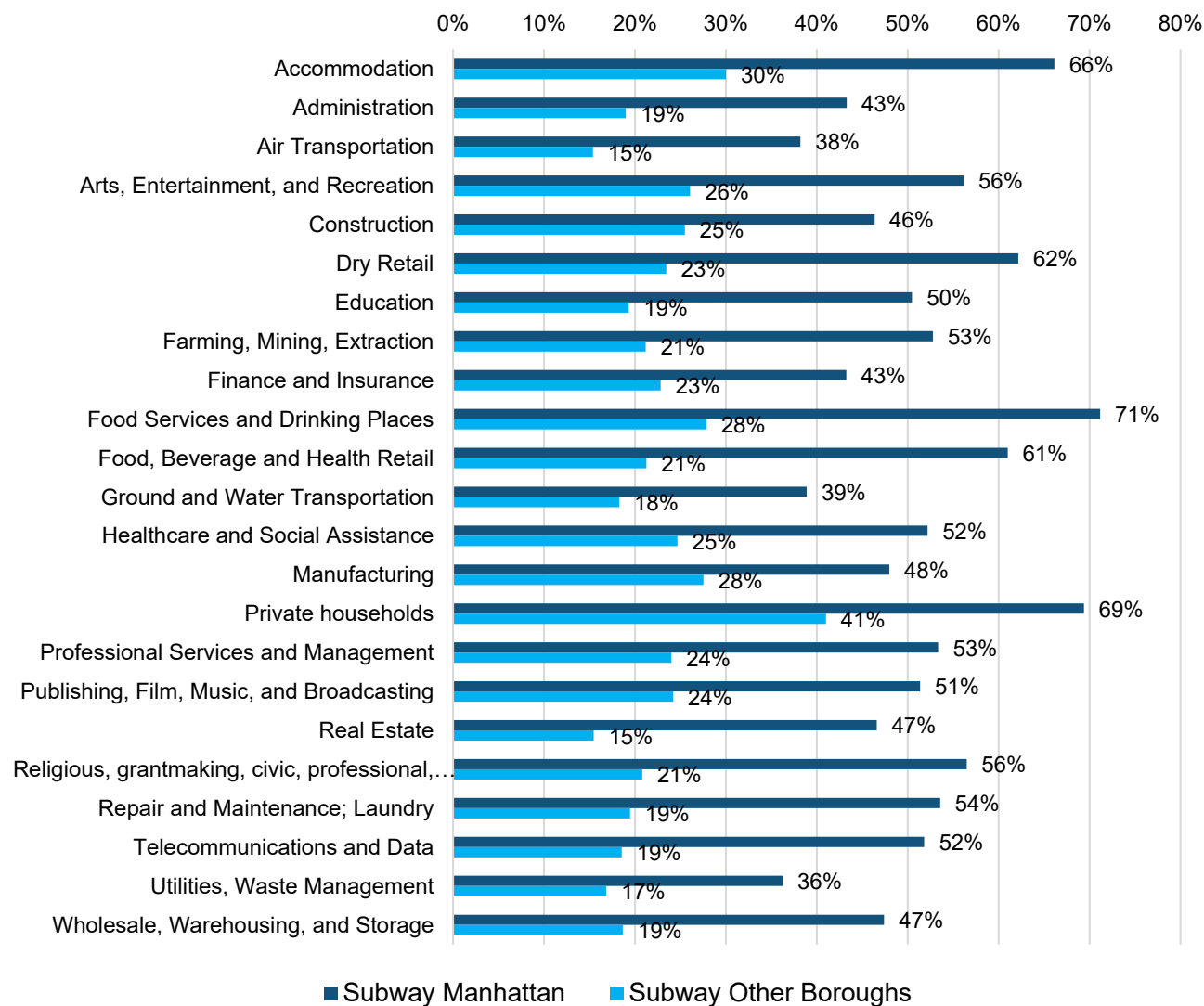
Public Transportation Commuters by Industry



56%
All worker average

Pre-COVID Commute Patterns by Industry: Subway

**Percentage of Commute Trips by Subway
(Manhattan-bound vs. Other Borough-bound)**



In general, subway is the predominate commute mode for workers in many industries, especially ***Food Services and Drinking Places, Private Households, Accommodation.***

