COVID19 IMPACTS ON TRANSPORTATION

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

May 5, 2020

NYC PLANNING

Introduction

- 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 sixth weekly report.

- This week's report includes the following information:
    1. Executive Summary
    2. Citi Bike
    3. Sidewalk
    4. Subway
    5. Pre-COVID Workforce
    6. 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.

- We are also now exploring pre-COVID commute patterns in attempt to anticipate impacts of an eventual economic reopening on our transportation system.

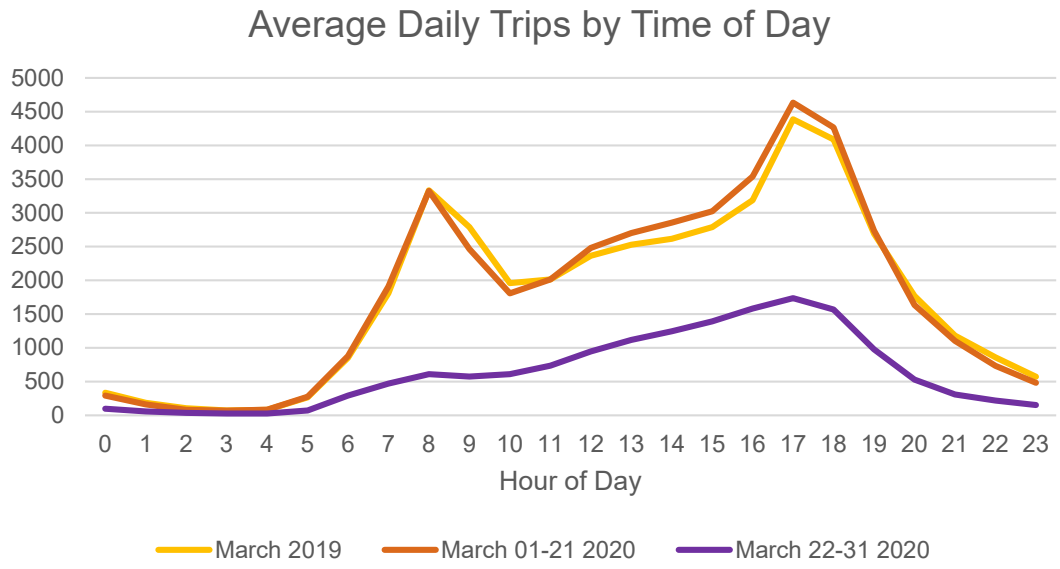
- This report may serve to help in pandemic response and longer-term recovery. We are eager for feedback in how to make this more useful. Feel free to reach out to Laura Smith (lsmith@planning.nyc.gov) with questions or comments.

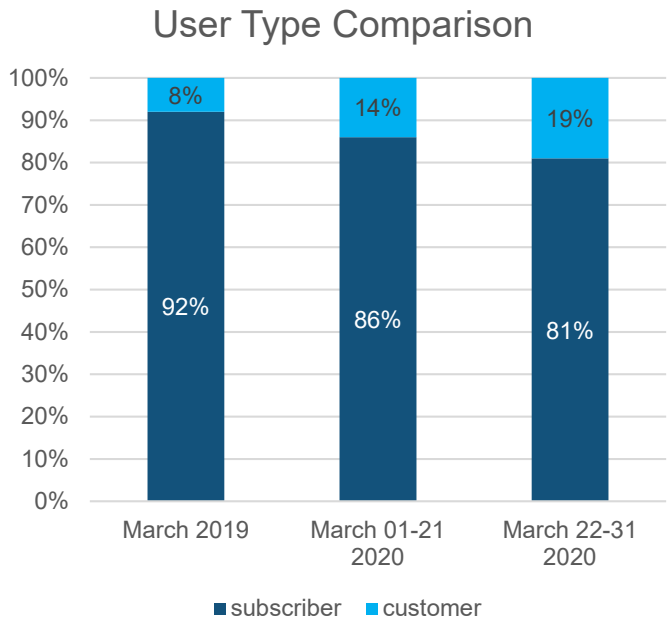
Executive Summary

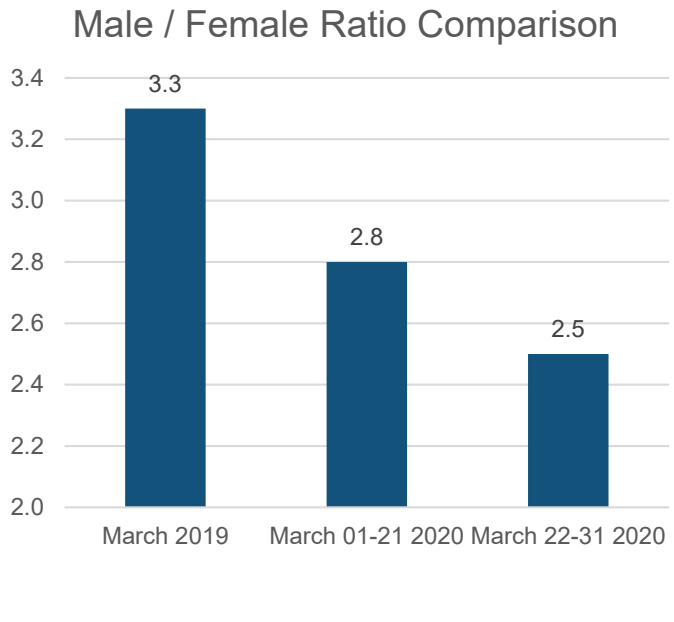
- Citi Bike ridership declines have been steep, but not as dramatic as declines in most other modes of travel. **Average Citi Bike trip duration has increased post-PAUSE among both customers and subscribers, as has the share of rides with the same origin as destination.**
- An analysis of job density and sidewalk area shows **Midtown and Lower Manhattan, Downtown Brooklyn, and Flushing Queens as having insufficient sidewalk space for social distancing, as well as other employment hubs including Long Island City, Forest Hills, Williamsburg, and Sunset Park.**
- Subway service as measured by stops per hour has increased somewhat, and **total MetroCard swipes during the week of April 18-24 were higher than each of the previous two weeks.** South Williamsburg and southern Brooklyn show the greatest increases, but this **pattern is observed across much of the city and especially Brooklyn and Queens.**
- Overnight subway service is scheduled to stop between 1am and 5am this week. ***Food Service and Drinking Places* and *Healthcare and Social Assistance* have the highest number of workers who commute by subway during the overnight and very early morning hours.**
- Looking at pre-COVID19 commute patterns, and particularly commutes in the Manhattan Core, may inform transportation planning as we shift from PAUSE to "GO":
  - 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.
  - Manhattan-bound commute trips are usually much less likely made by car (12% overall) than commute trips to other boroughs (45% overall). The overall percentage of commuting by subway is 52% for Manhattan-bound trips and only 23% for trips to the outer boroughs.

Citi Bike

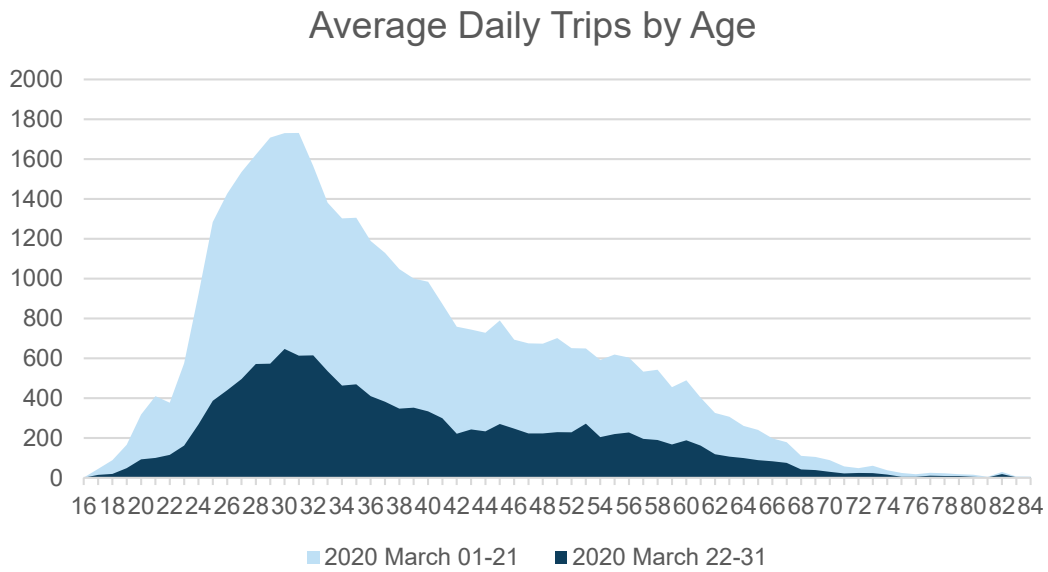
Citi Bike Overall Comparison







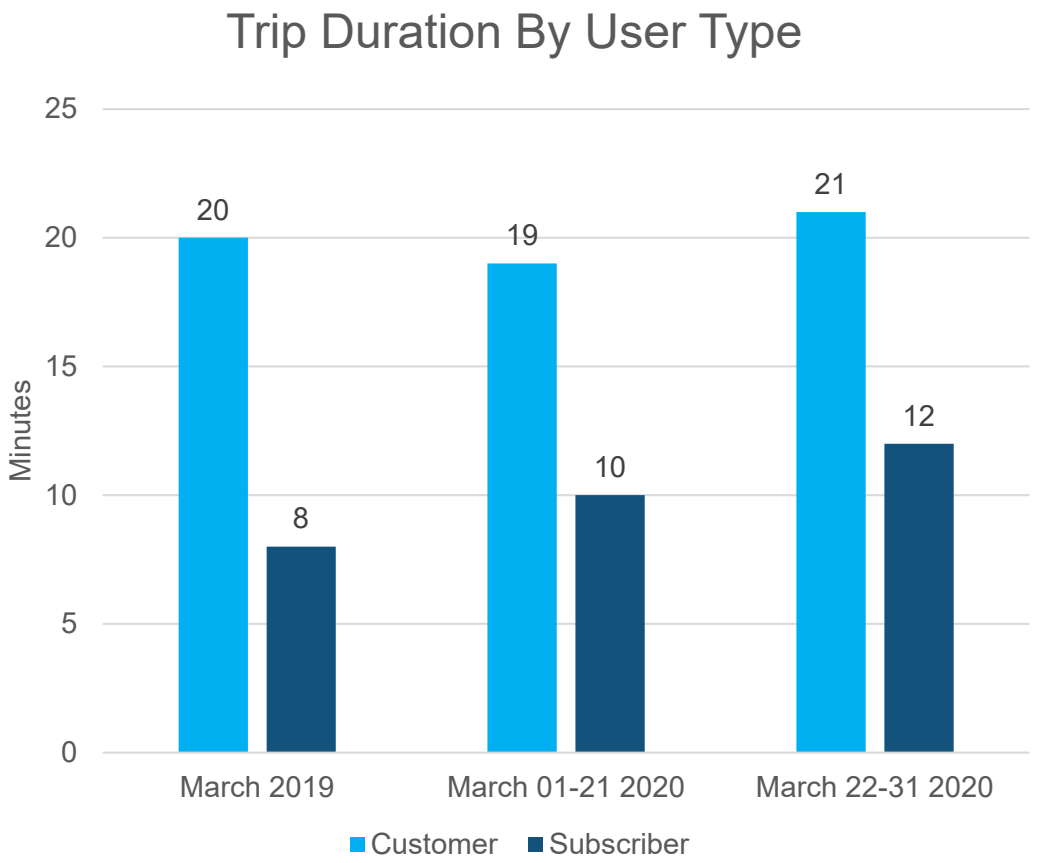
- Citi Bike ridership under the PAUSE is lower than pre-PAUSE, and peak hour spikes in ridership are less pronounced.
- "Customers," or those riding under 24-hour or 3-day passes, are an increasing share of riders compared to "subscribers," who are annual members.
- Men are typically more frequent users, but the ratio of males to females riding under the PAUSE has gone down.
- The age distribution of riders remains fairly consistent, though riders in their late 20s and early 30s have seen the greatest decline as a percent of trips taken.

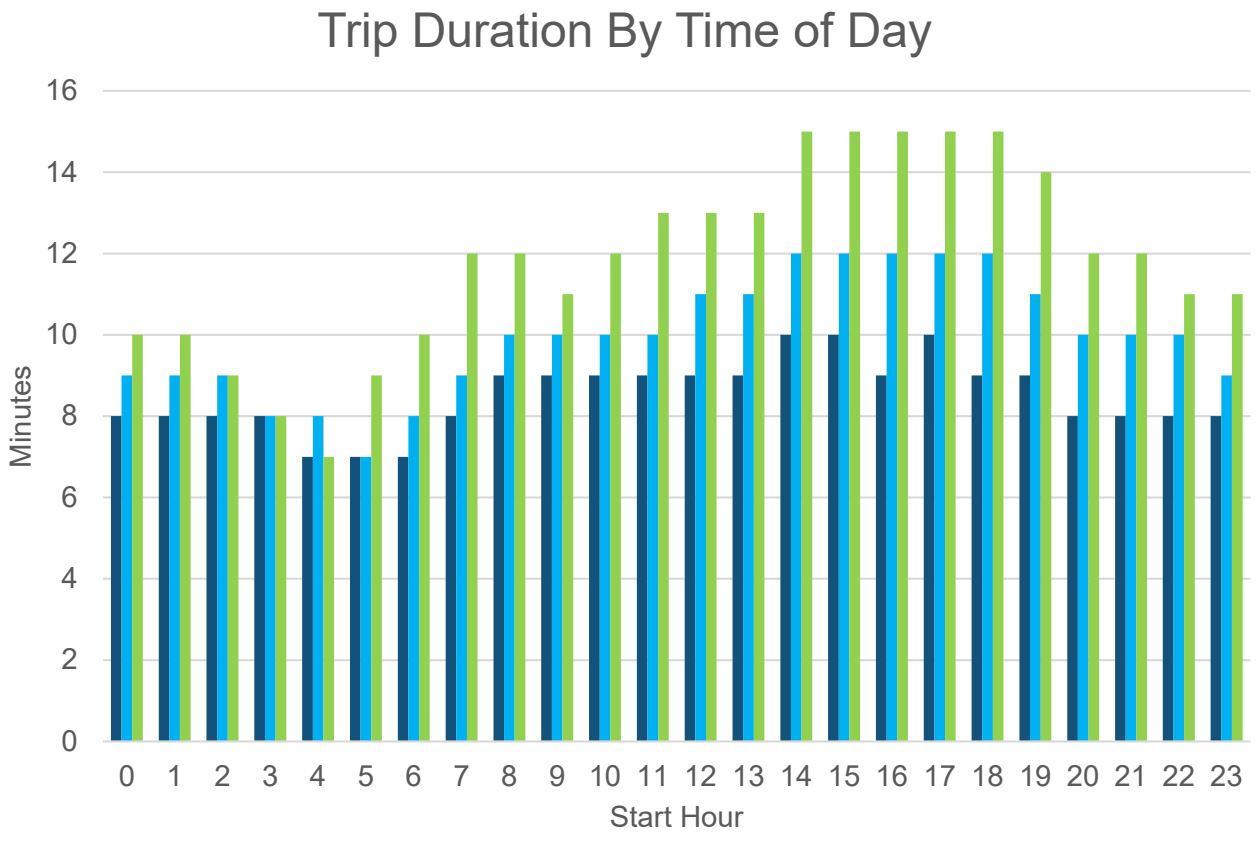


Note: weather has a great effect on Citi Bike ridership

Citi Bike Trip Duration Comparison

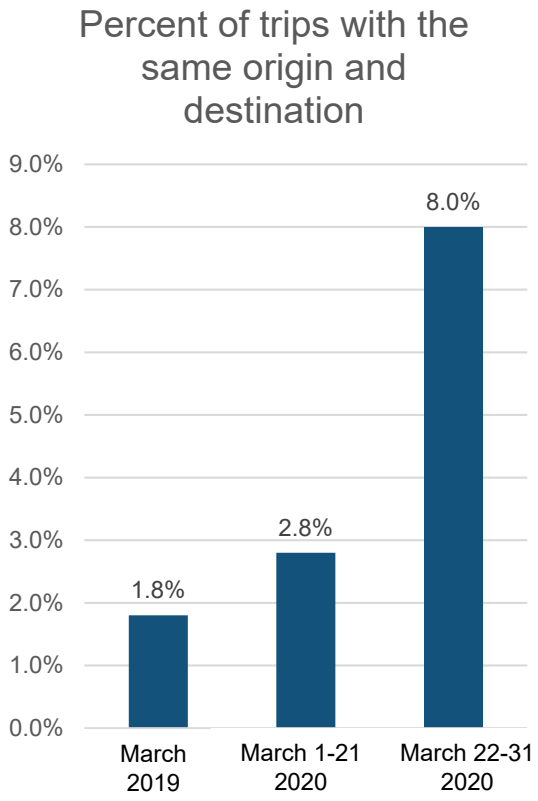
- Average trip duration has increased post-PAUSE among both customers and subscribers.
- Morning peak hour and late afternoon trip durations have seen the greatest increase in total duration. This is occurring also in the context of reduced automobile traffic.



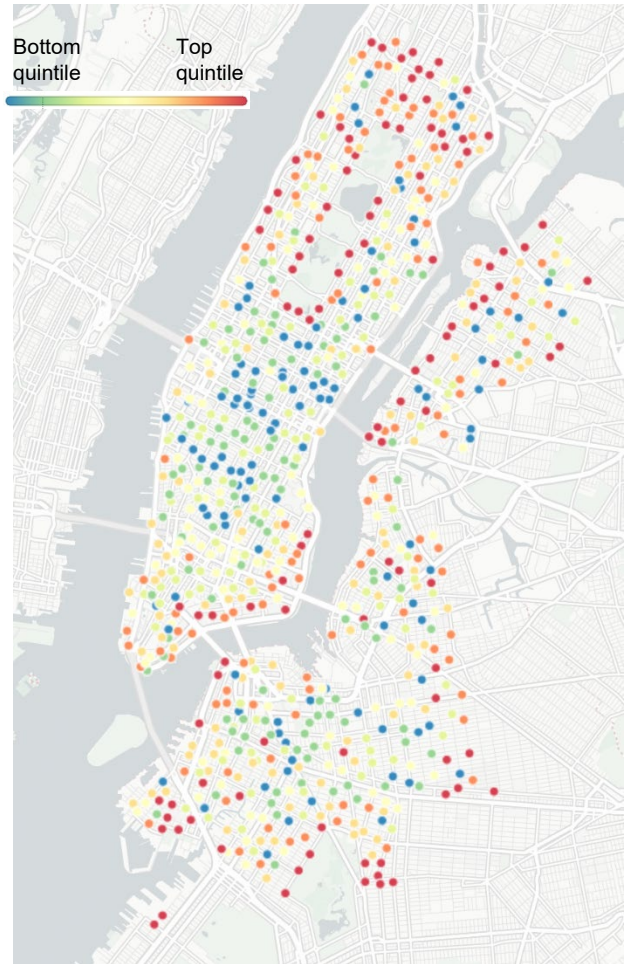


Trips with the Same Origin and Destination (O/D)

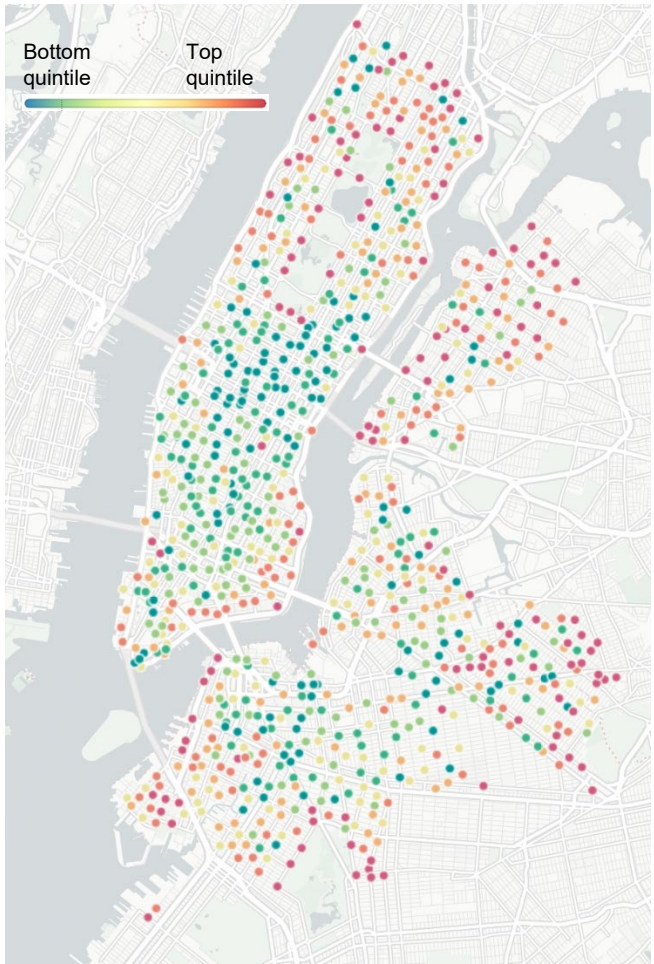
- The percent of total trips with the same origin and destination increased 4x during the PAUSE.
- Docking stations producing trips with the same O/D appear to be more evenly distributed than they were pre-COVID, when they were almost exclusively clustered along the waterfront or adjacent to parks.