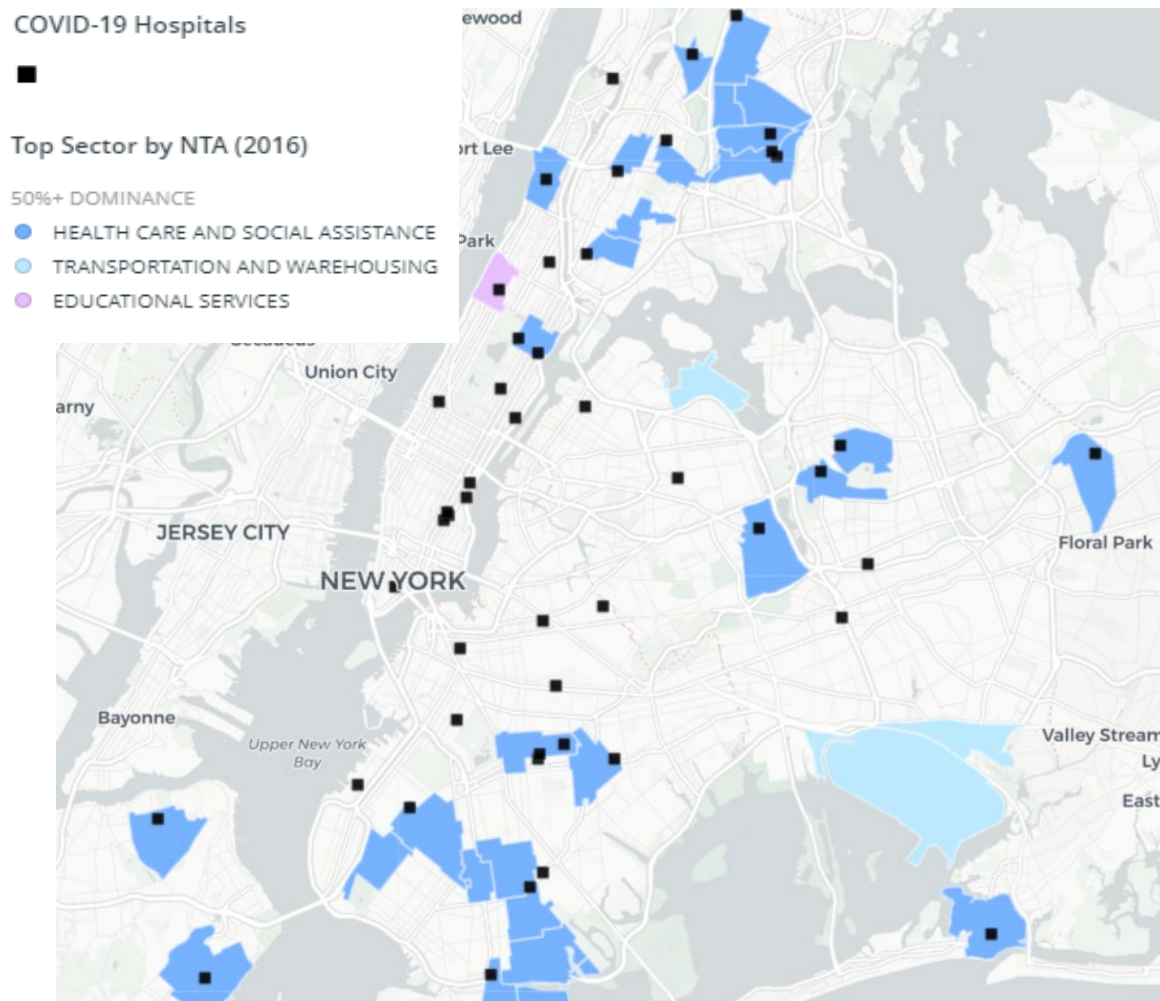
Like auto commute trips, the percentage of commuting by subway is also greatly affected by their commute destination. The overall percentage of commuting by subway is **52%** for Manhattan-bound trips and only **23%** for trips to the outer boroughs.

Data source: 2014-2018 PUMS.