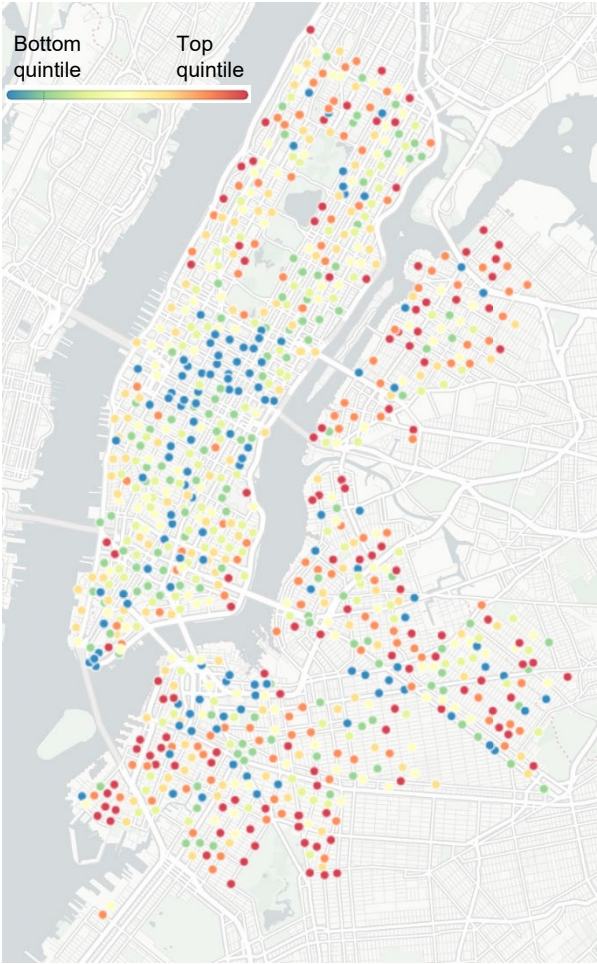
Trips with the same O/D
March 1-31, 2019



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



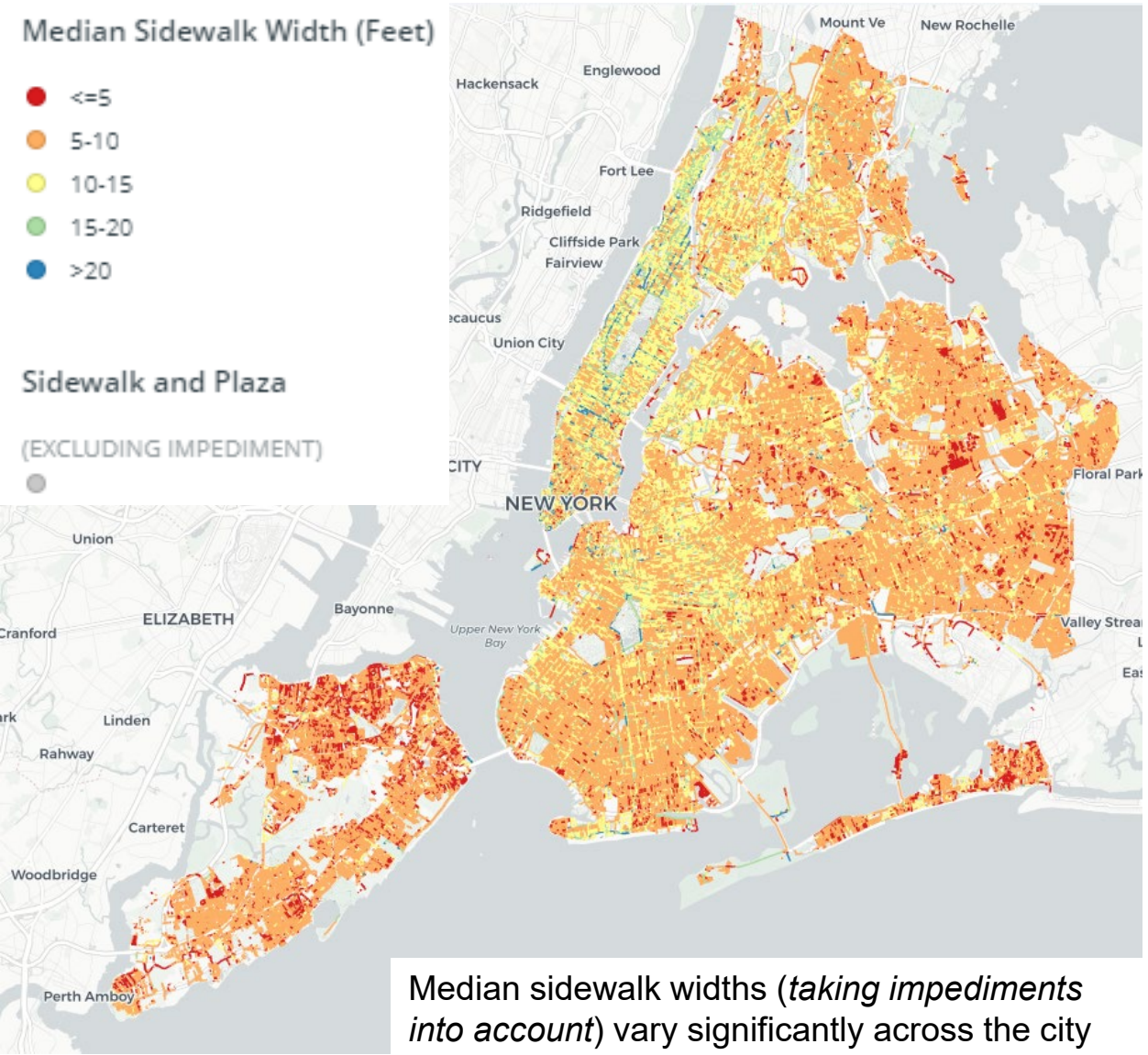
Trips with the same O/D
March 22-31, 2020



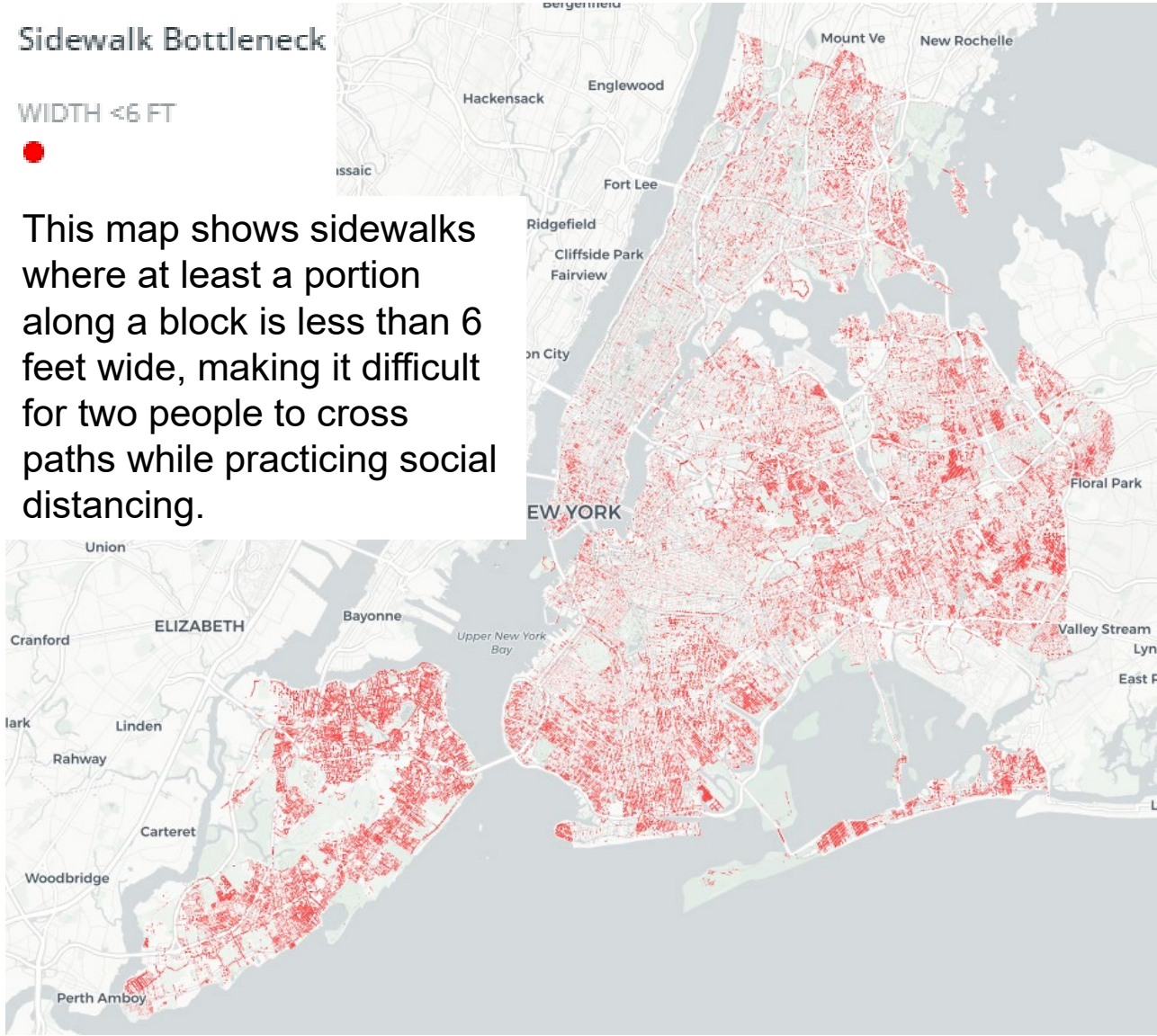
NYC PLANNING

Sidewalks

Sidewalk Width Analysis



Median sidewalk widths (*taking impediments into account*) vary significantly across the city

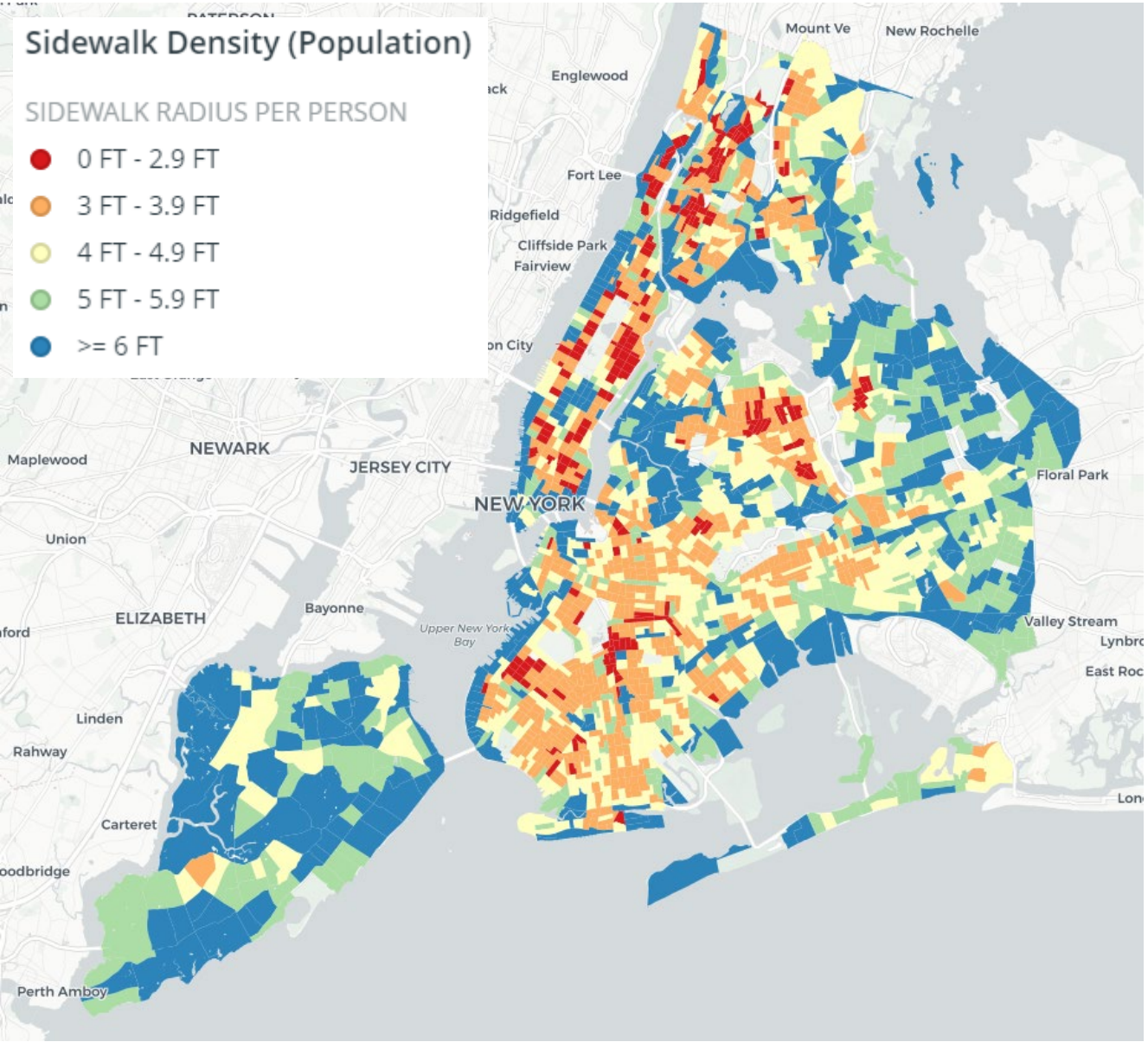


This map shows sidewalks where at least a portion along a block is less than 6 feet wide, making it difficult for two people to cross paths while practicing social distancing.

Sidewalk Impediments include: CityBench; WalkNYC; parking meter; bus shelter; LinkNYC; pay phone; news stand; hydrant; litter basket; recycling basket; tree (on the curb); 2-feet 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

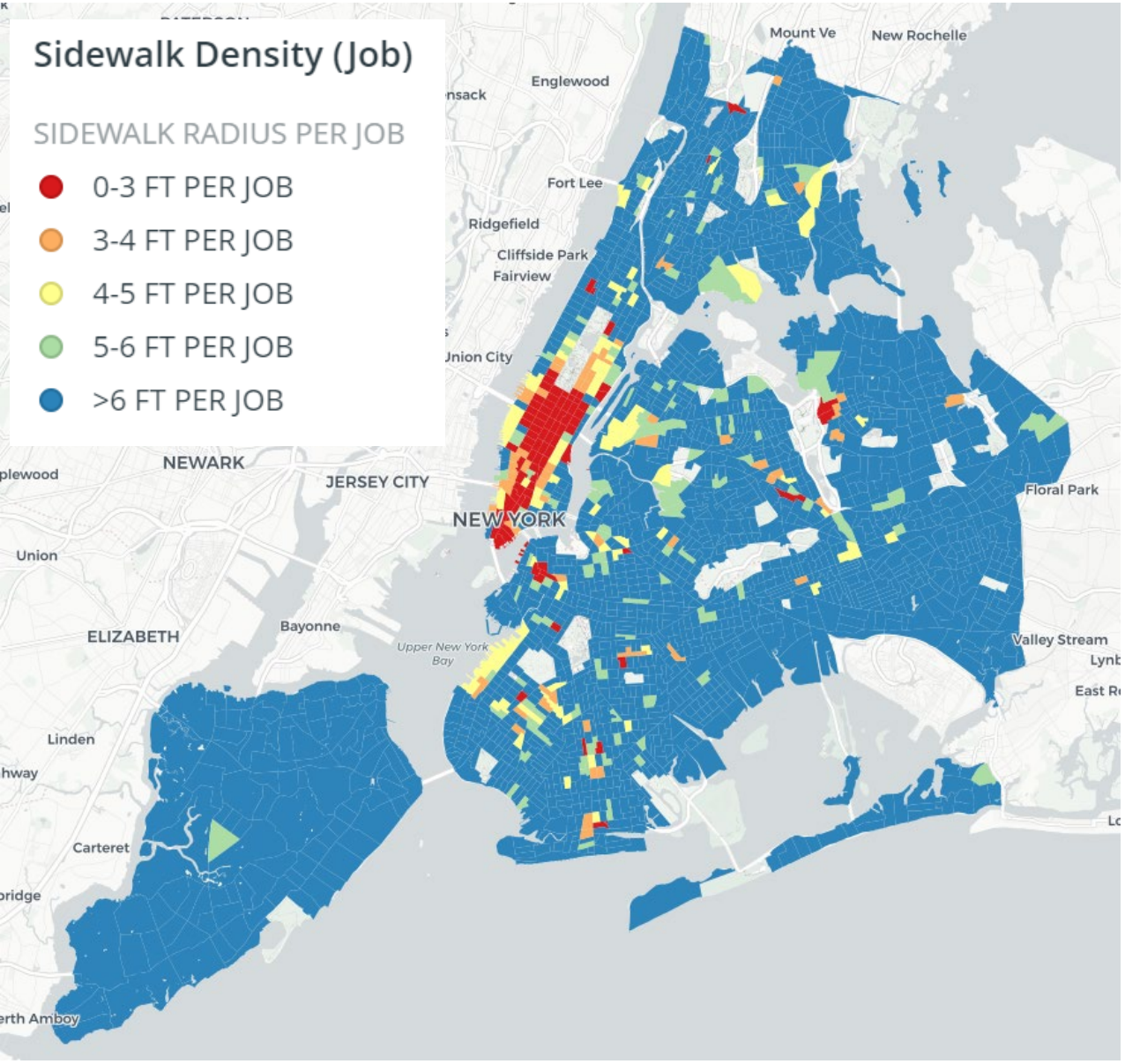


- If we allow everyone a 3-foot radius "bubble" in order to maintain a 6-foot social distance from one another, we require approximately 28 square feet each.
- Looking at total sidewalk square footage and residential density by Census Tract, we can see where sidewalks have a higher residential pedestrian 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.

Interactive Map: https://nycplanning.carto.com/u/dcpbuilder/builder/8cb4fdfa-75f0-4686-b91c-835cc6613ed2/embed
Data sources: NYC Planimetrics; ACS 2014-2018

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.

Interactive Map: https://nycplanning.carto.com/u/dcpbuilder/builder/8cb4fdfa-75f0-4686-b91c-835cc6613ed2/embed
Data sources: NYC Planimetrics; LEHD 2017 All Jobs

311 Social Distance Complaints: Street and Sidewalk

311 Social Distancing Complaints

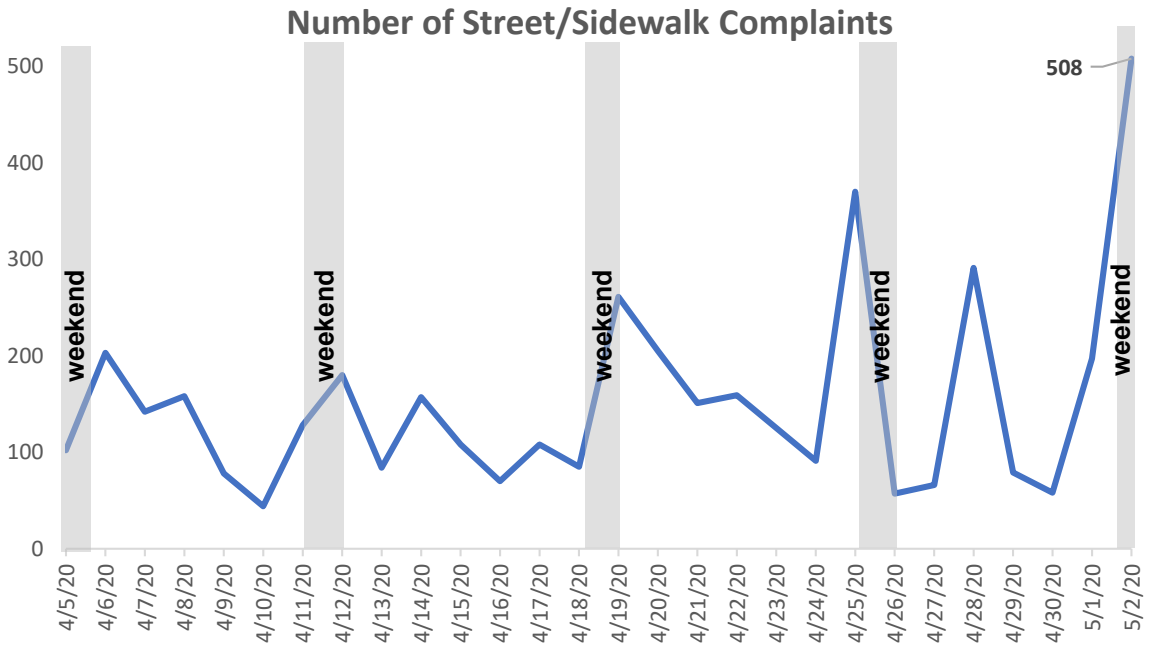
04/26 - 05/02

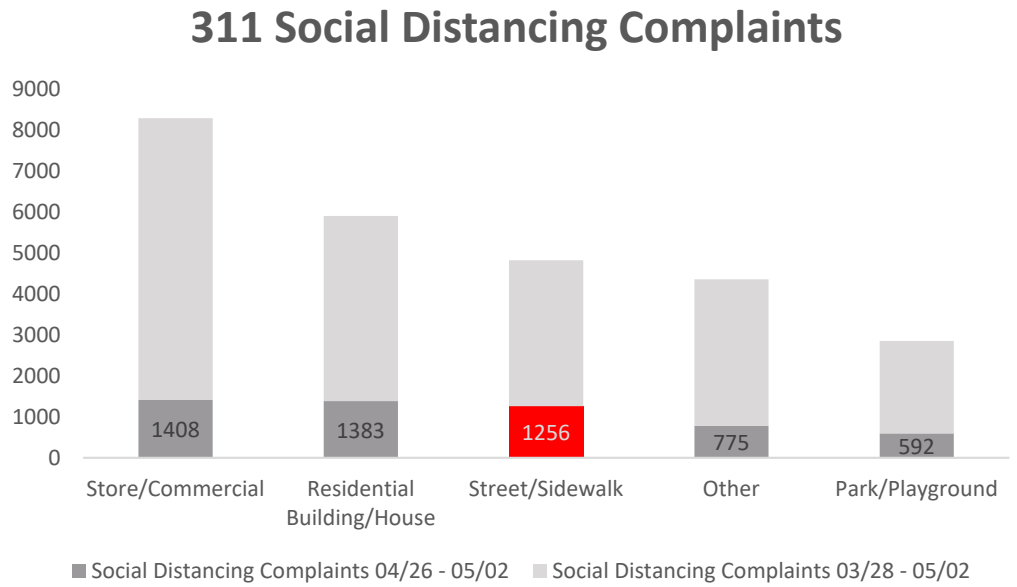
STREET/SIDEWALK COMPLAINTS

Source: NYC Open Data: 311 Service Requests

https://nycplanning.carto.com/u/dcpbuilder/builder/de21abd9-3c00-4598-9ad5-22af327979d0/embed

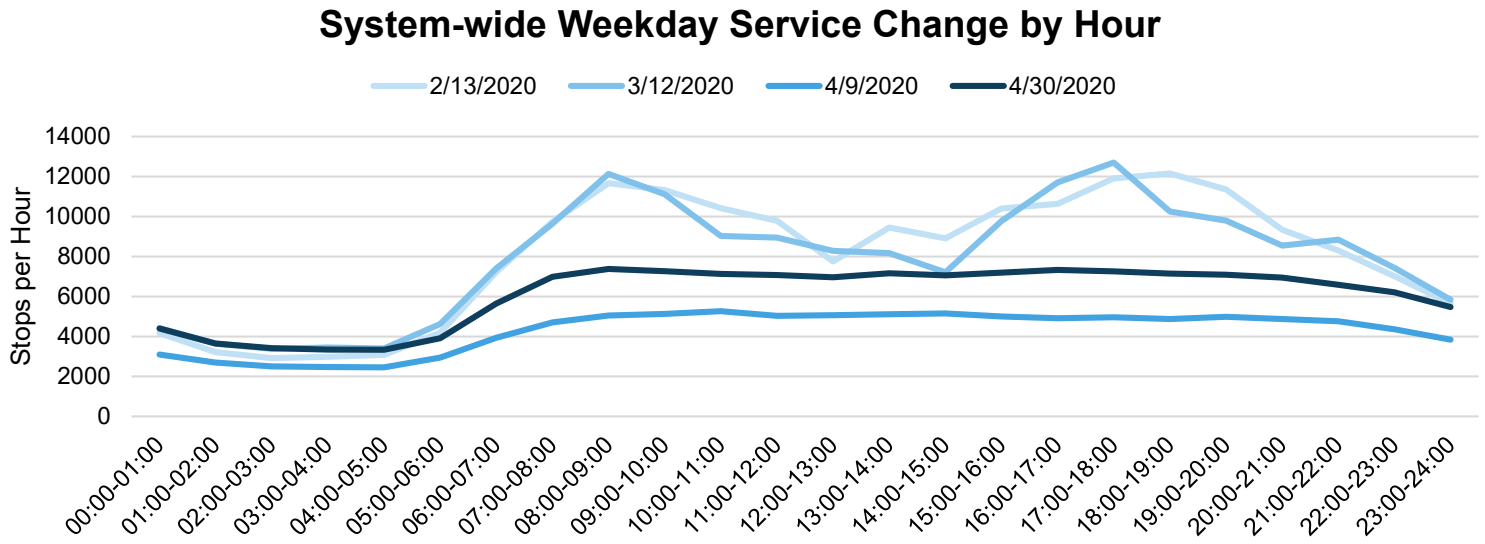
- "Social Distancing" is the **second most common** 311 service complaint (5414 records) after "Loud Music/Party," out of all 311 service complaints between April 26, 2020 and May 2, 2020.
- Highest concentrations of Street/Sidewalk complaints remain in upper Manhattan in CDs 12 & 10.
- **Weather continues to be the greatest predictor** of 311 complaints for street/sidewalk social distancing. May 2 recorded the highest number of street/sidewalk social distancing calls of 2020, when temperatures were in the 70s.

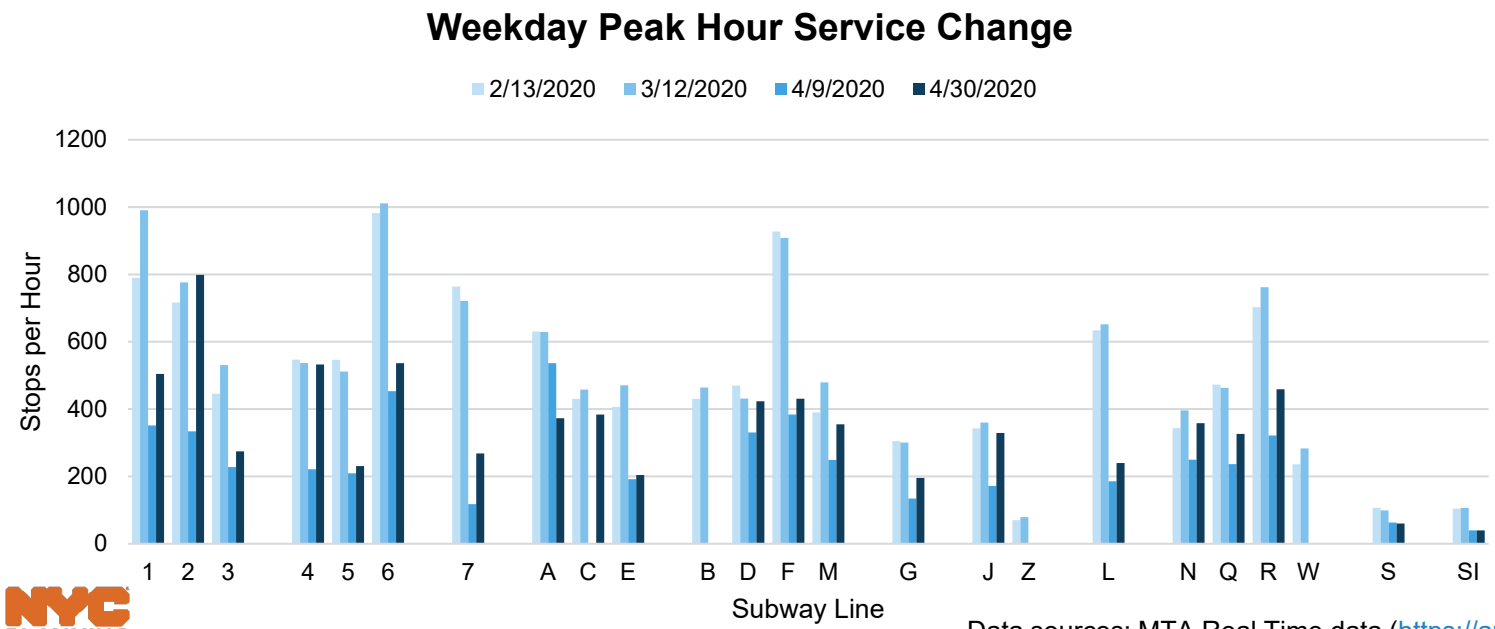




Subway

Subway System Service Changes





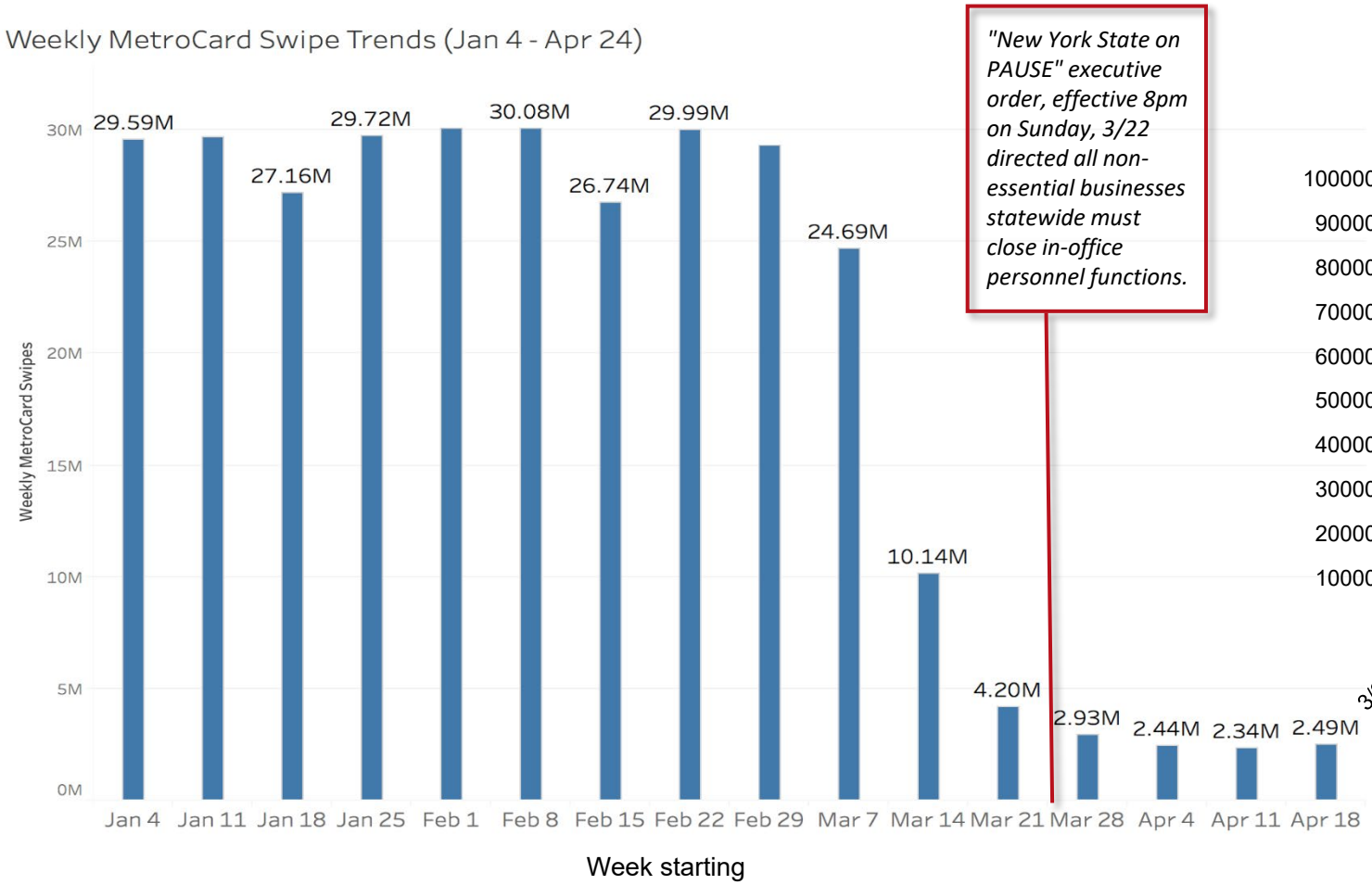
- MTA Subway started operating the essential service on March 25, 2020.
- The weekday peak hour services have been cut down to about 60% capacity, resulting in no distinction between daytime peak and daytime off-peak service.
- In the most recent weeks, the service increased somewhat (shown as dark blue line in both charts). However, starting from May 6, 2020, MTA will stop 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).

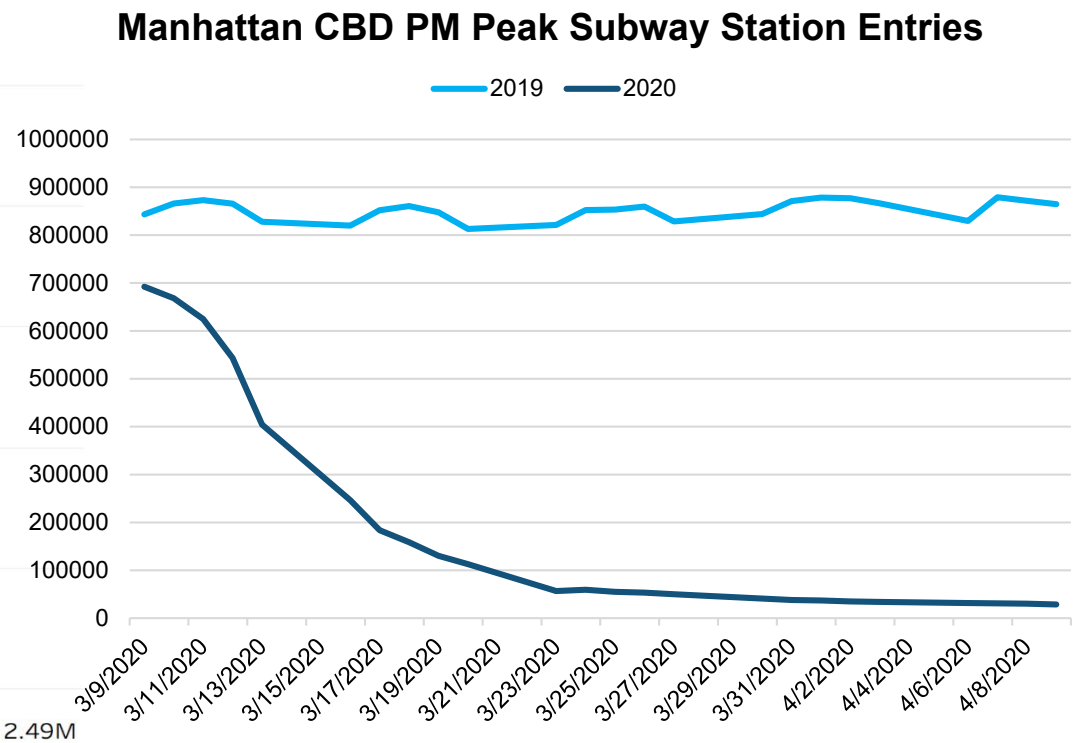
NYC PLANNING

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

Subway System-wide Ridership Changes

- The citywide percent change of MetroCard swipes during Apr 18-24 vs weekly average of Jan 4- Feb 28 was **-91.44%.**
- Total MetroCard swipes during the week of April 18-24 were **higher than each of the previous two weeks** (6.65% increase).
- Trips to and from the Manhattan Central Business District remain extremely low.





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)

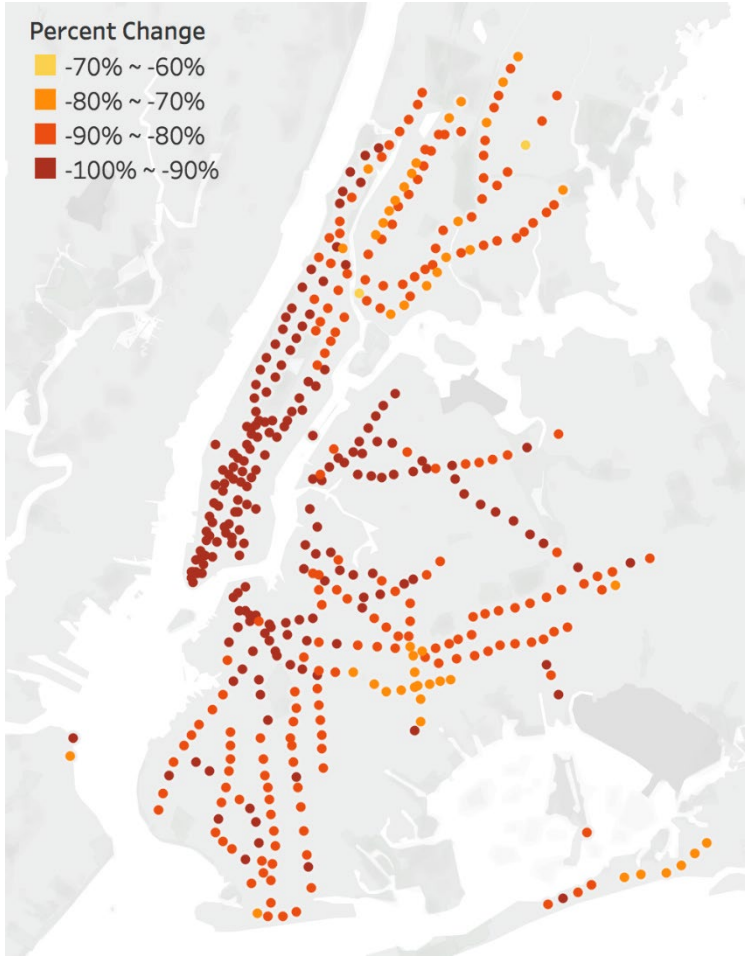
Notes: Holidays might lead to low subway swipes in the pre-COVID19 period. (Jan 18,2020: Martin Luther King Jr. Day; February 17, 2020: Presidents Day)

MetroCard Swipe Change Jan/Feb 2020 vs Apr 18-24 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)	-98.79%	138 St - Grand Concourse (4 5)	-68.06%
5 Av/53 St (E M)	-98.64%	Gun Hill Rd (5)	-68.24%
Prince St (R W)	-98.21%	Alabama Av (J)	-70.71%
Spring St (C E)	-97.49%	New Lots Av (L)	-72.69%
Franklin St (1)	-97.48%	Van Siclen Av (3)	-73.80%
72 St (B C)	-97.29%	Far Rockaway - Mott Av (A)	-74.36%
28 St (R W)	-97.28%	New Lots Av (3)	-74.48%
47-50 Sts - Rockefeller Ctr (B D F M)	-97.26%	Beach 60 St (A)	-74.52%
Rector St (1)	-97.26%	E 105 St (L)	-75.14%
Canal St (1)	-97.26%	Livonia Av (L)	-75.46%
18 St (1)	-97.22%	Junius St (3)	-75.60%
8 St - NYU (R W)	-97.19%	Longwood Av (6)	-75.61%
Spring St (6)	-97.13%	Sutter Av (L)	-75.84%
5 Av/59 St (N W R)	-97.06%	Rockaway Av (3)	-75.89%
Canal St (A C E)	-97.05%	Atlantic Av (L)	-75.91%

Percent Change of Swipes (Apr 18-24 2020 vs. Weekly Average of Jan 4 to Feb 28 2020)



- The week of Apr 18, the fifth 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, **several stations in the system are beginning 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.**

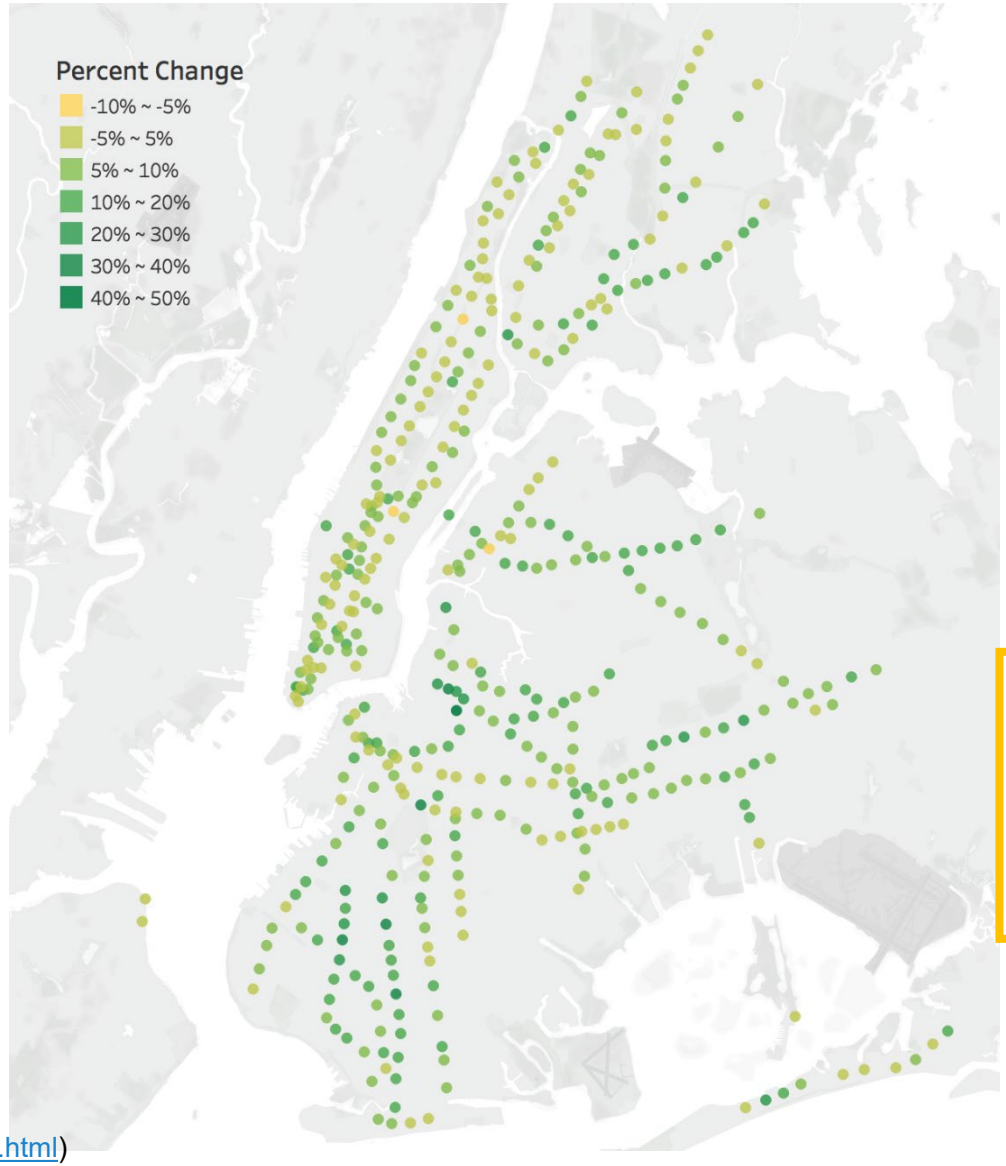
Interactive dashboard link:
https://public.tableau.com/profile/dcptransportation#!/vizhome/MetroCardSwipes/PercentChange
Data sources: MTA Fare Data (http://web.mta.info/developers/fare.html)

MetroCard Swipe Change Apr 18-24 vs Apr 11-17 2020

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

Station (Route)	Percent Change	Station (Route)	Percent Change
Flushing Av (G)	40.55%	135 St (B C)	-8.24%
55 St (D)	37.38%	5 Av/53 St (E M)	-6.48%
Hewes St (J M)	36.33%	Queens Plaza (E M R)	-5.83%
Ditmas Av (F)	35.79%	72 St (B C)	-4.15%
Eastern Pkwy - Brooklyn Museum (2 3)	31.74%	155 St (C)	-3.68%
Avenue N (F)	30.98%	Kingston - Throop Avs (C)	-3.50%
Broadway (G)	26.58%	Cathedral Pkwy (110 St) (B C)	-2.89%
Marcy Av (J M Z)	24.68%	Grand Army Plaza (2 3)	-2.42%
111 St (J)	23.68%	68 St - Hunter College (6)	-2.24%
Beach 105 St (A S)	22.62%	96 St (B C)	-2.18%
Lorimer St (J M)	22.13%	23 St (C E)	-1.86%
Greenpoint Av (G)	21.95%	Clinton - Washington Avs (C)	-1.79%
50 St (D)	21.84%	Lafayette Av (C)	-1.73%
62 St / New Utrecht Av (D N)	20.69%	Eastchester - Dyre Av (5)	-1.69%
138 St - Grand Concourse (4 5)	20.59%	50 St (C E)	-1.66%

Percent Change of MetroCard Swipes by Station (Apr 18-24 vs. Apr 11-17)



Many stations in the system have seen dramatic *increases* in ridership.