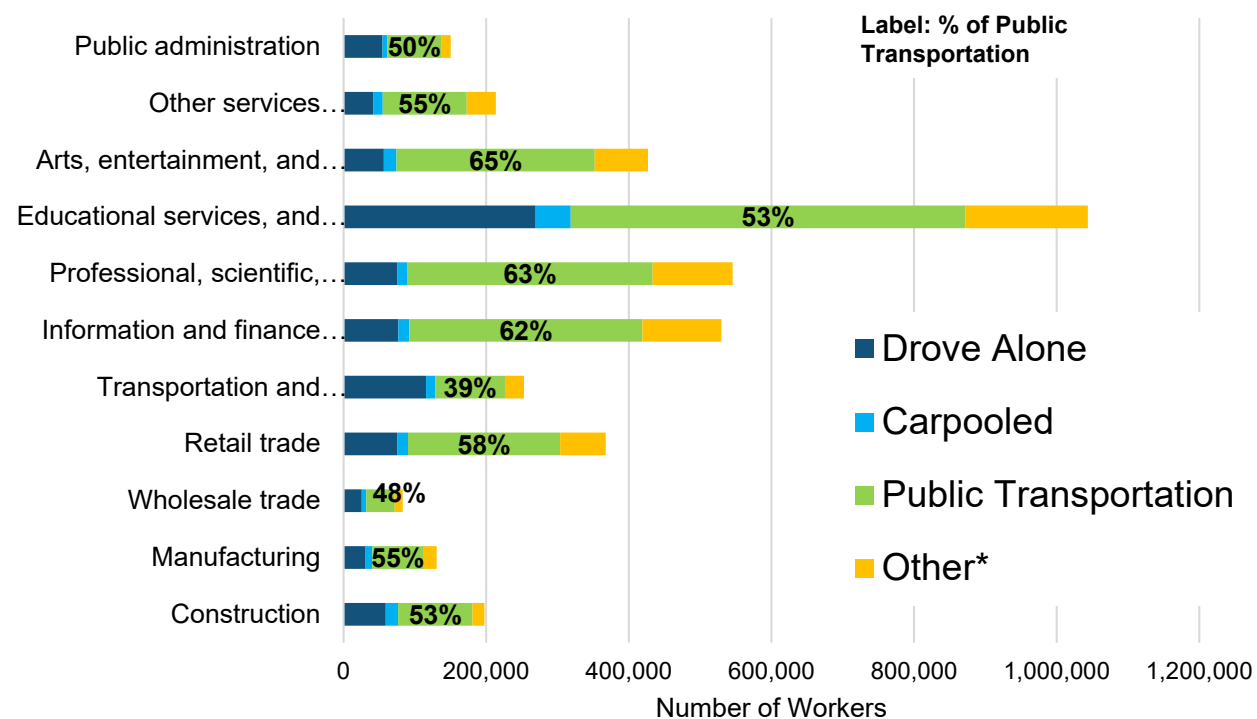
Note: Universe is all workers in NYC, who lived in the region (CT, NJ, NY, PA).

Means of Transportation to Work by Industry *Pre-COVID19*

Although the percentage of **educational service, health care and social assistance** workers who typically commute by public transportation to work (53%) is slightly lower than total worker average (56%), the actual number in that industry is still larger than any other industries in the City – **more than 500,000 workers (pre-COVID19)**.



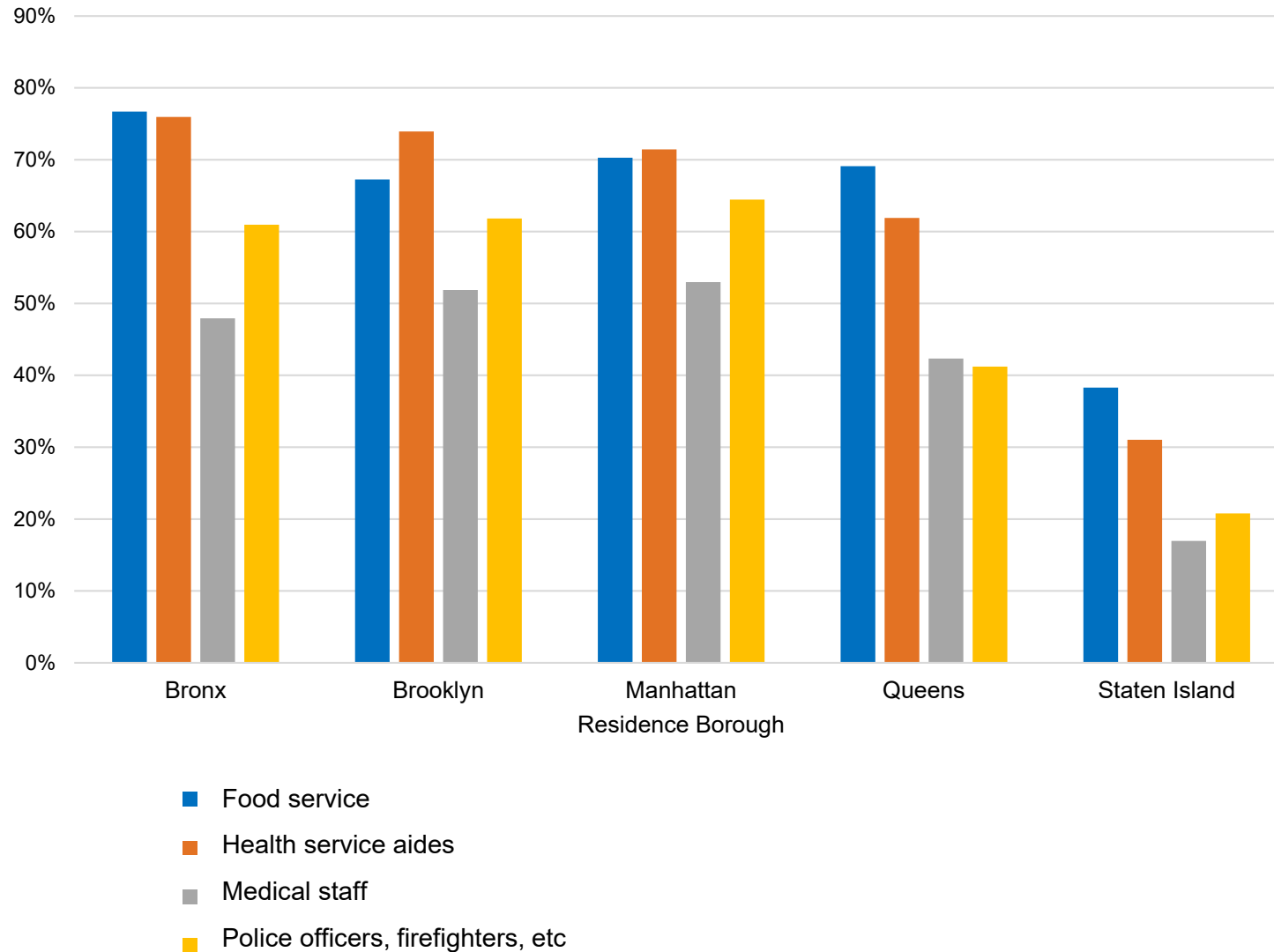
Means of Transportation to Work by Industry (Universe: NYC Resident Workers)