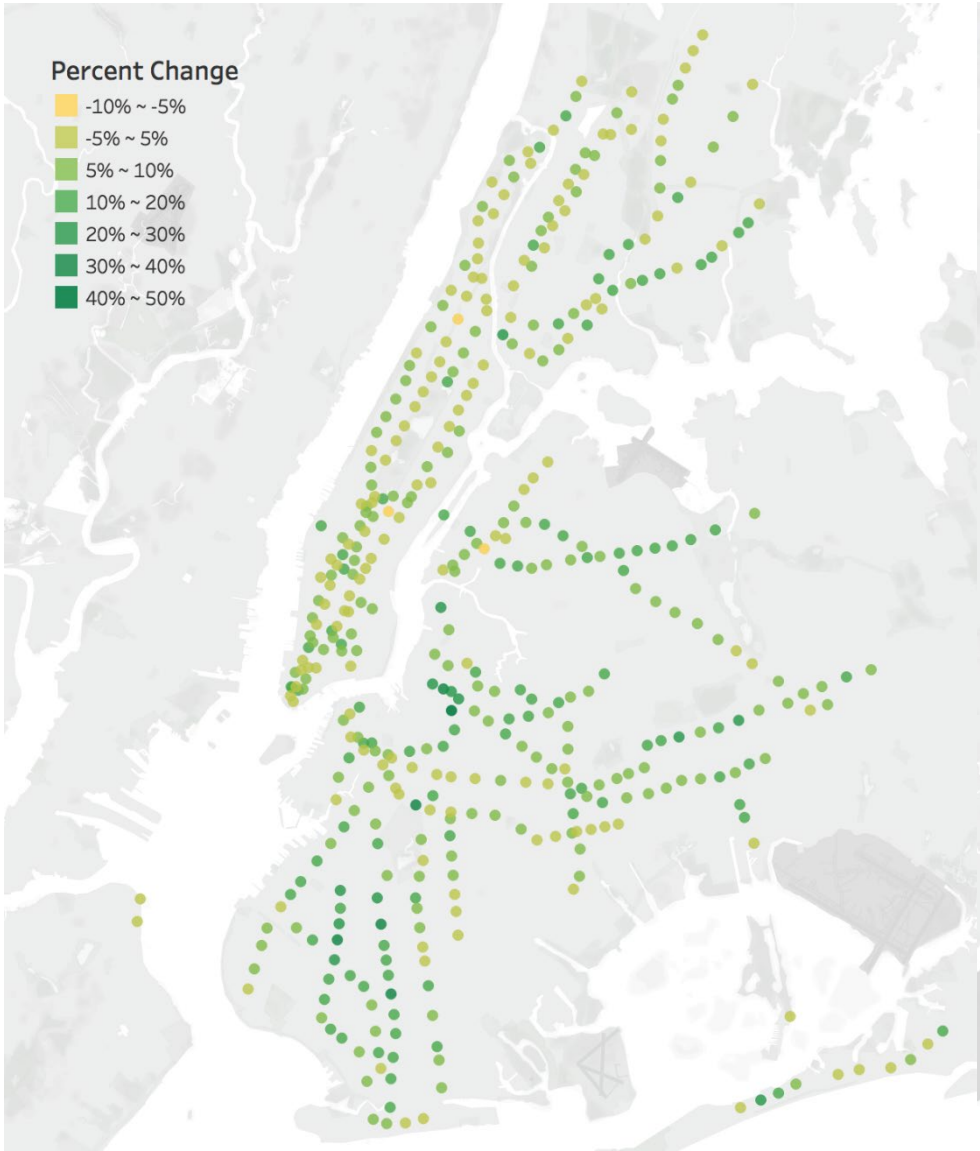
South Williamsburg and southern Brooklyn show the greatest increases, but this pattern is observed across much of the city and especially Brooklyn and Queens.

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

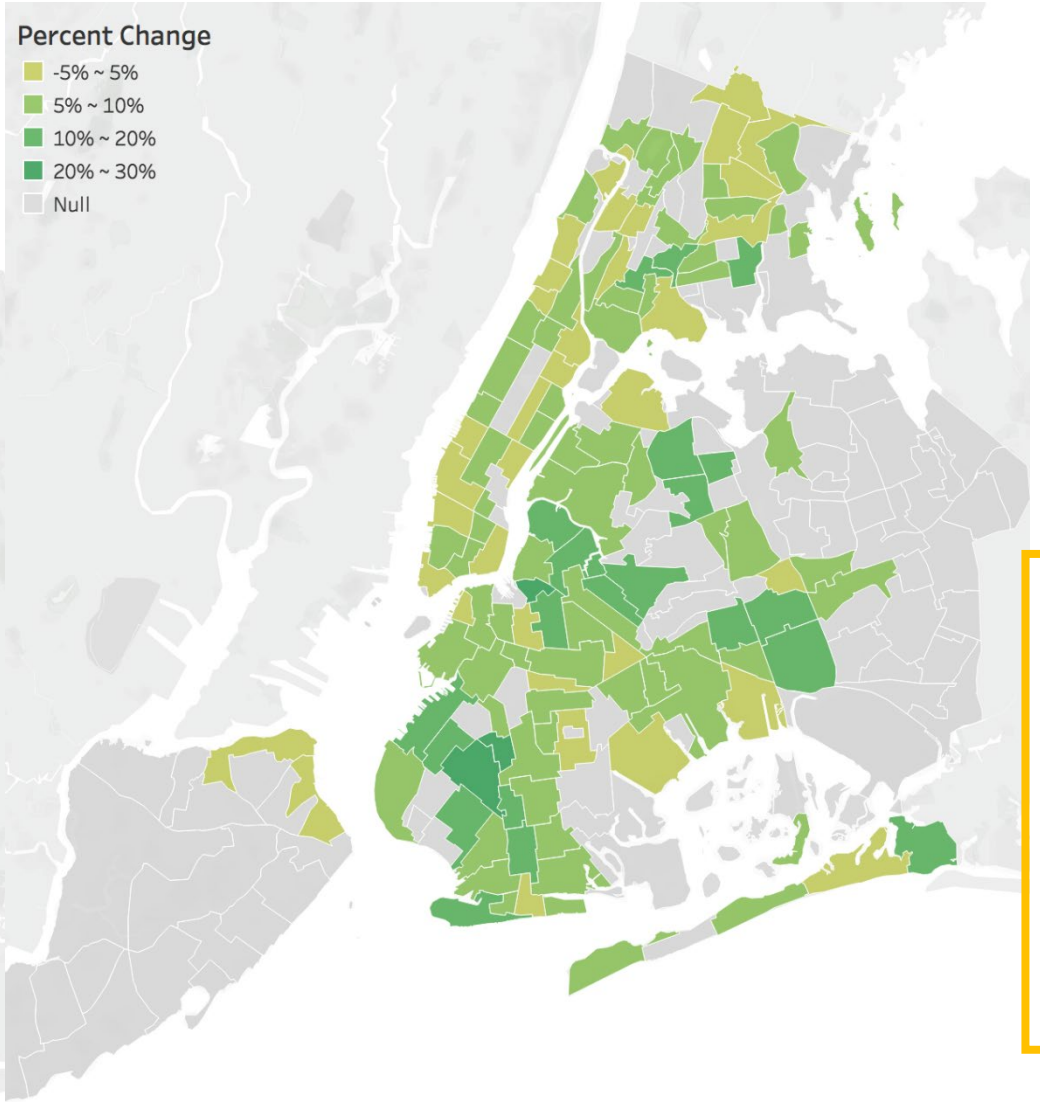
Data sources: MTA Fare Data (http://web.mta.info/developers/fare.html)

MetroCard Swipe Change by Neighborhood and Station Over Previous Week

Percent Change of MetroCard Swipes by Station (Apr 18-24 vs. Apr 11-17)



Percent Change of MetroCard Swipes by Neighborhood (Apr 18-24 vs. Apr 11-17)



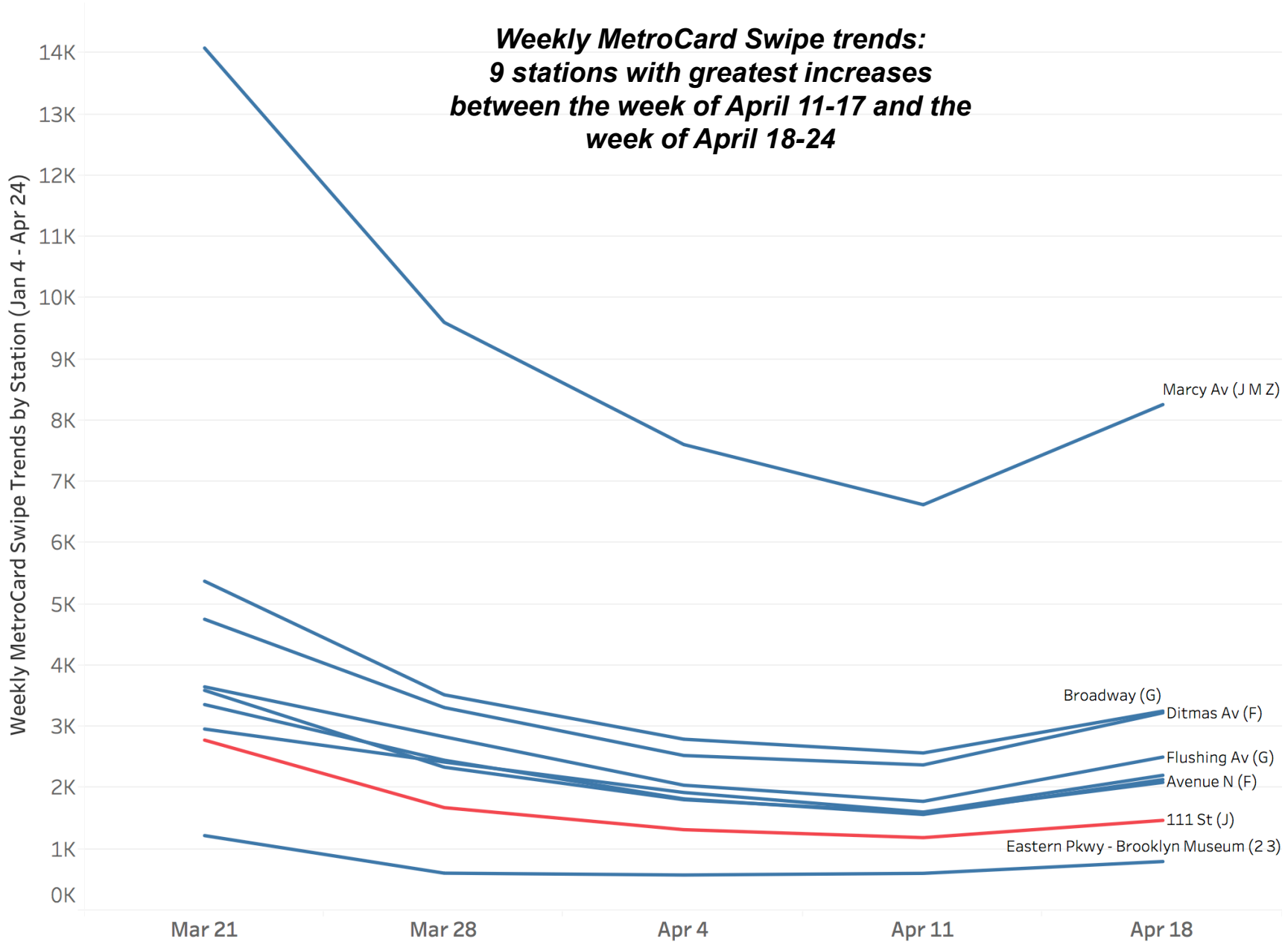
Aggregating station level changes to the neighborhood (NTA) level, we see areas in darkest green showing the greatest increases in ridership over the previous week.

Interactive dashboard links:
https://public.tableau.com/profile/dcptransportation#!/vizhome/MetroCardSwipes/LastWeekComparison

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

Data sources: MTA Fare Data (http://web.mta.info/developers/fare.html)

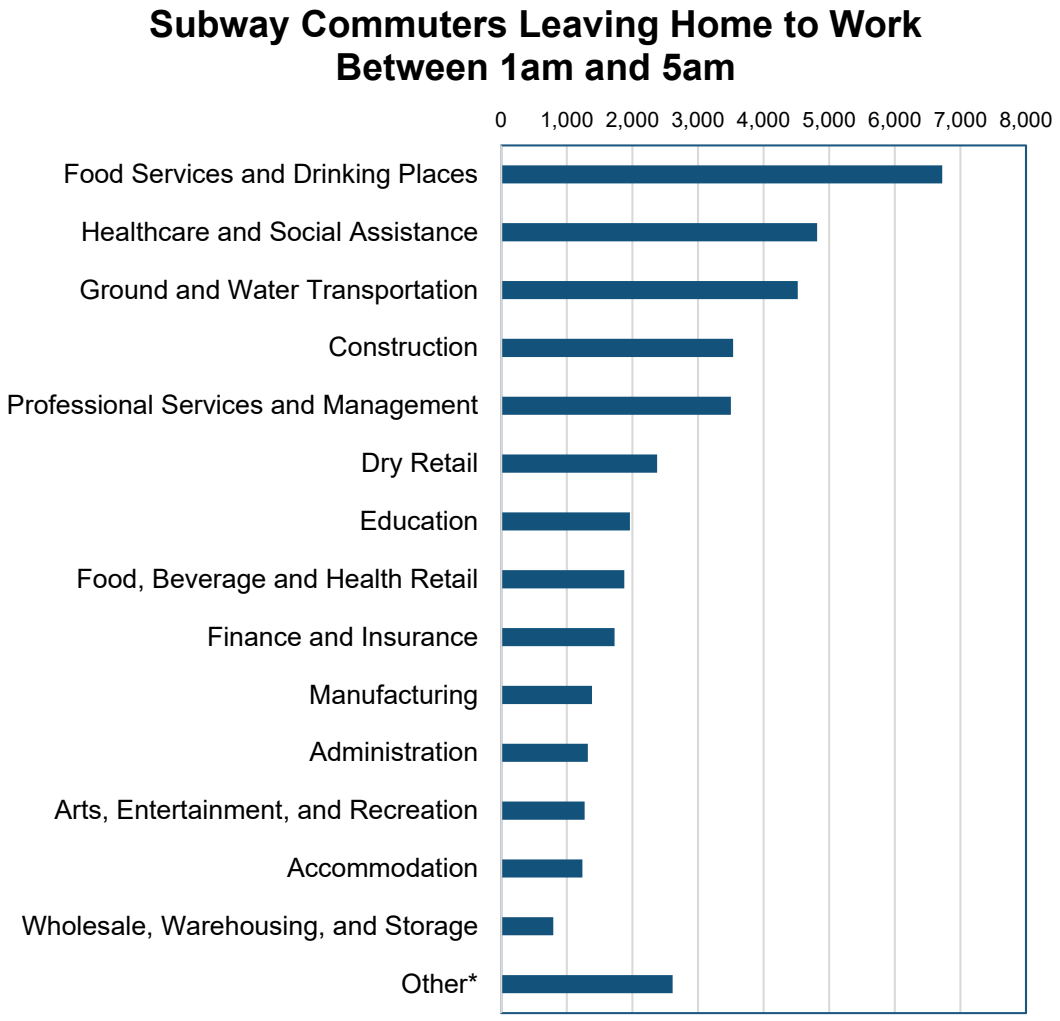
MetroCard Swipe Trends by Station Since PAUSE Began

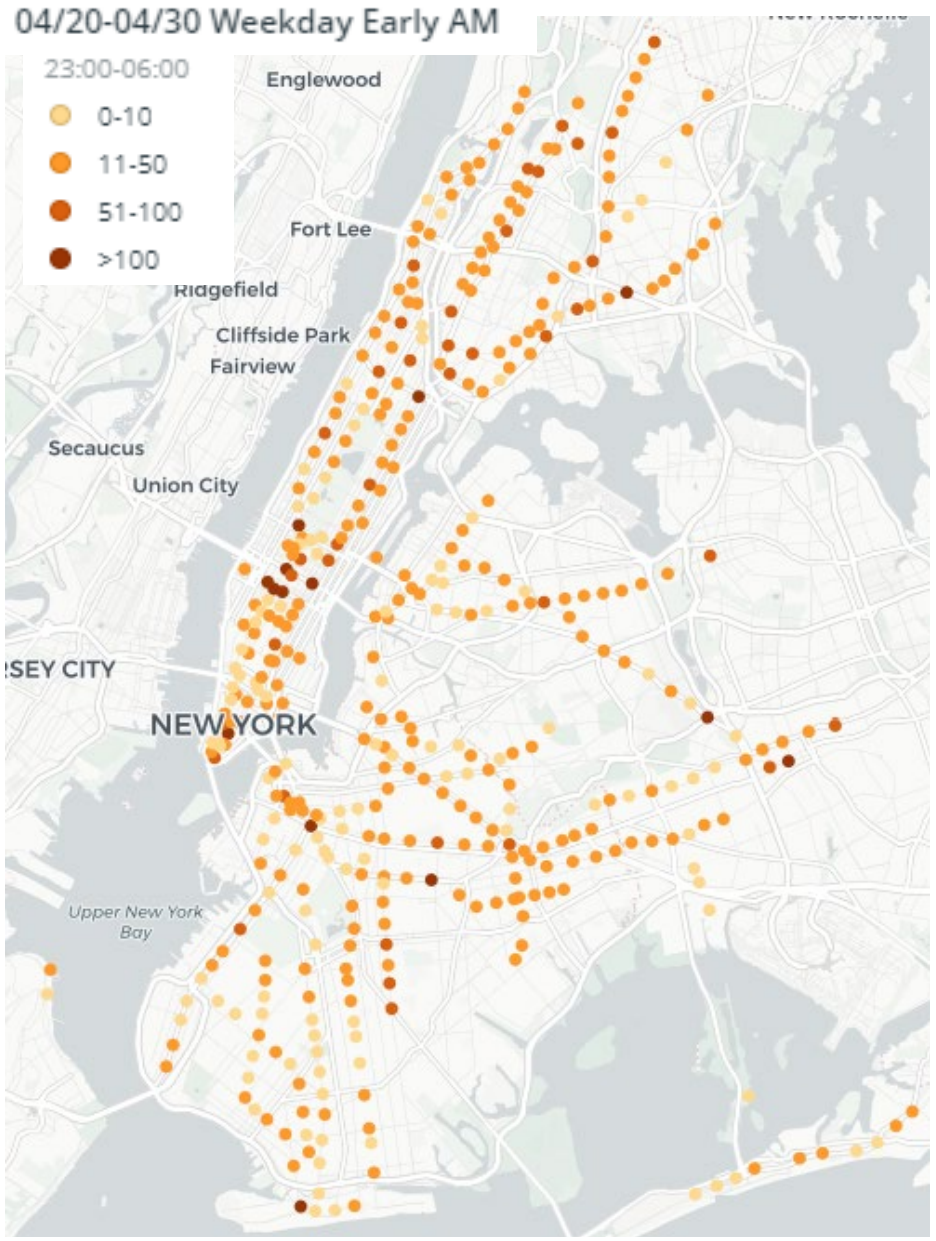


Interactive dashboard link:
https://public.tableau.com/profile/dcptransportation#!/vizhome/MetroCardSwipes/Stations

Data sources: MTA Fare Data (http://web.mta.info/developers/fare.html)

Pre-COVID 19 Early Morning Subway Commuters





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.
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

Workforce

Pre-COVID Commute Patterns

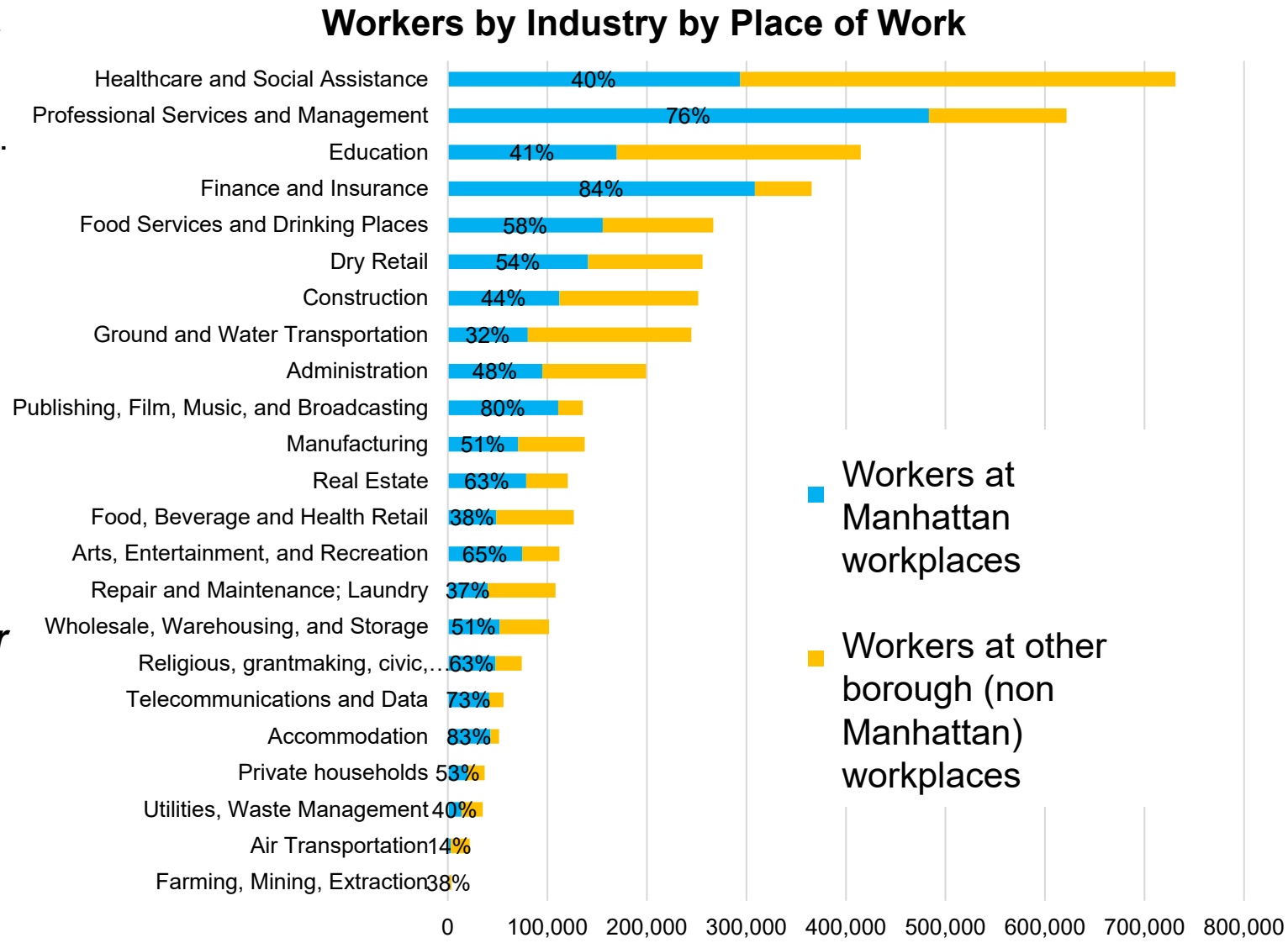
Looking at how workers commuted pre-COVID may help inform our planning around a shift from PAUSE to “GO”.