Note: Other mode is derived from total workers and workers using the 3 other modes.

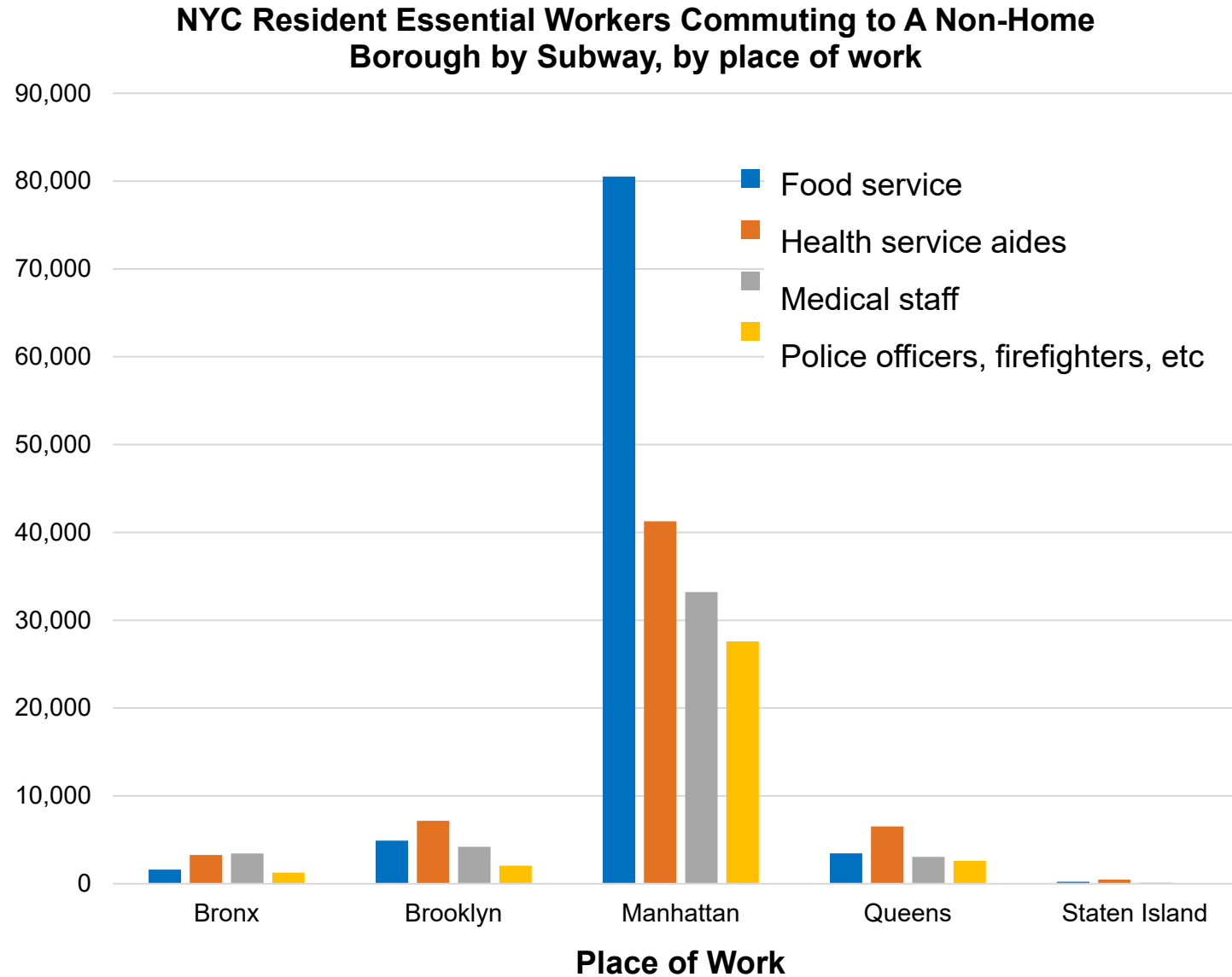
Essential Workers Commuting by Public Transportation *Pre-COVID 19*