- 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?

Pre-COVID Workers at Workplace

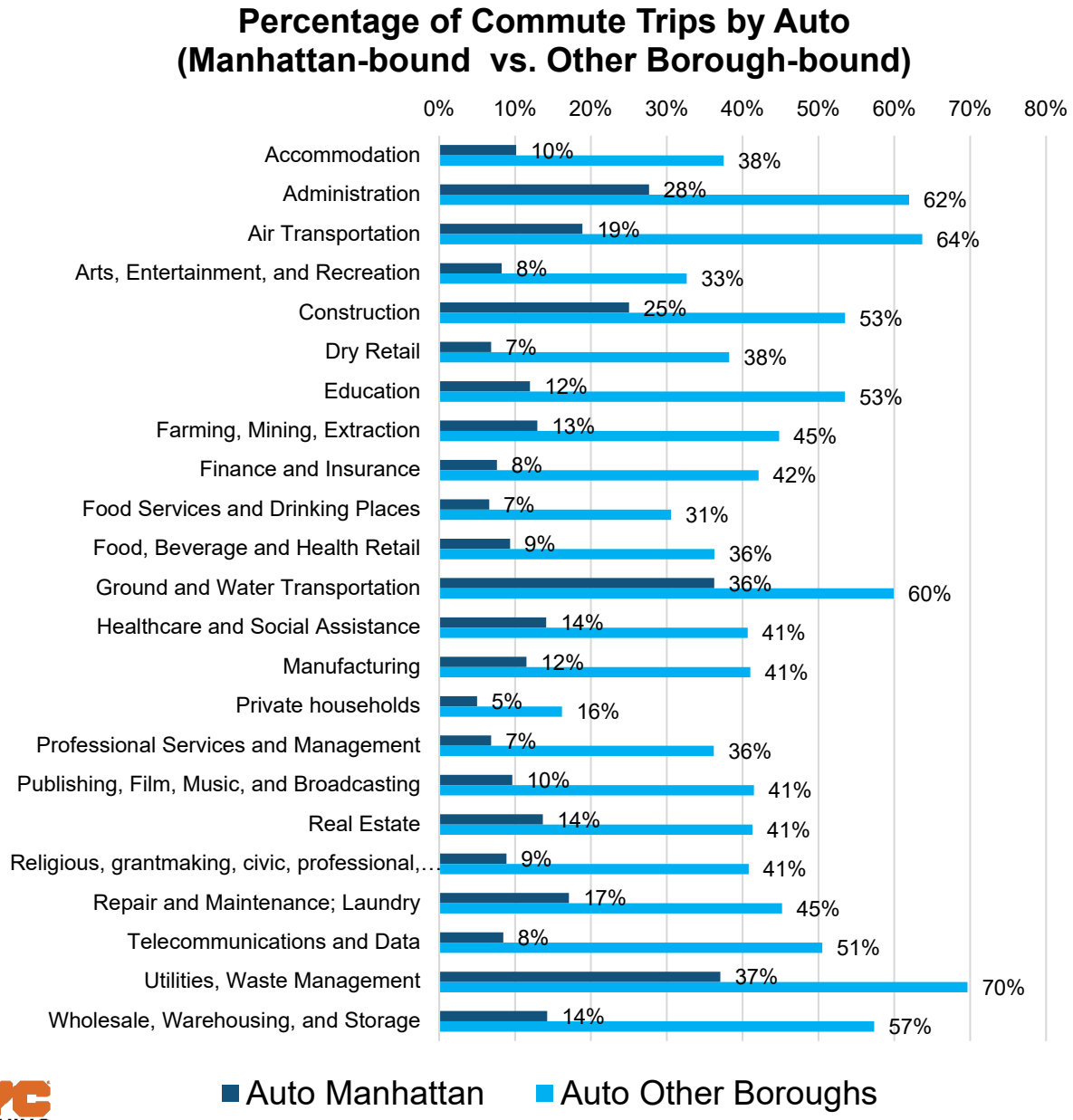
According to ACS PUMS data, ***Healthcare and Social Assistance*** is the largest employment sector in NYC, with more than 750,000 workers. Forty percent of these workers work in Manhattan.

Finance and Insurance (84%), ***Accommodation (83%)***, ***Publishing, Film, Music and Broadcasting (80%)***, and ***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.



Data source: 2014-2018 PUMS.
Note: Universe is all workers in NYC, who lived in the region (CT, NJ, NY, PA).

Pre-COVID Commute Patterns by Industry: Automobile



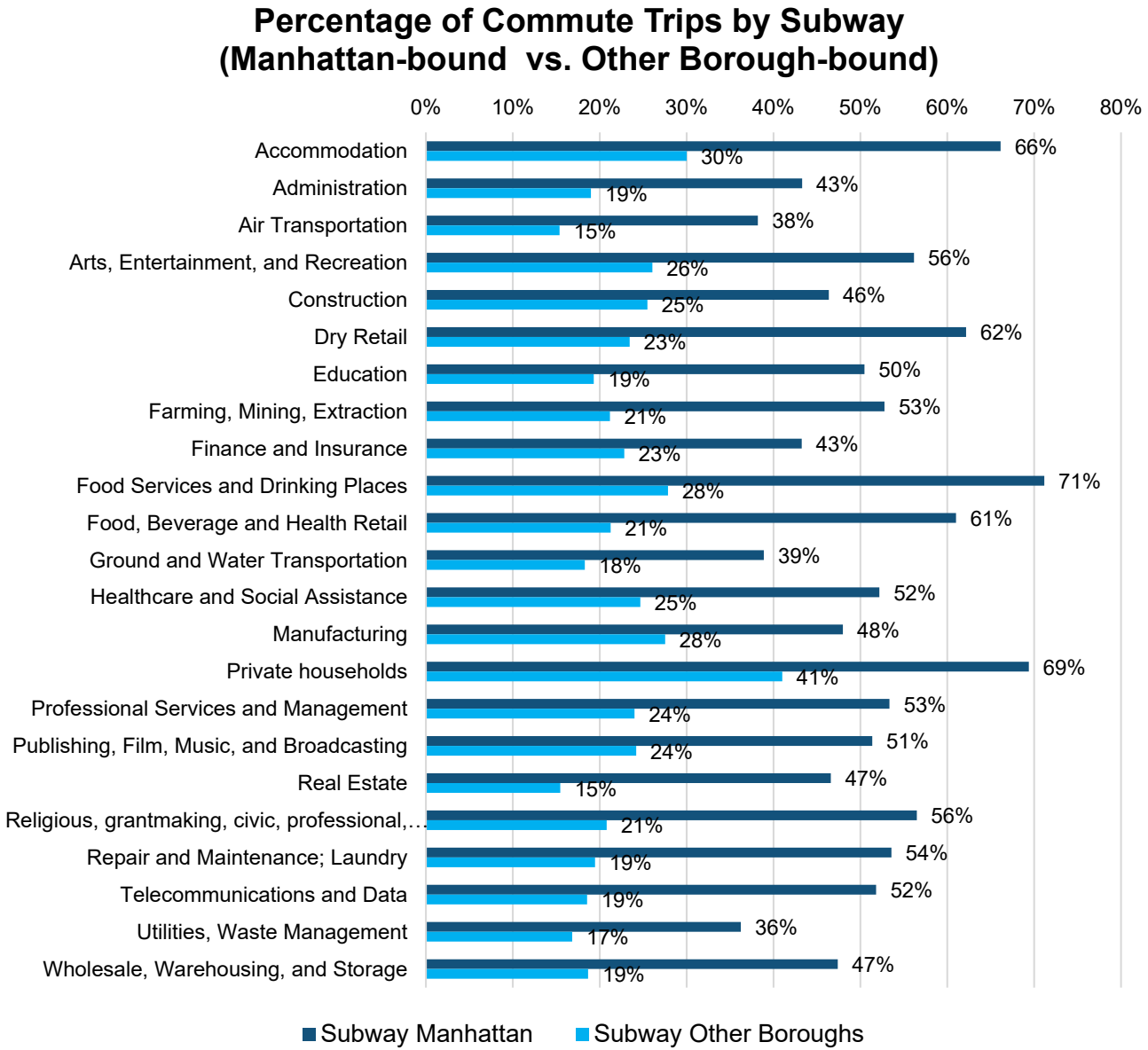
Workers in some industries tend to commute by car more than others, including ***Utilities, Warehousing and Storage***, ***Administration***, ***Air Transportation***, and ***Ground and Water Transportation***.

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-COVID Commute Patterns by Industry: Subway



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).

Timeline

New York COVID-19 Pandemic Timeline

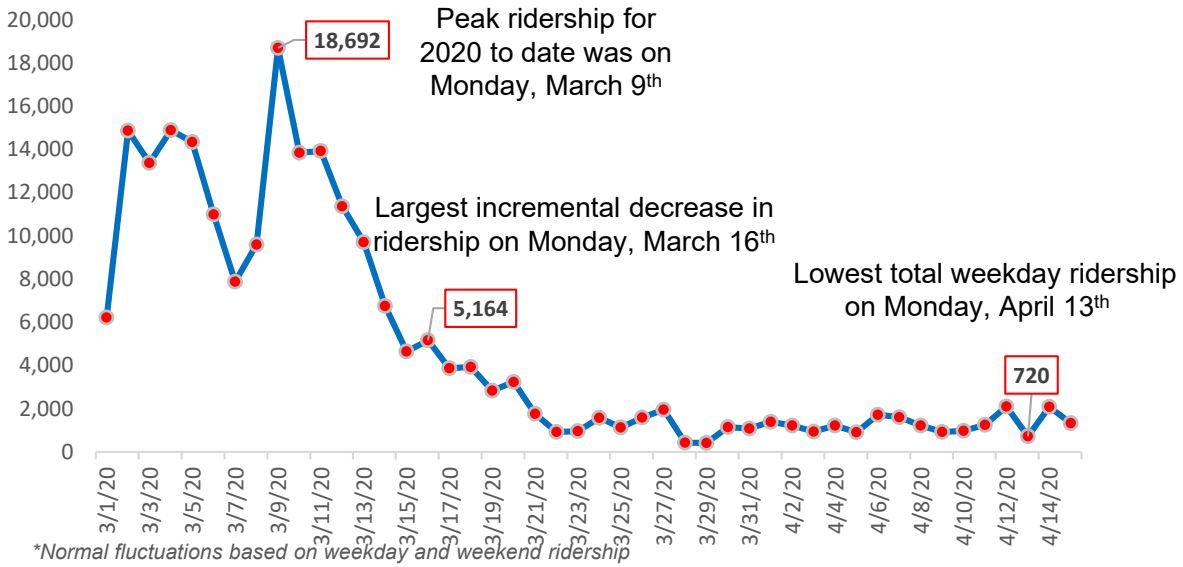
- March 1st, 2020: **First confirmed case** in New York (Manhattan healthcare worker) https://www.wsj.com/articles/first-case-of-coronavirus-confirmed-in-new-york-state-11583111692
- March 5th, 2020: Mayor De Blasio says that a virus fears shouldn't keep New Yorkers off the subway https://www.nydailynews.com/coronavirus/ny-coronavirus-bill-de-blasio-coronavirus-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 modified 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 reduced 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 subway shutdowns set to begin at 1:00 am

APPENDIX

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

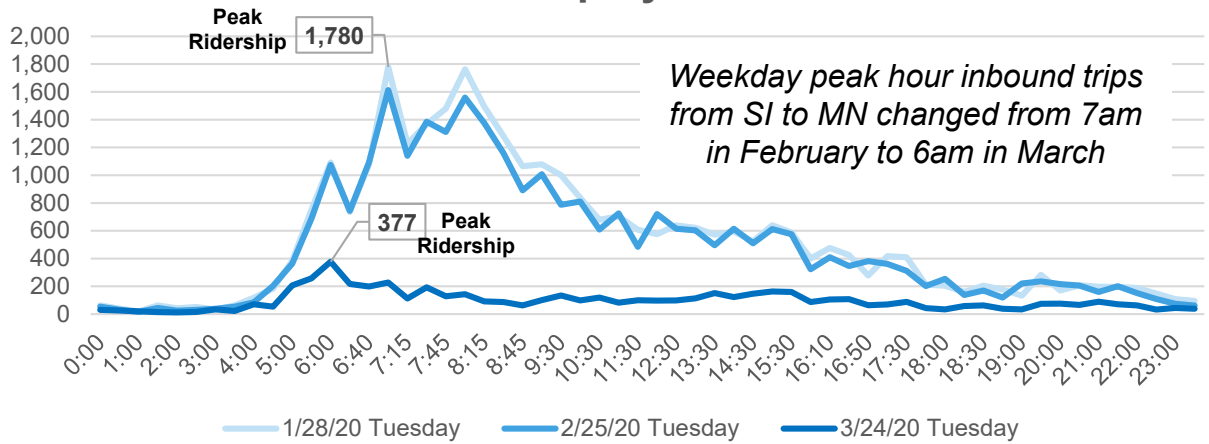
Ferry Ridership

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

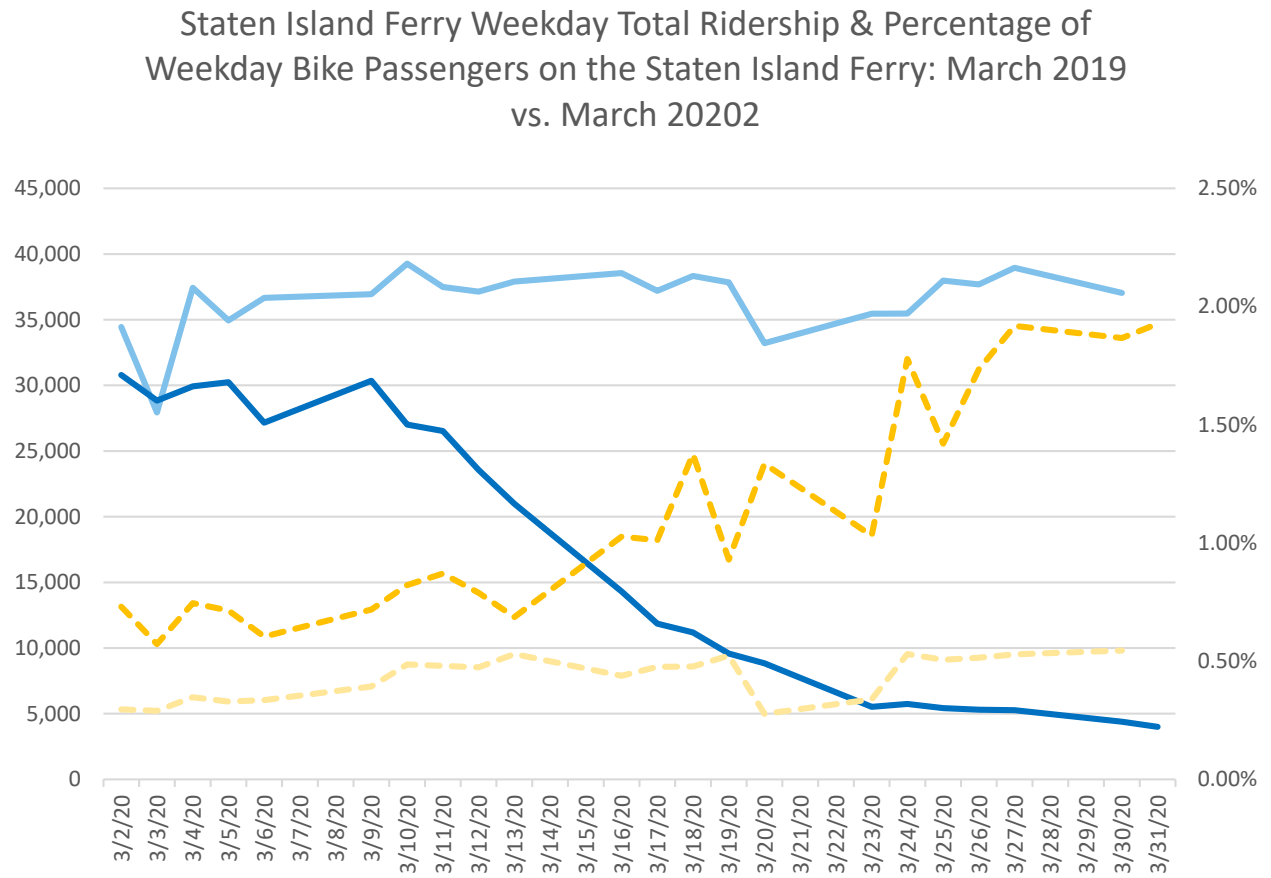


*Normal fluctuations based on weekday and weekend ridership

2020 Staten Island Ferry Inbound Weekday Ridership by Service



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



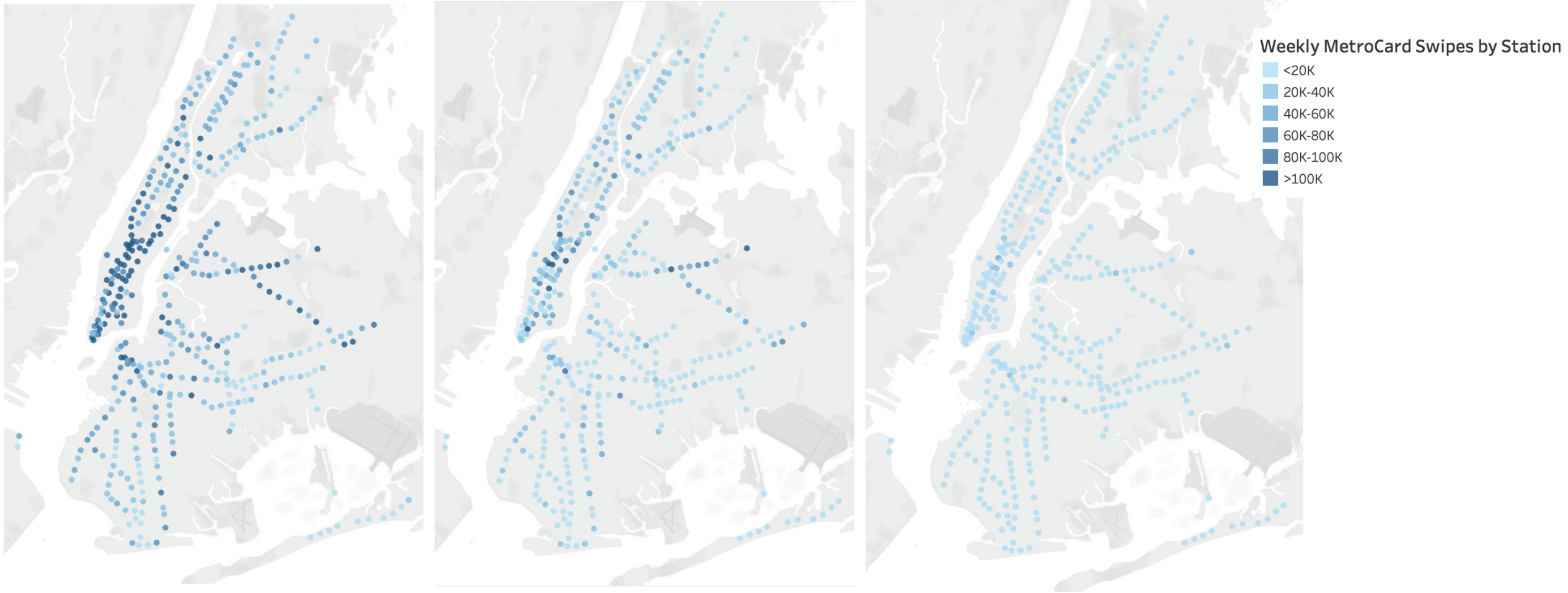
While overall ridership has plummeted, the percent of passengers travelling with a bike increased.