**% Workers Commuting by Public Transportation,
by place of residence**



- Pre-COVID19 commuter patterns indicate differing dependence on public transportation across different sectors of the economy.
- Looking only at a subset of the essential workforce, we can see that food service workers and health care aides seem reliant on public transportation for getting to work, while medical staff, police, firefighters, etc. are less reliant on public transportation.
- This subset of workers who live on Staten Island appear least reliant on public transportation
- Expanding this analysis to include other non-essential sectors will help us plan for an economic reopening.

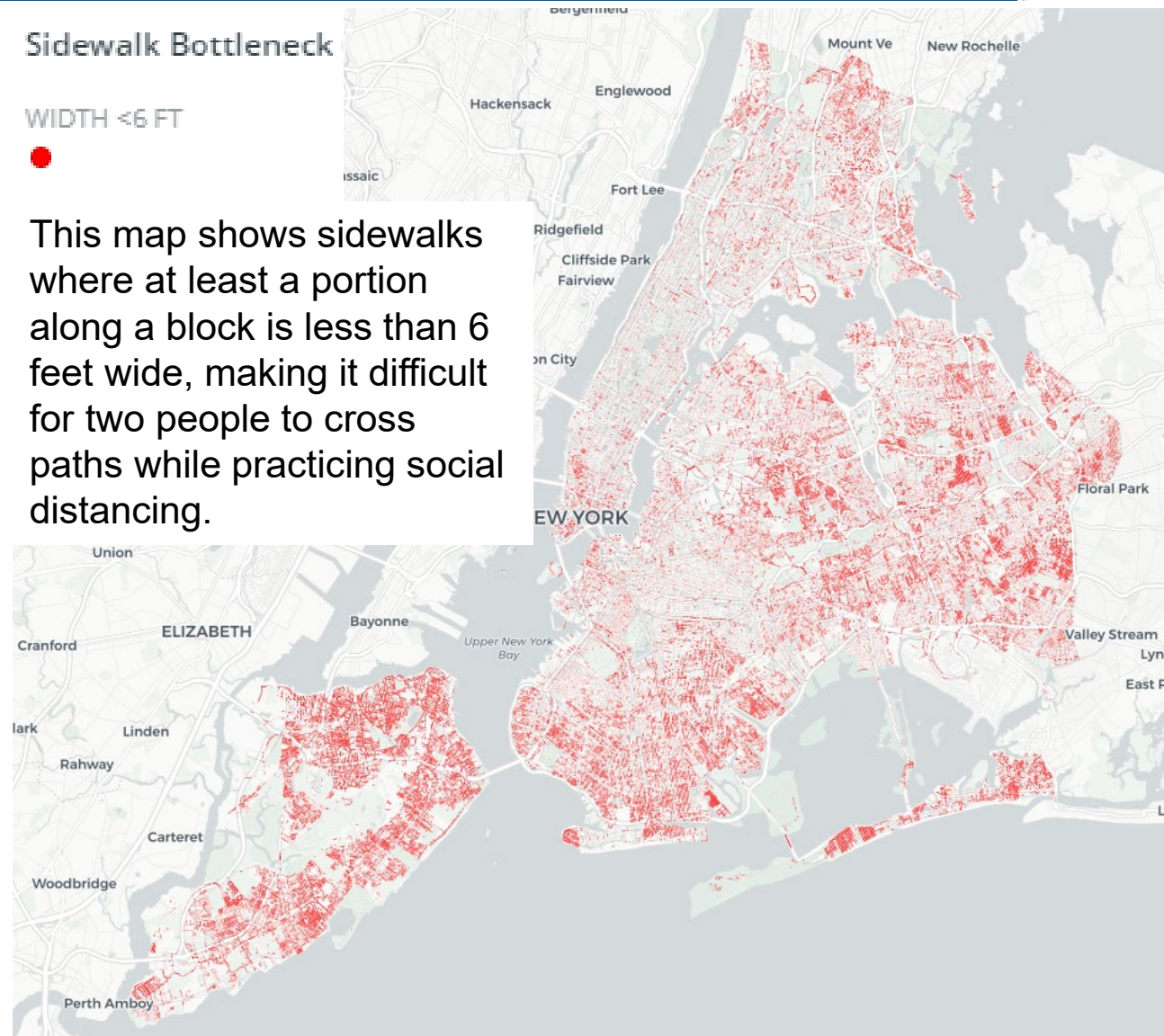
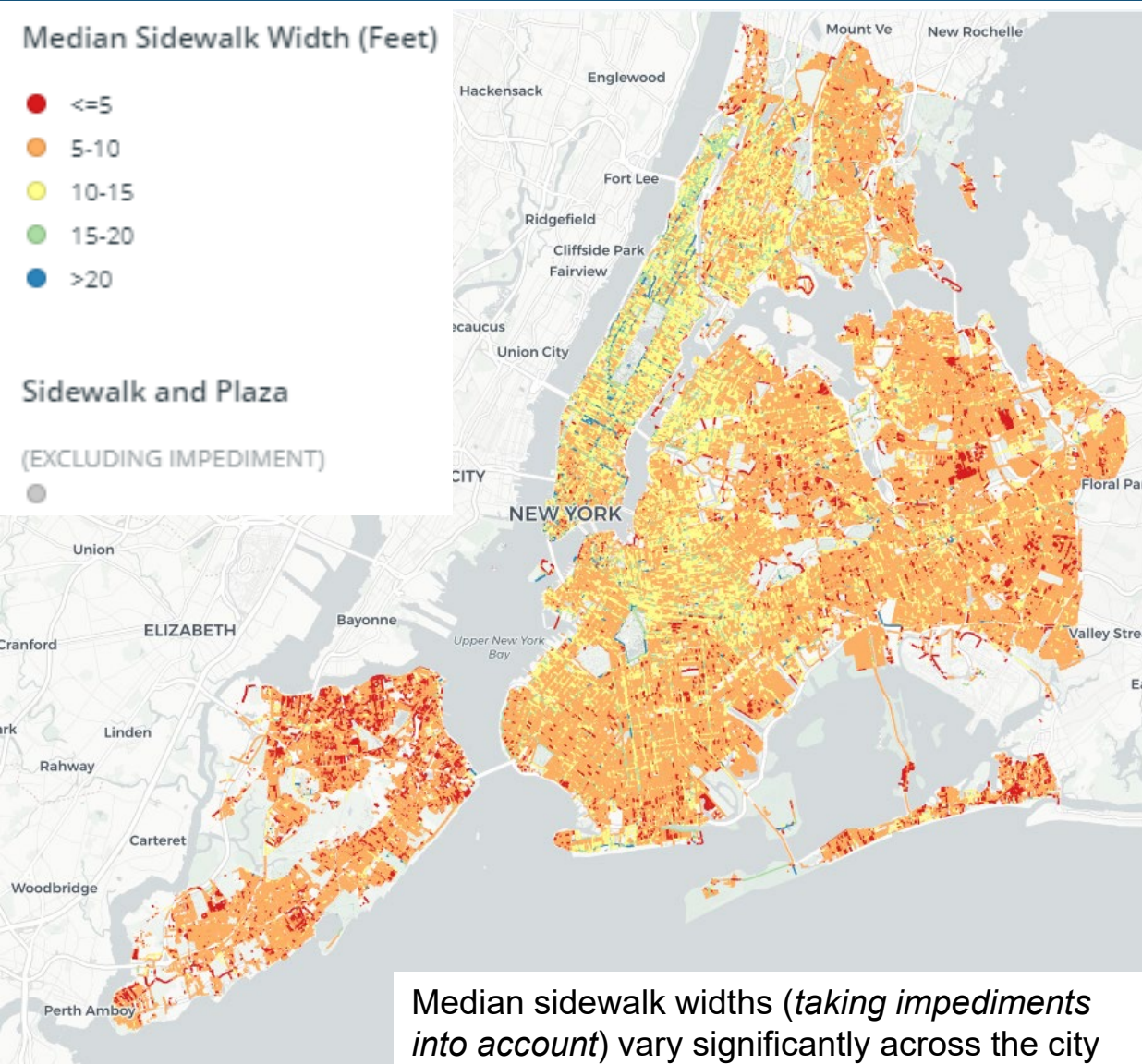
Essential Workers Commuting by Subway *Pre-COVID19*



- Pre-COVID19, nearly 200,000 workers in this subset of essential sectors commuted via subway to Manhattan from another borough.
- Among these selected sectors, food service workers constituted the majority of Manhattan-bound subway commuters from other boroughs, while health service aides were the most numerous inter-borough subway commuters with destinations outside of Manhattan.