MetroCard Swipes: Week of Jan 4-10 vs Mar 14-20 vs Apr 18-24

January 4-10 2020

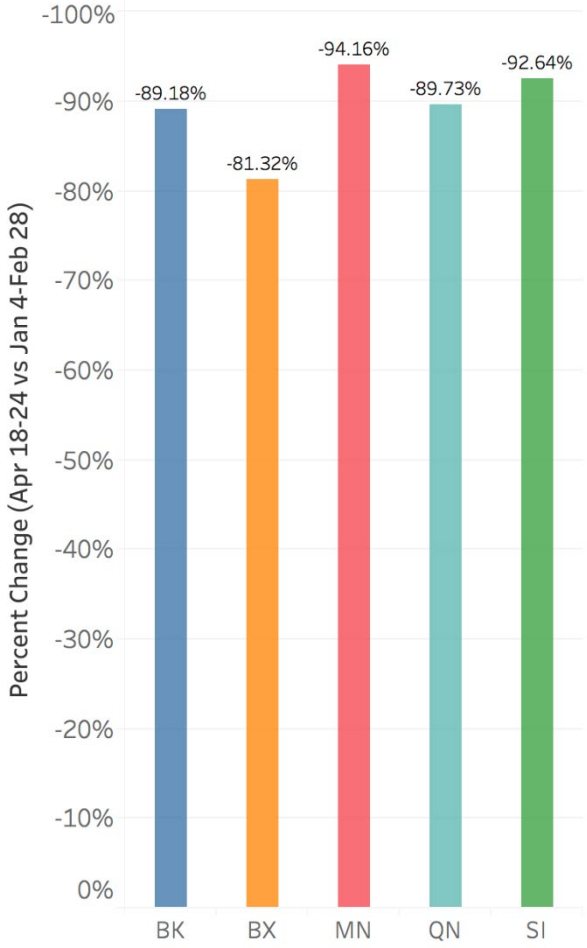
March 14-20 2020

April 18-24 2020

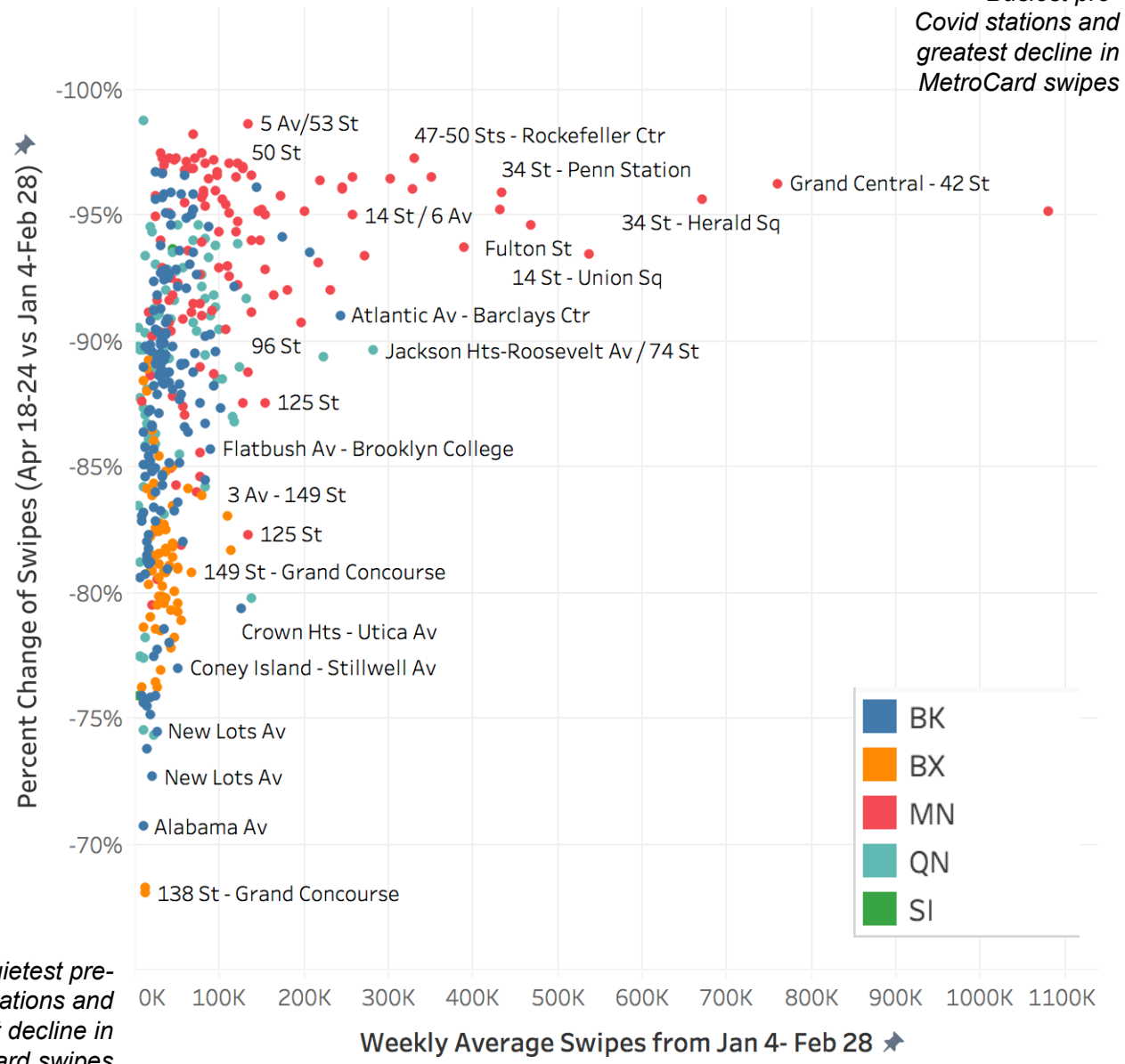


Data sources: MTA Fare Data (http://web.mta.info/developers/fare.html) May 5, 2020

Degrees of Ridership Change by Station Activity



Busiest pre-Covid stations and greatest decline in MetroCard swipes



Quietest pre-Covid stations and lowest decline in MetroCard swipes

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

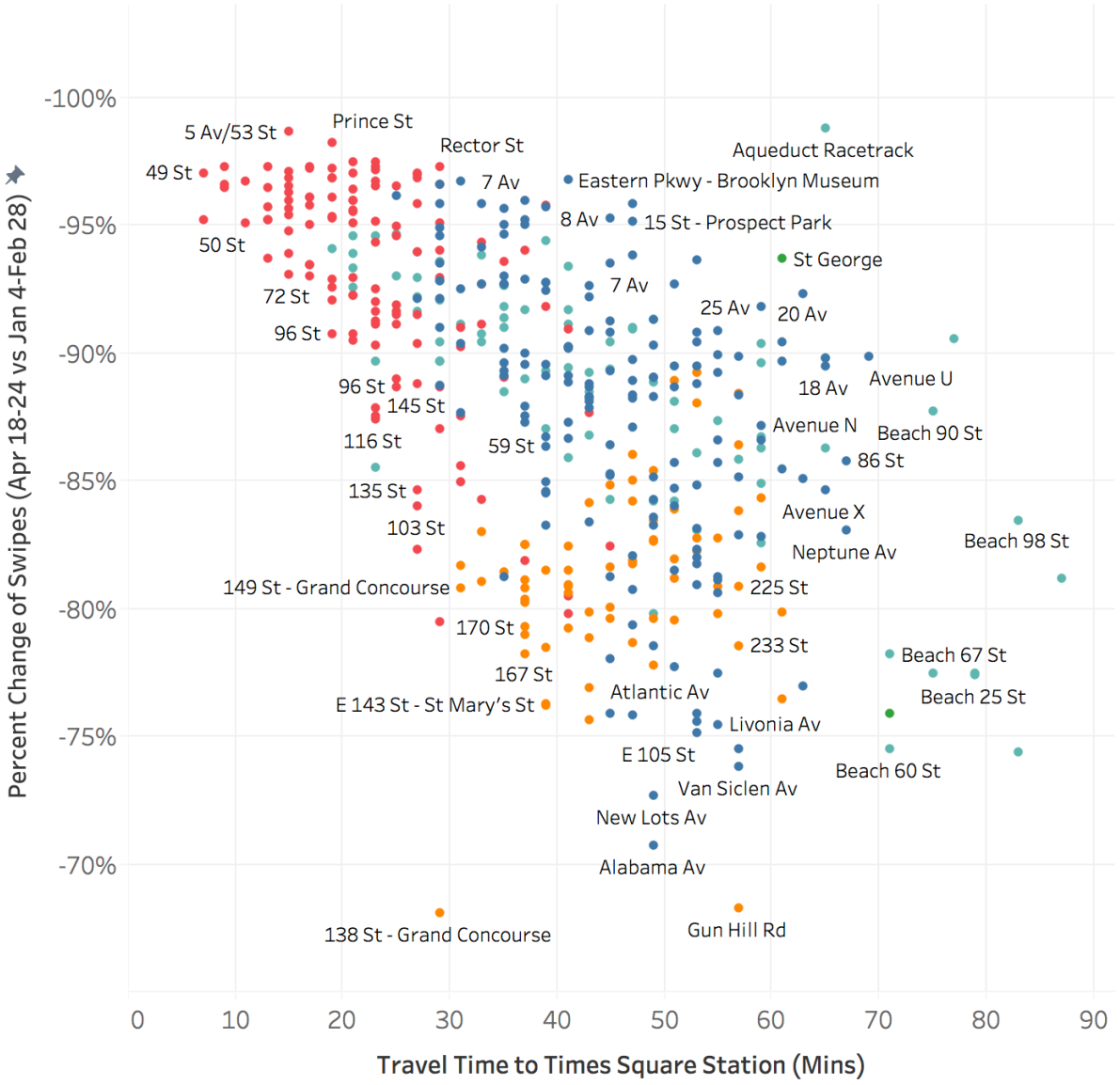
Overall, busier stations saw more dramatic declines, particularly in the central business districts.

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 18-24.

Data sources: MTA Fare Data (http://web.mta.info/developers/fare.html)

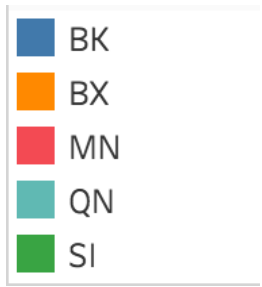
MetroCard Swipes Percent Change by Distance to The Core



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.

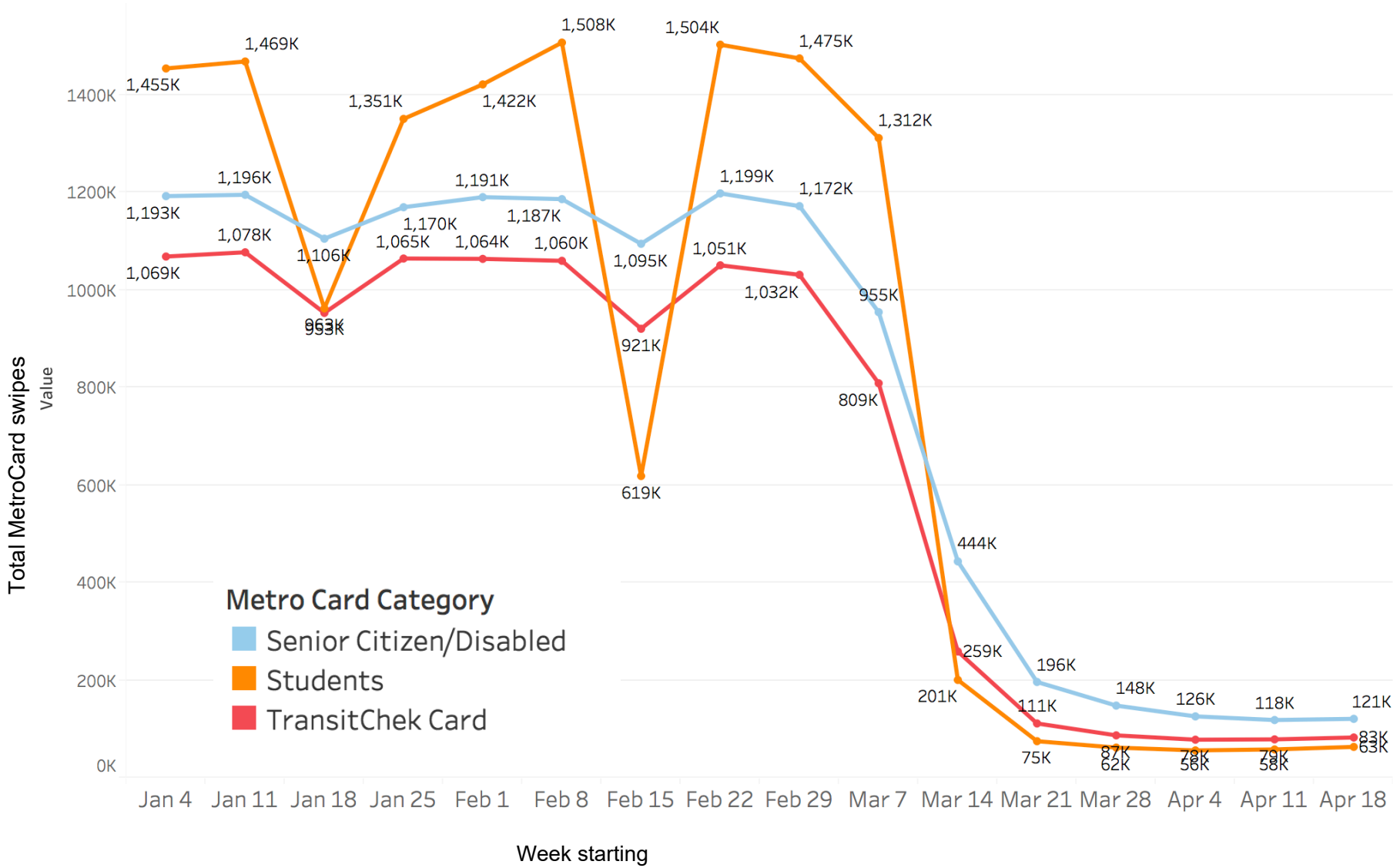
Change is measured by comparing the weekly average of January 4 – February 28th against the week of April 18-24.



https://public.tableau.com/profile/dcptransportation#!/vizhome/MetroCardSwipes-Distance/Dashboard1

Data sources: MTA Fare Data (http://web.mta.info/developers/fare.html)

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



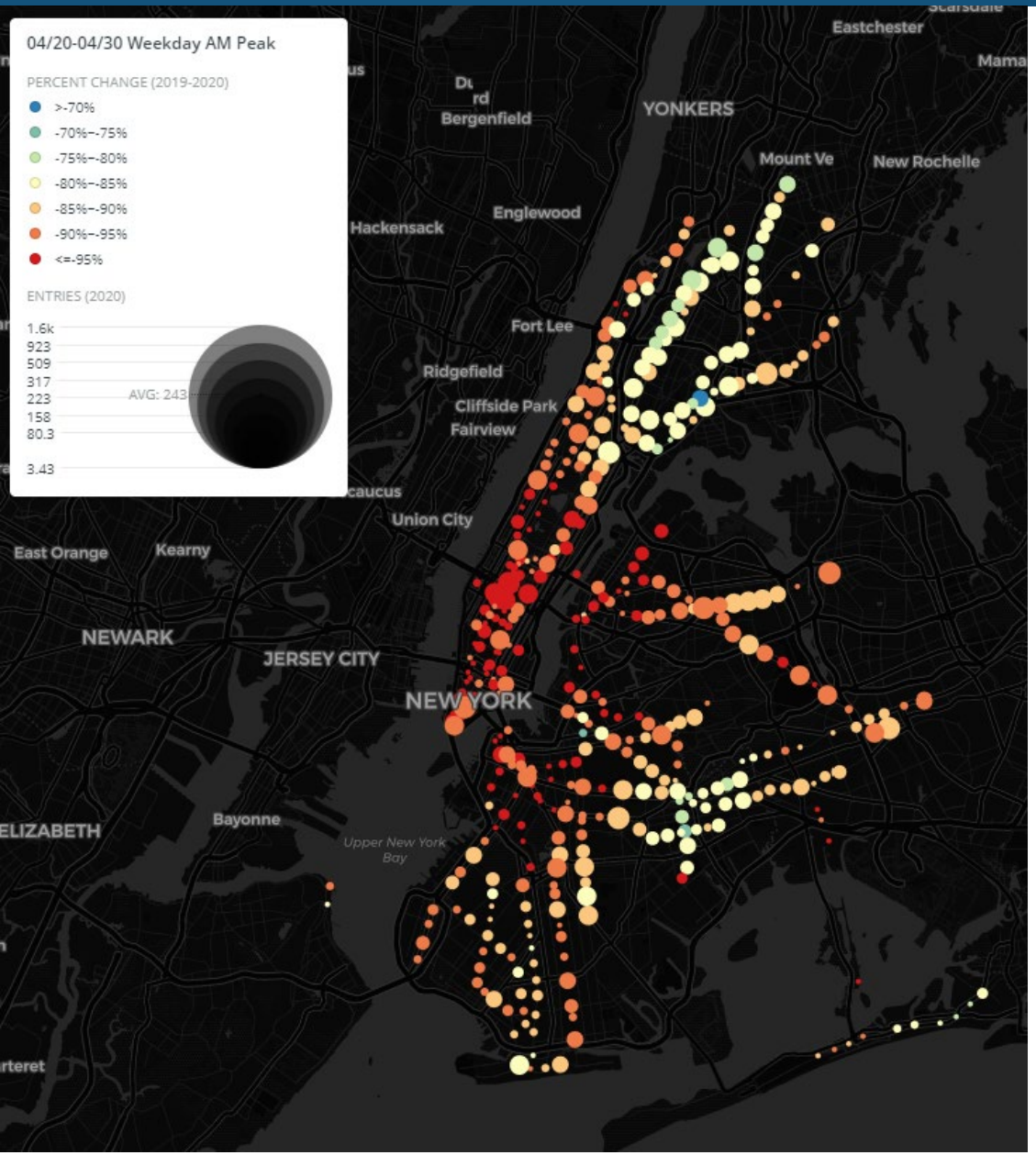
Though drastically reduced over typical time periods, there were still more than 120,000 MetroCard swipes by reduced-fare cards for senior citizens, and people with disabilities, the week of April 18-24.

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

Data sources: MTA Fare Data (http://web.mta.info/developers/fare.html)

AM Peak Weekday Turnstile Data: Apr 20-Apr 30 2020 vs 2019



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

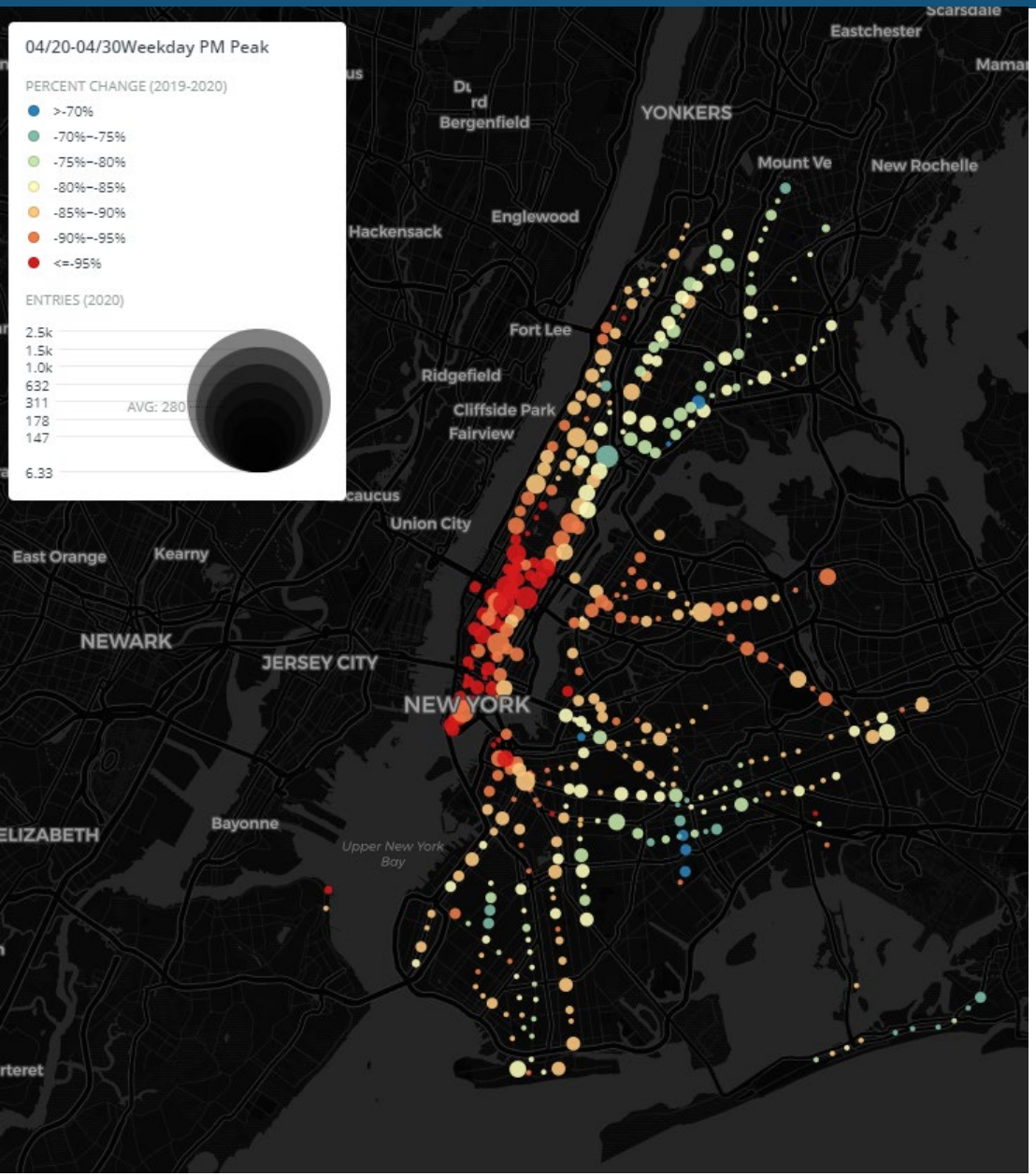
- The largest AM peak ridership declines are observed in the Manhattan Core and Inner Ring, and along the B/Q and E train lines.

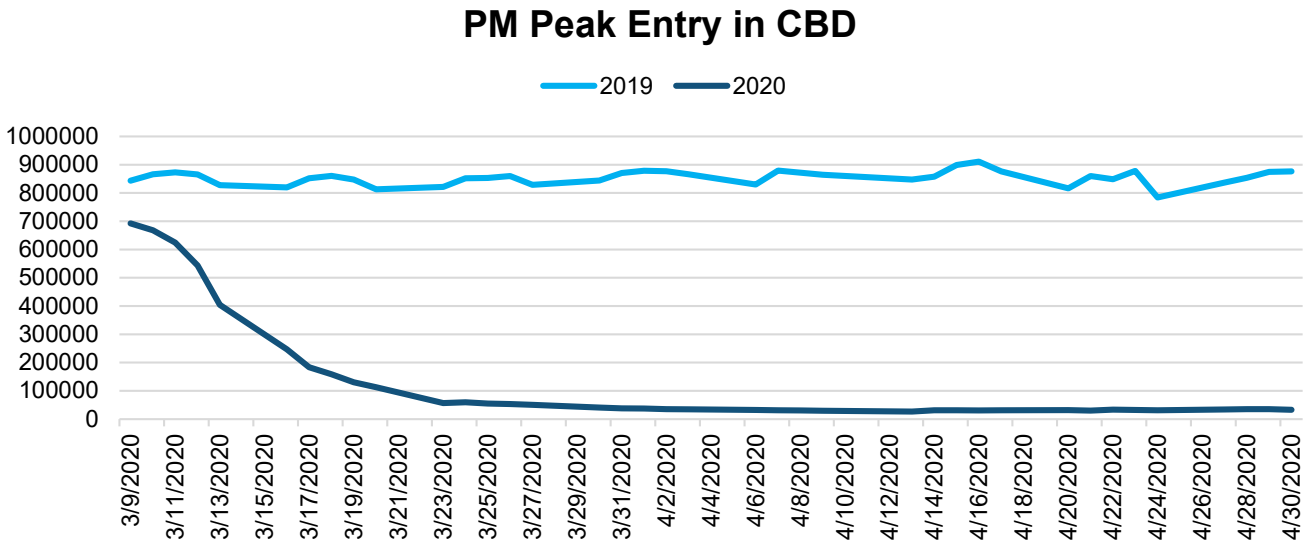
Turnstile Data:

- MTA turnstile data map compares weekday ridership during the fourth and fifth weeks of April 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 fourth and fifth weeks of April 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 20-Apr 30 2020 vs 2019



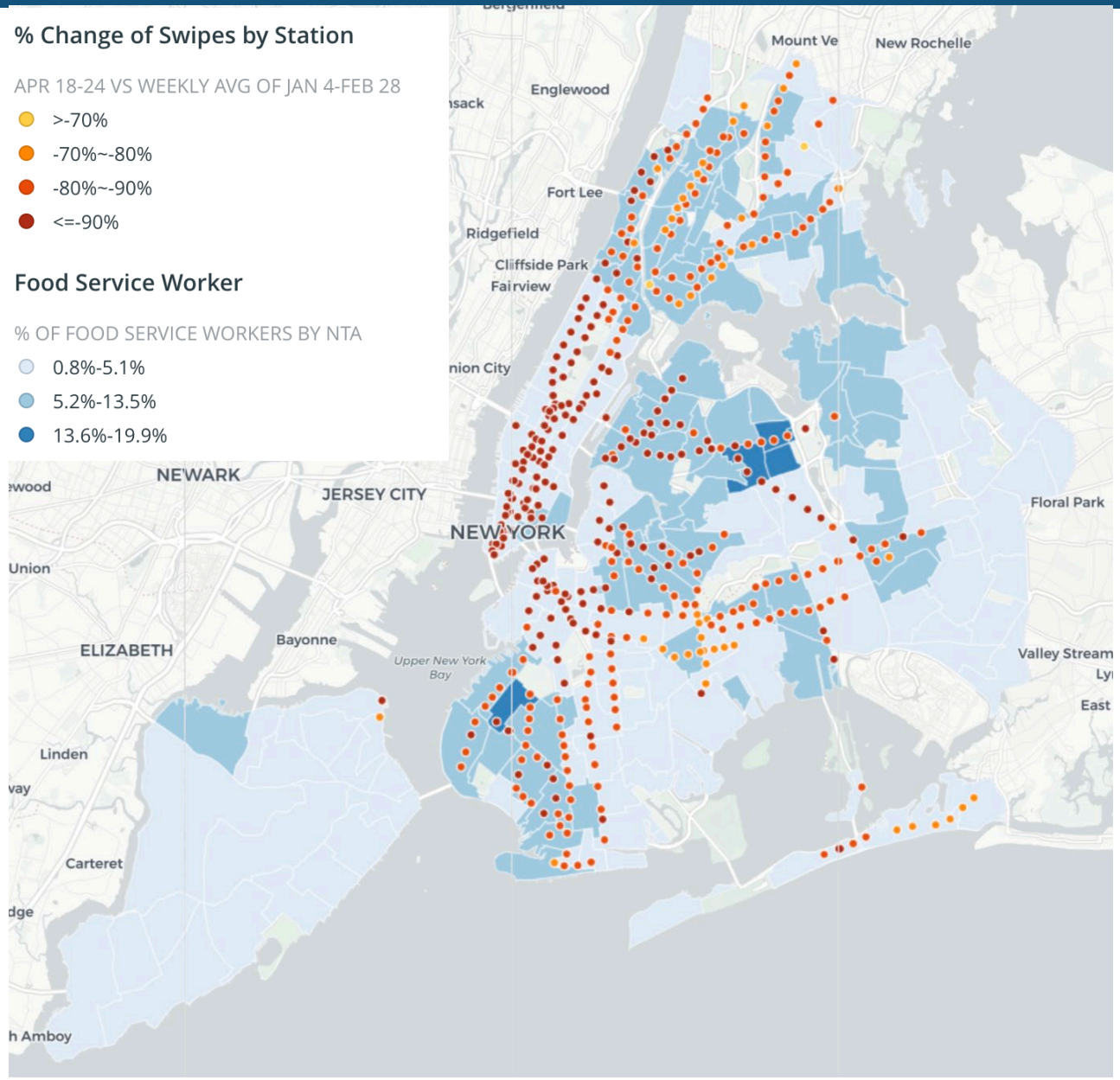


PM peak hour trips generally indicate where people are commuting *to*:

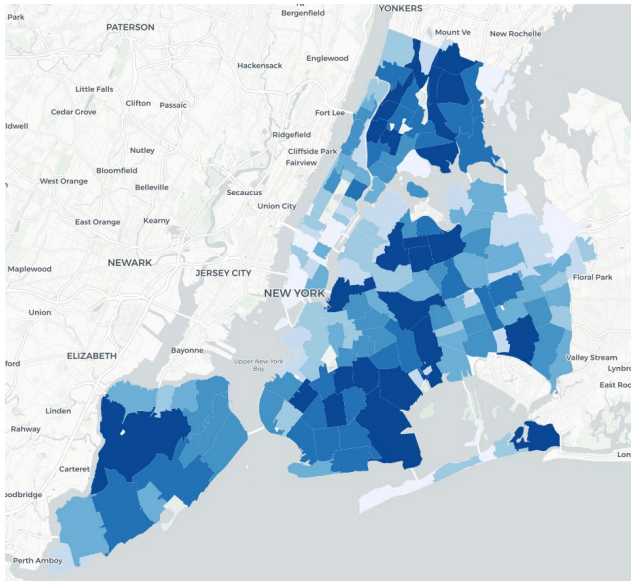
- The CBD area has seen the largest decreases in weekday entries during the PM peak 4-hour window*. The ridership has dropped approximately 96%.
- However, the CBD stations continue to have the highest ridership across the city, with about 30,000 entries per 4 hours in total in the PM peak.

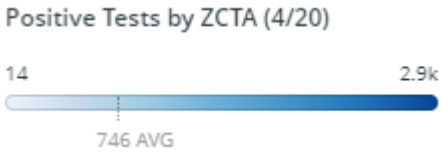
*the 4-hour window of aggregated data varies by station but the map reflects whichever window encompassed the typical morning peak.
Data sources: MTA Turnstile data (http://web.mta.info/developers/turnstile.html)

MetroCard swipes and where food service workers live



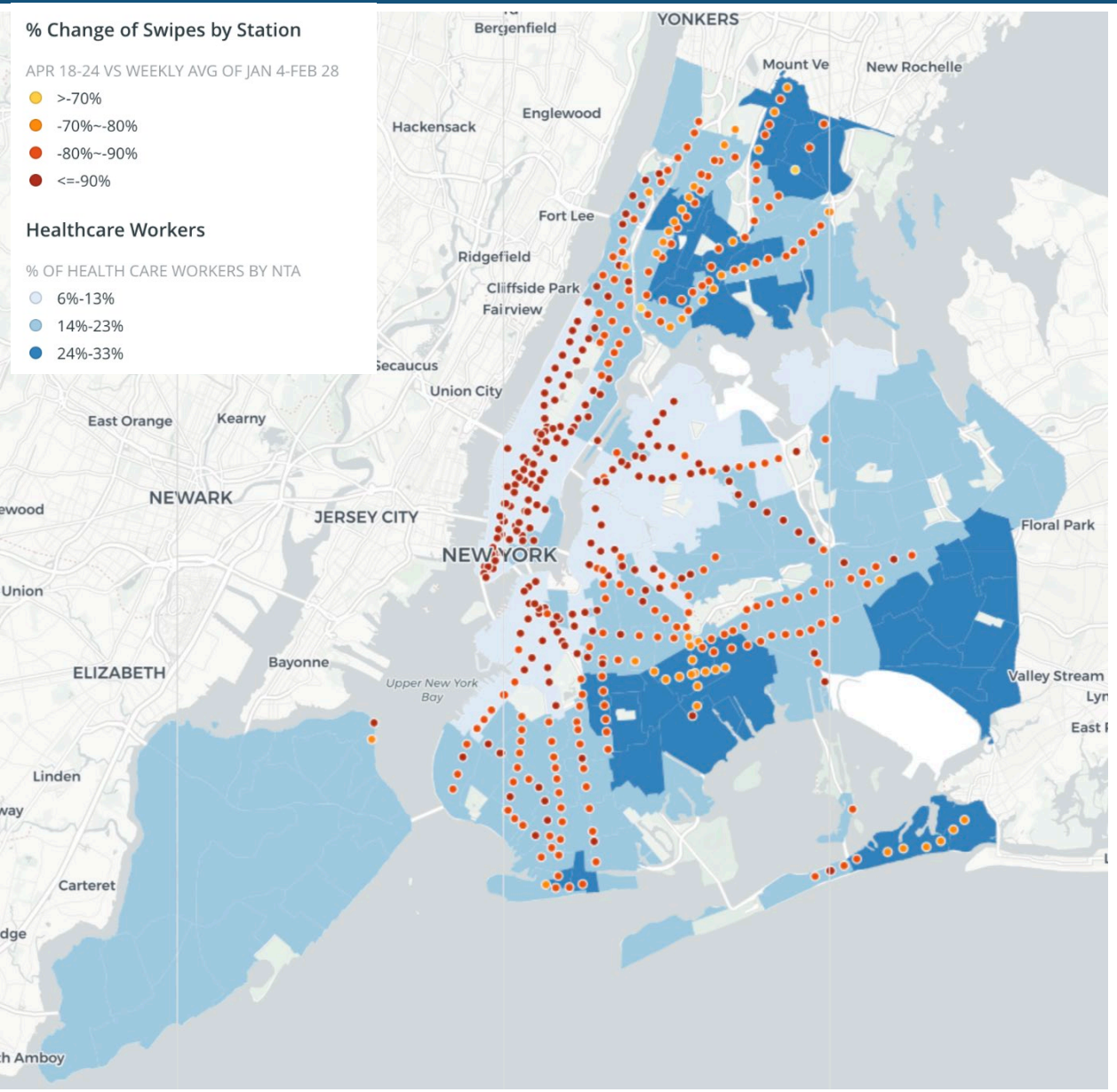
- Areas where concentrations of food workers live do not appear to connected with higher rates of subway ridership under the pandemic.
- Nevertheless, we do see concentrations of food workers in the same neighborhoods as, or adjacent to, concentrations of confirmed positive COVID19 cases.
- Corona, Queens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





Data source: 2014-2018 ACS. Table S2401: OCCUPATION BY SEX FOR THE CIVILIAN EMPLOYED POPULATION 16 YEARS AND OVER

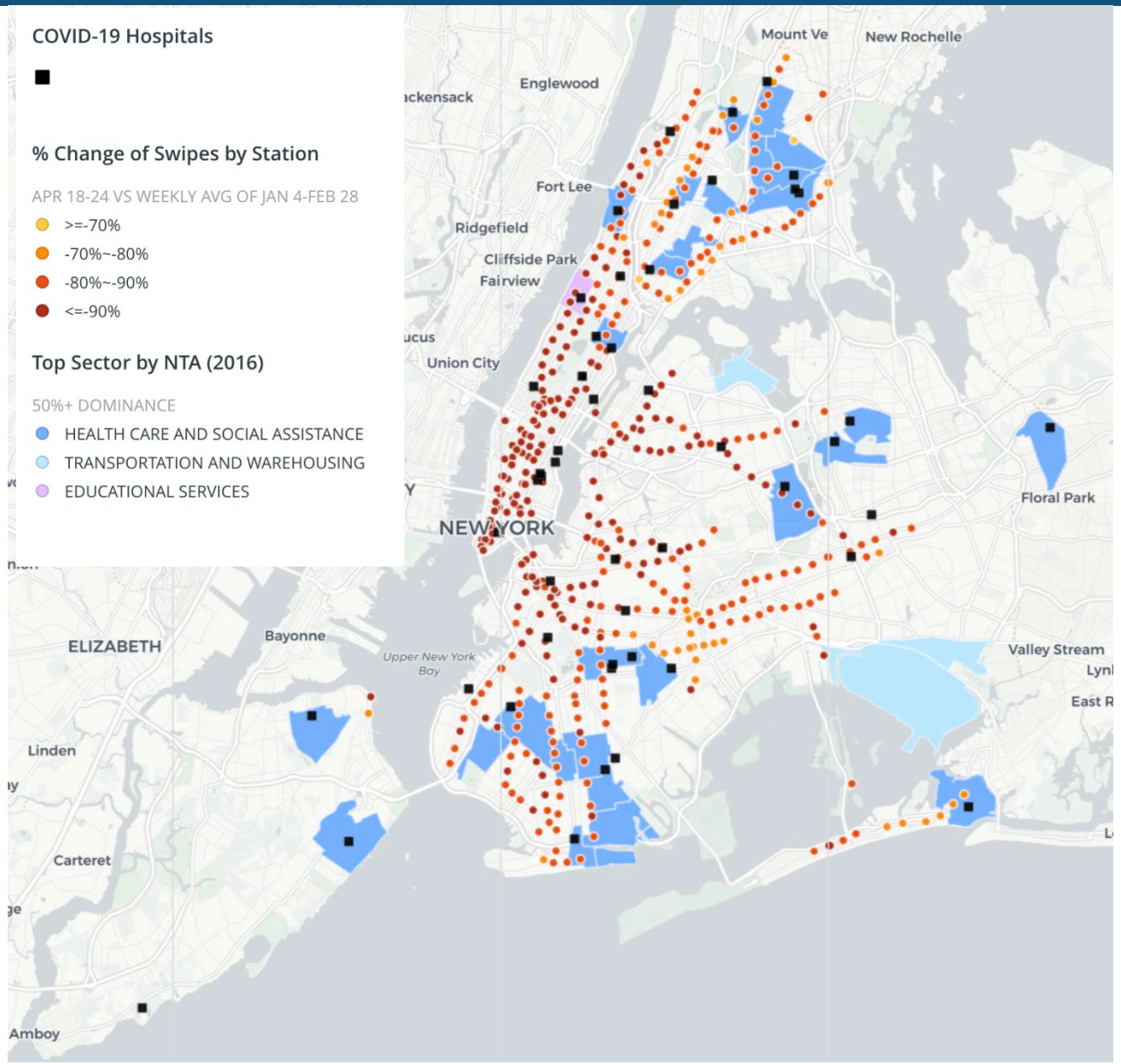
MetroCard swipes and where healthcare workers live



- 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.

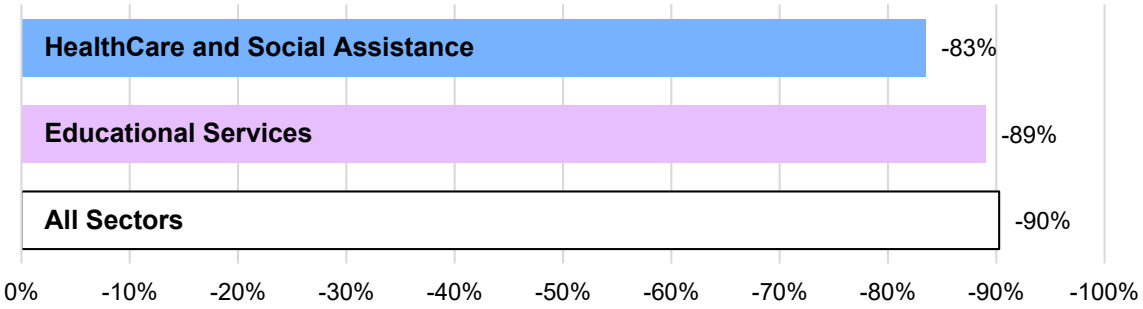
Data sources: MTA Fare Data (http://web.mta.info/developers/fare.html); 2014-2018 ACS, healthcare & social assistance workers over total employed civilians over 16 years old Table number: S2403INDUSTRY BY SEX FOR THE CIVILIAN EMPLOYED POPULATION 16 YEARS AND OVER

MetroCard Swipes and Healthcare Jobs – Place of Work



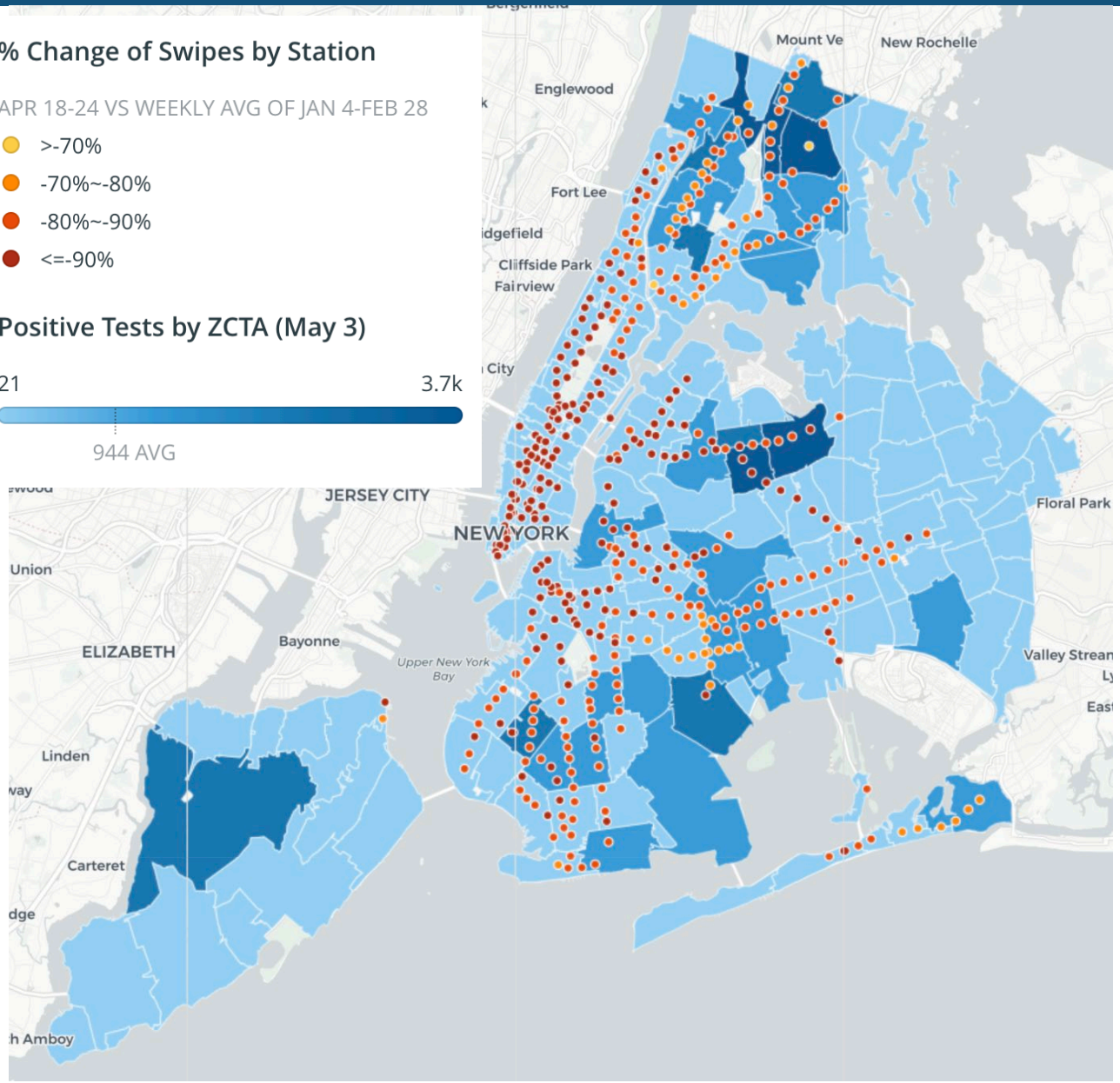
- This map shows neighborhoods where more than half of the jobs within the neighborhood are within a single sector. Most of these are in healthcare or social assistance.
- These neighborhoods contain or are near hospitals that are currently accepting suspected COVID19 patients.
- As essential workers 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