Sidewalks

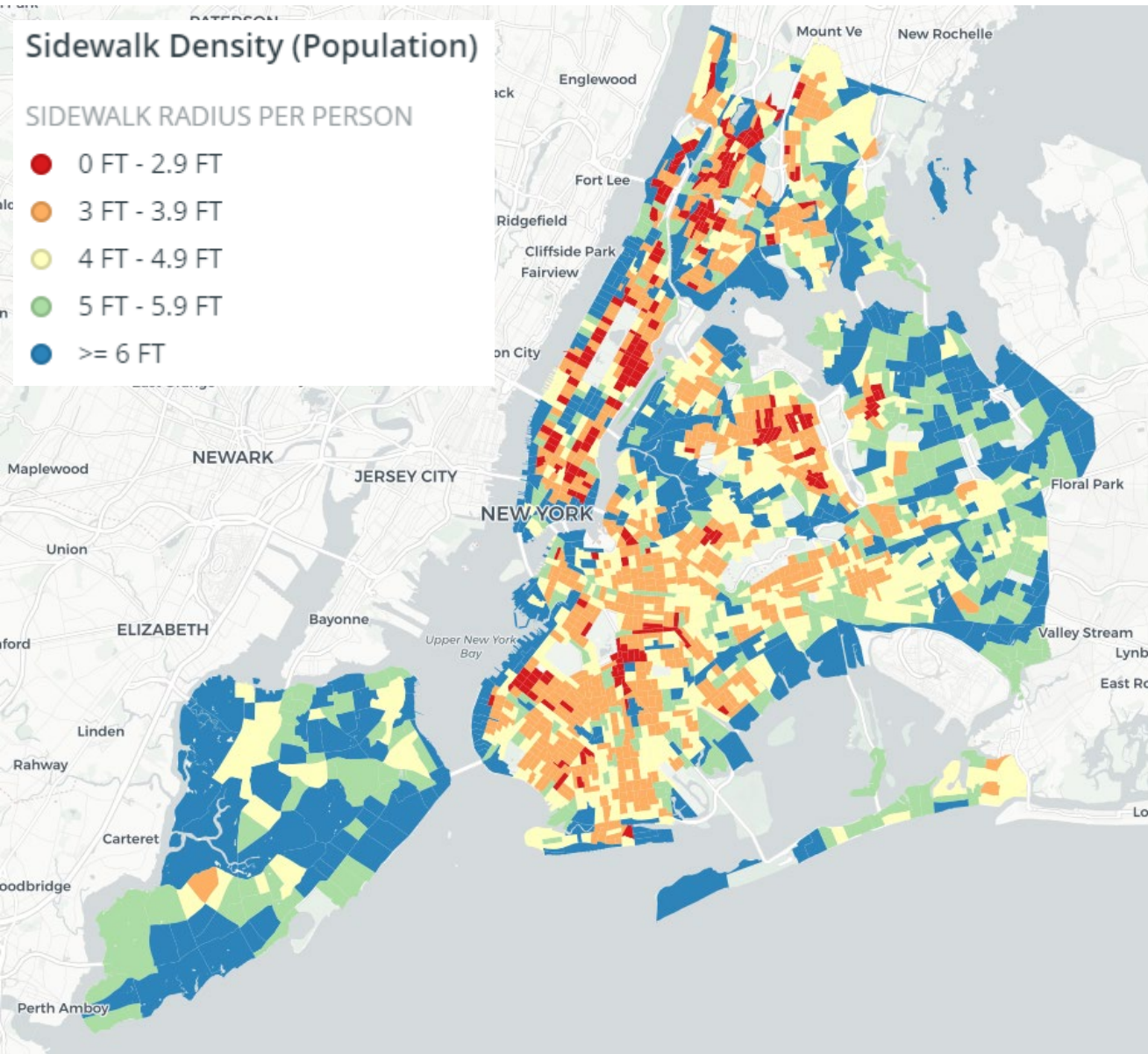
Sidewalk Width Analysis



Sidewalk Impediments include: CityBench; WalkNYC; parking meter; bus shelter; LinkNYC; pay phone; news stand; hydrant; litter basket; recycling basket; tree (on the curb); 2-foot utility strip from the curb to include other impediments like signage, light pole, etc.

Interactive Map: <https://nycplanning.carto.com/u/dcpbuilder/builder/8cb4fdfa-75f0-4686-b91c-835cc6613ed2/embed>

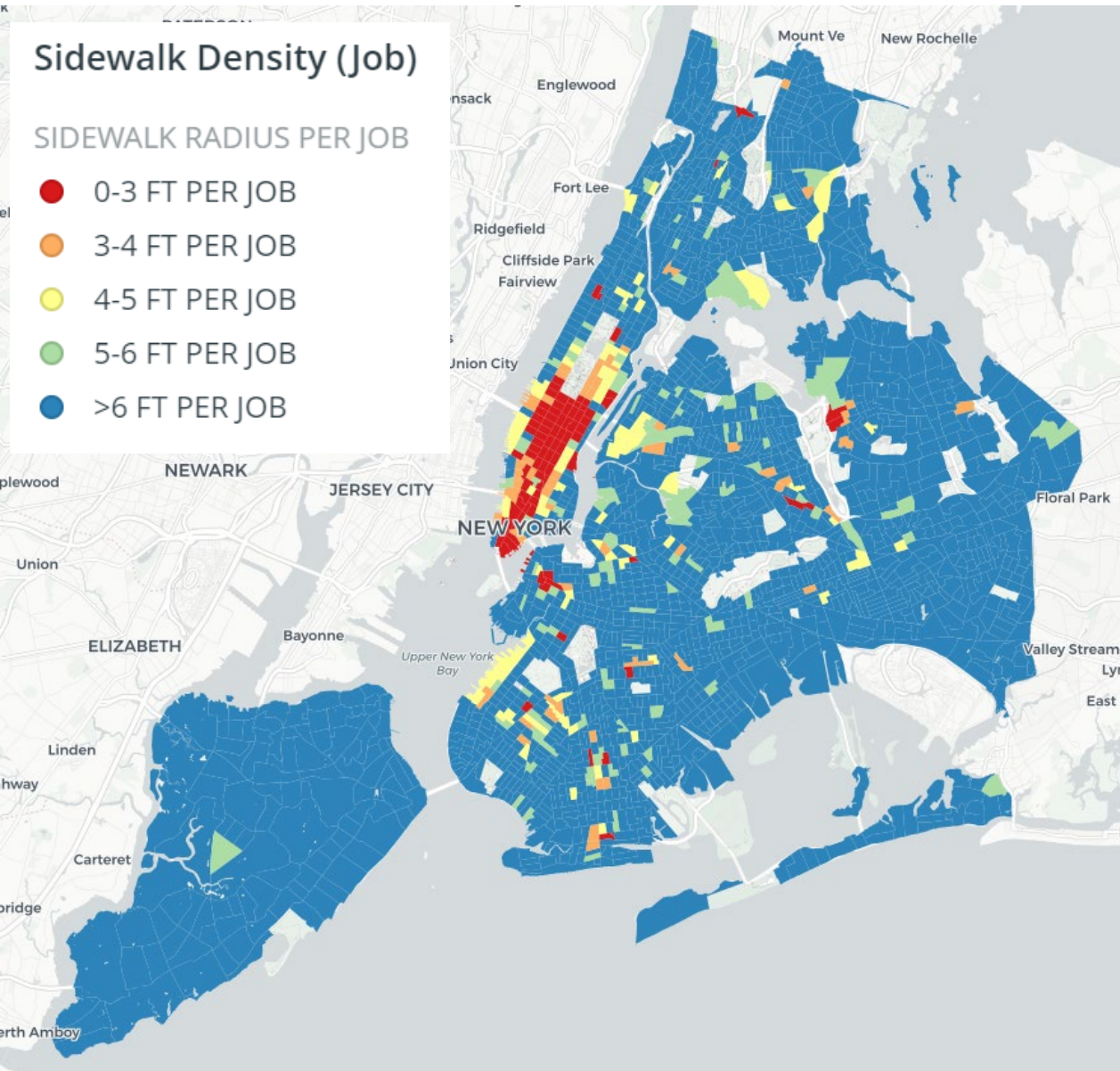
Sidewalk Square Footage and Residential Density



- If we allow everyone a 3-foot radius “bubble” in order to maintain a 6-foot social distance from one another, we require approximately 28 square feet each.
- Looking at total sidewalk square footage and residential density by Census Tract, we can see where sidewalks have a higher residential pedestrian load.
- Tracts in red are those where there is the least amount of total sidewalk square footage per resident.

Note: the sidewalk area includes ROW sidewalk, interior sidewalk, plaza, boardwalk, and pedestrian bridge in the planimetrics data.

Sidewalk Square Footage and Job Density



- A similar analysis incorporates job density, by counting the number of jobs in each Census Tract and measuring them against sidewalk square footage.
- Again, the areas in red are those where the sidewalks may be most constrained for workers at their workplace.
- Midtown and Lower Manhattan, Downtown Brooklyn, and Flushing Queens stand out, as do other employment hubs including Long Island City, Forest Hills, Williamsburg, and Sunset Park.

Note: the sidewalk area includes ROW sidewalk, interior sidewalk, plaza, boardwalk, and pedestrian bridge in the planimetrics data.