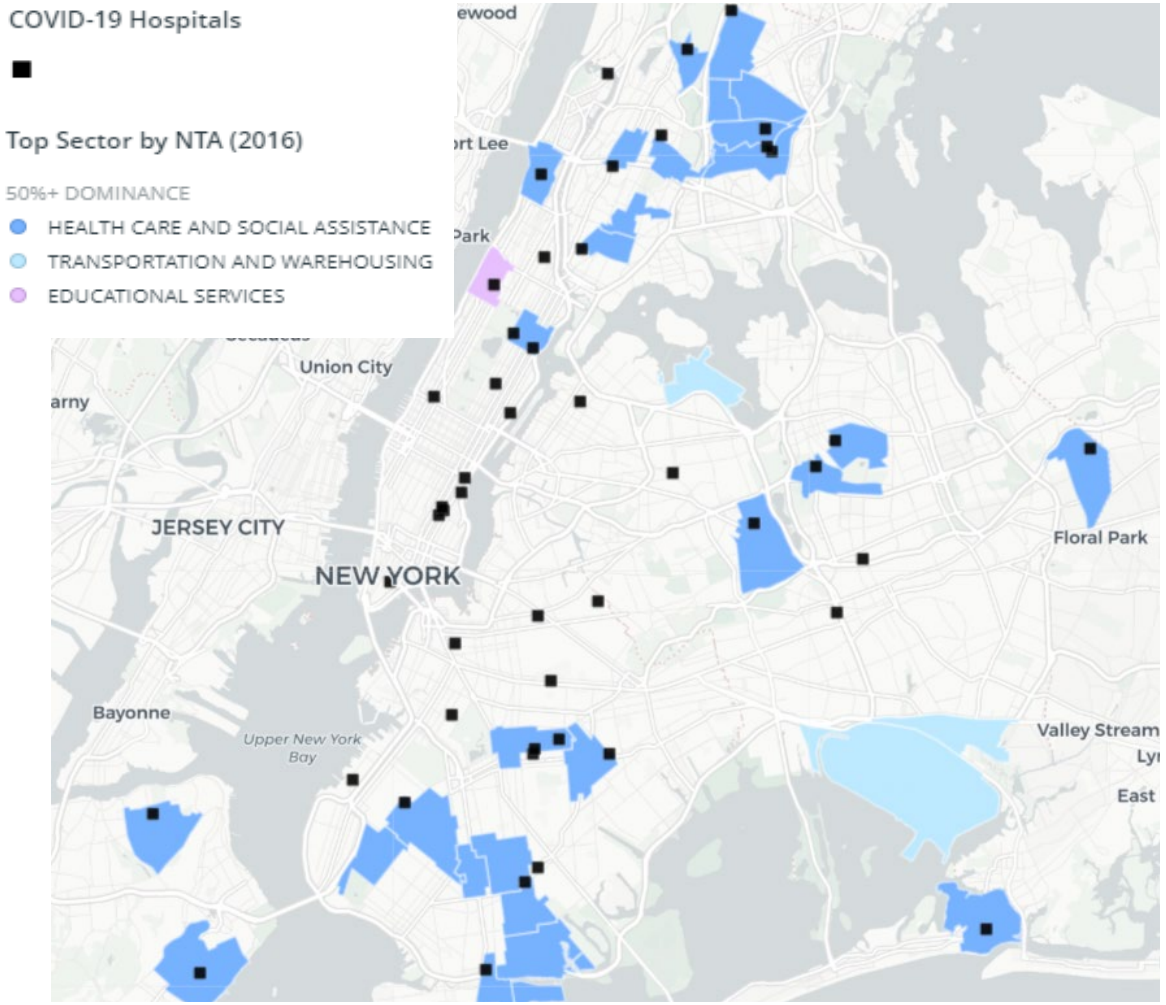
- Some neighborhoods in the city with the lowest decline in subway ridership also show the highest numbers of confirmed positive COVID19 cases.
- Areas with the highest number of confirmed cases (shown in dark blue) and the least change in ridership (shown in lighter orange) include Borough Park and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

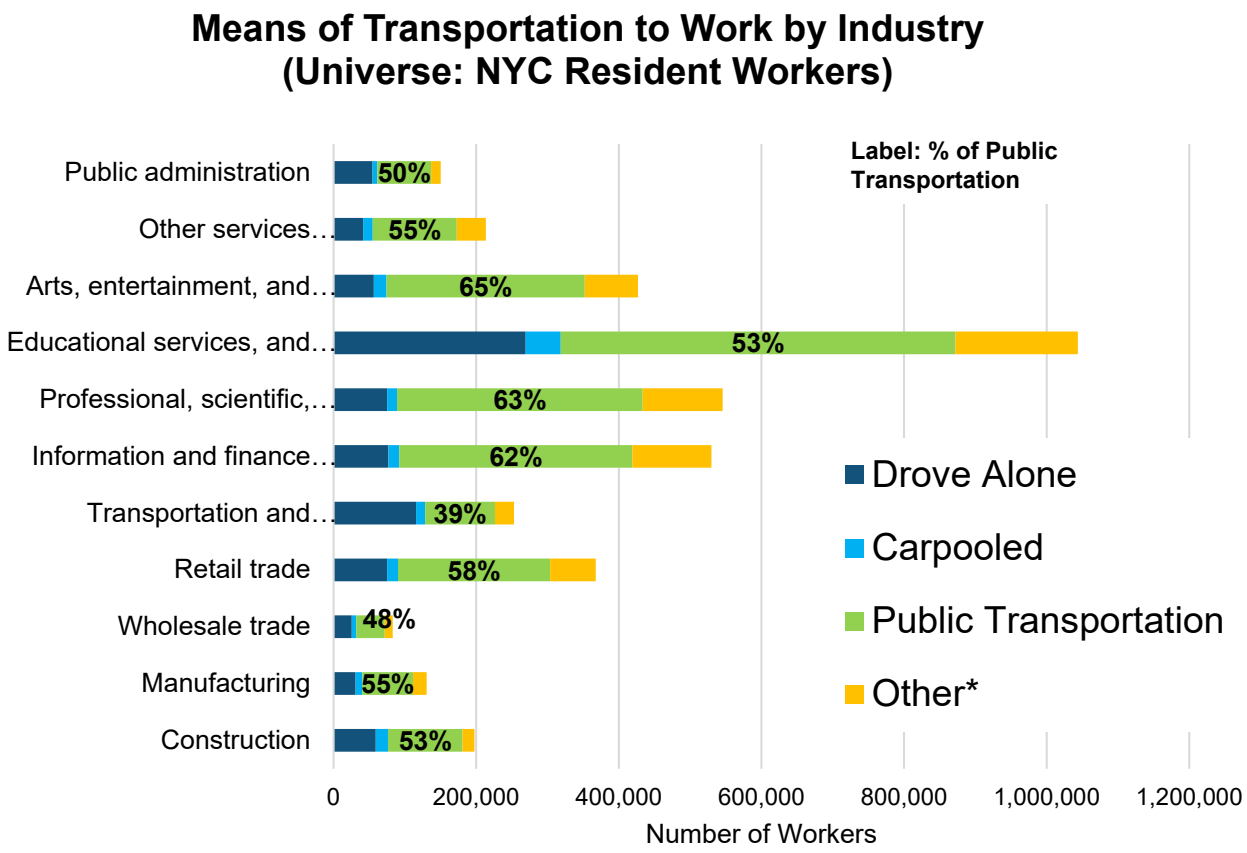
Source: DOH – COVID19 Data from 5/3; MTA Fare Data (http://web.mta.info/developers/fare.html)

Journey to Work

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 slighter 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).**

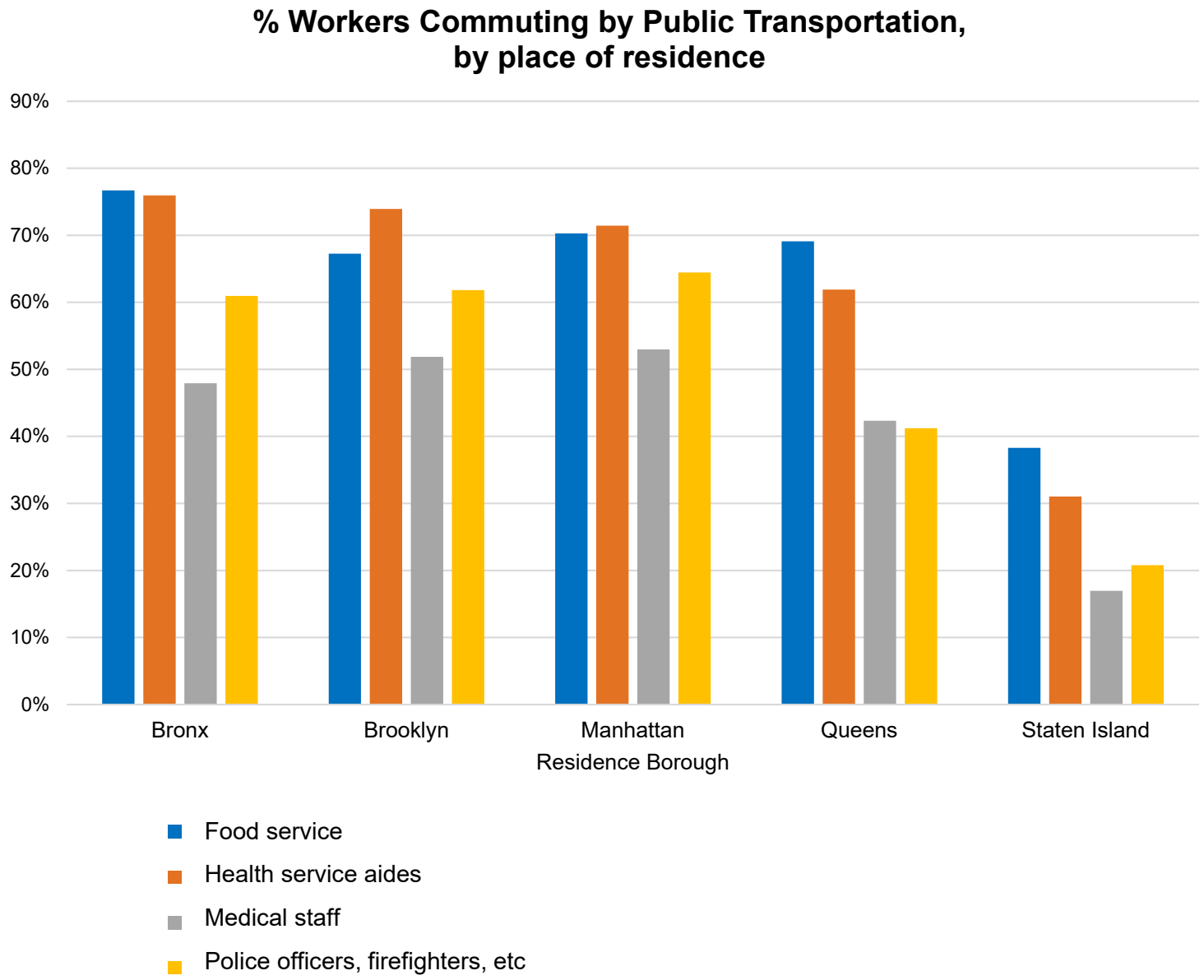




Note: Other mode is derived from total workers and workers using the 3 other modes.

Data sources: DCP Housing Economic Development division, QCEW 2016 (3rd Quarter), geocoded private, non-headquartered firms; 2014-2018 ACS, Table S0802 MEANS OF TRANSPORTATION TO WORK BY SELECTED CHARACTERISTICS.

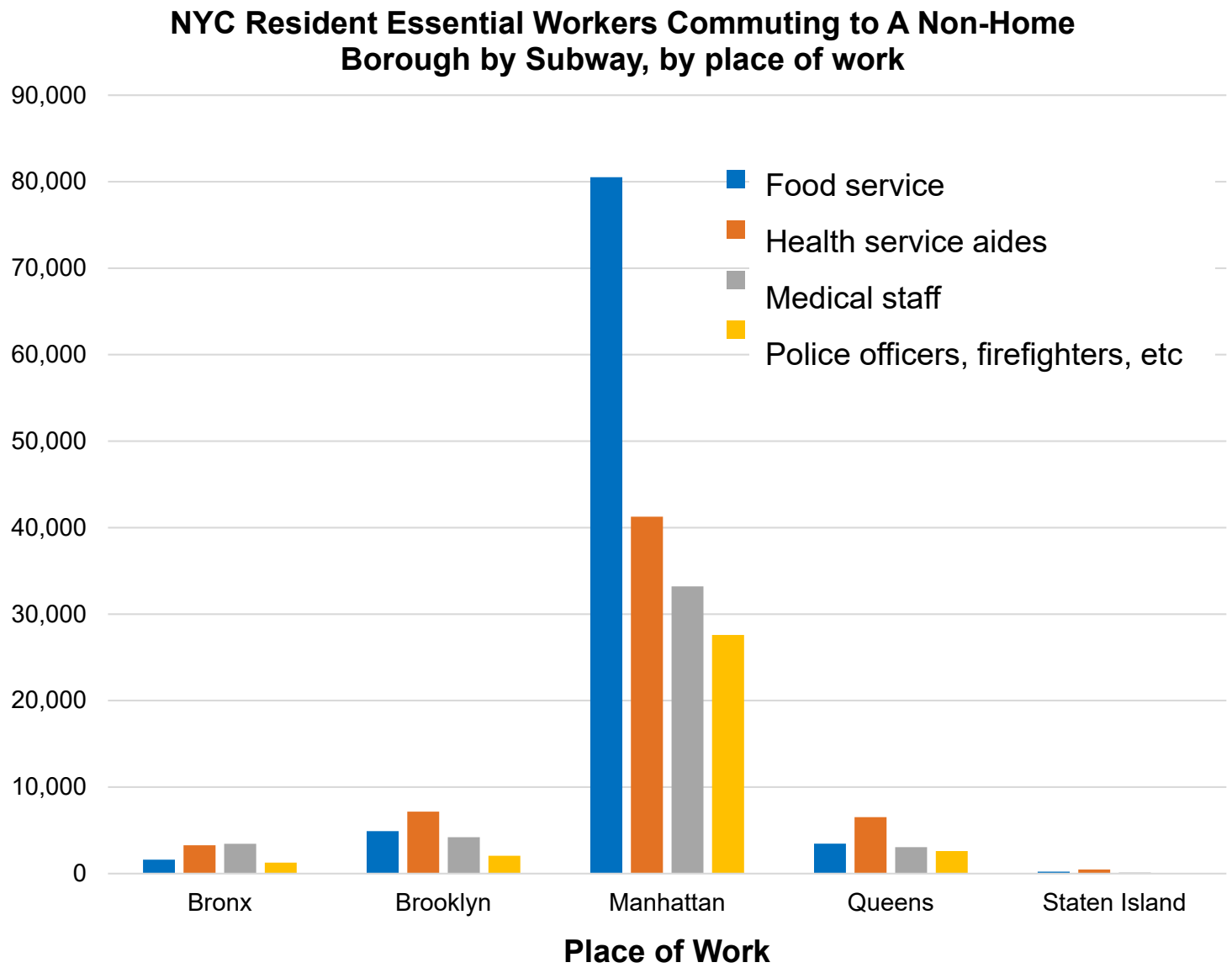
Essential Workers Commuting by Public Transportation *Pre-COVID 19*



- 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.

Data sources: 2014-2018 PUMS. Universe: people who both lived and worked in NYC.

Essential Workers Commuting by Subway *Pre-COVID19*

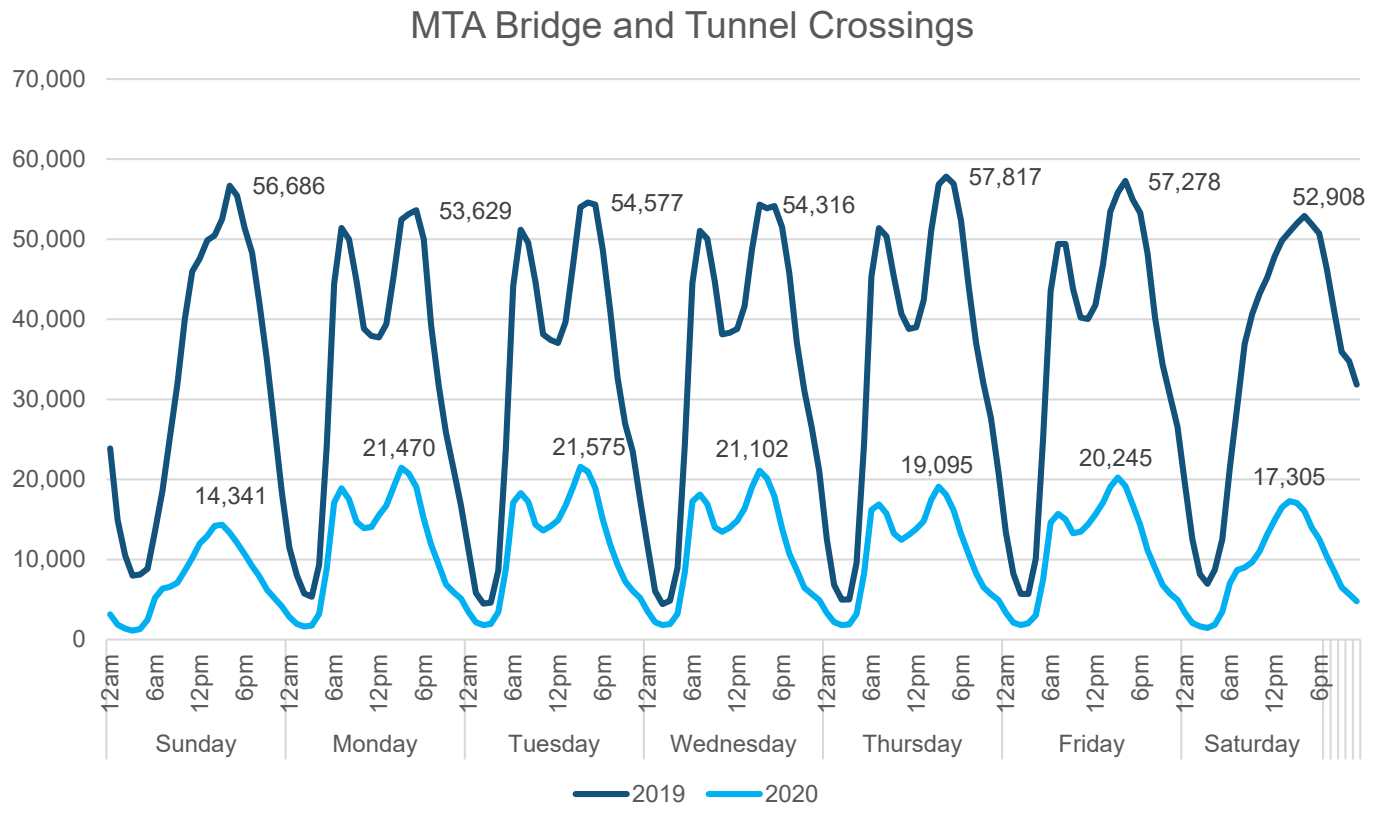


- Pre-COVID19, nearly 200,000 workers in this subset of essential sectors commuted via subway to Manhattan from another borough.
- Among these selected sectors, food service workers constituted the majority of Manhattan-bound subway commuters from other boroughs, while health service aides were the most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

Data sources: 2014-2018 PUMS. Universe: people who both lived and worked in NYC.

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.

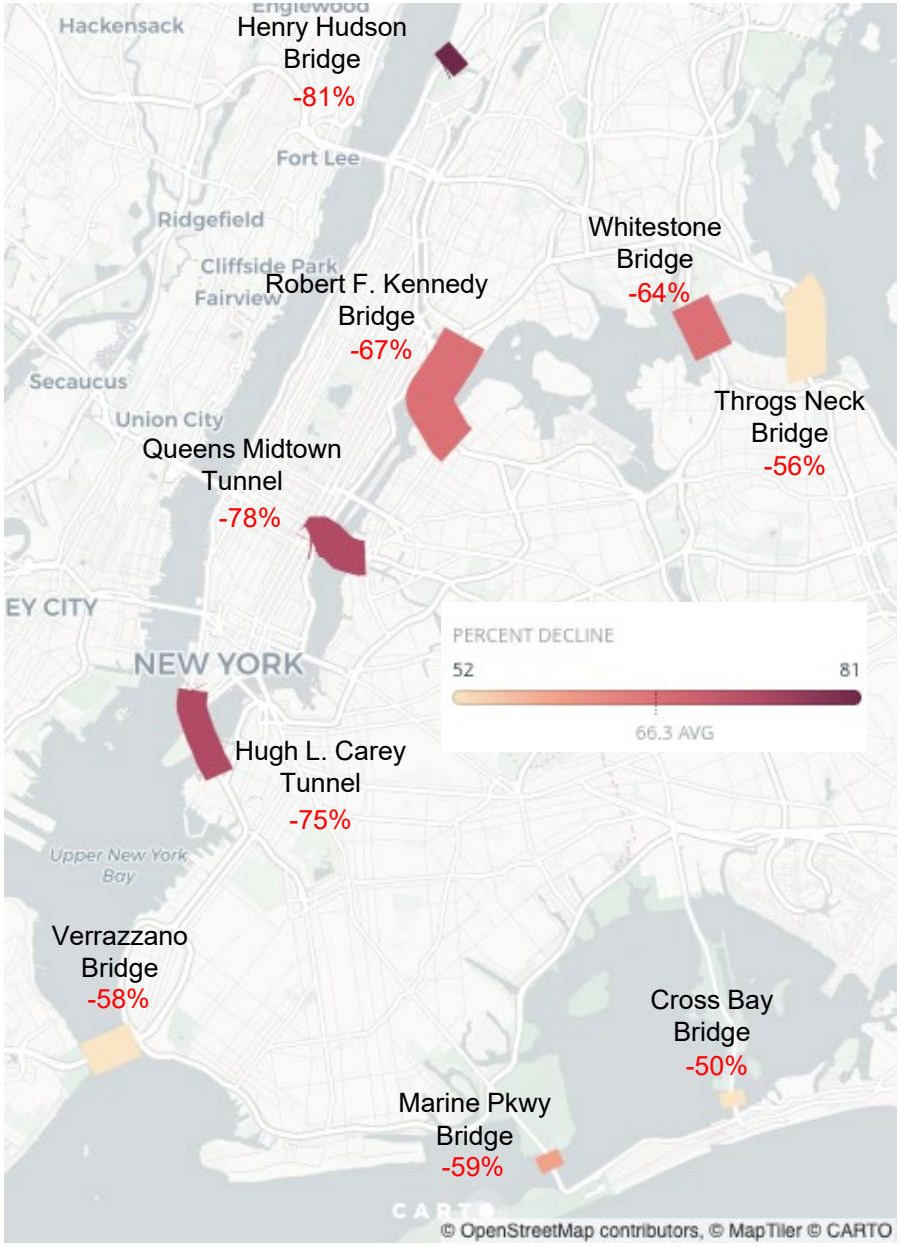
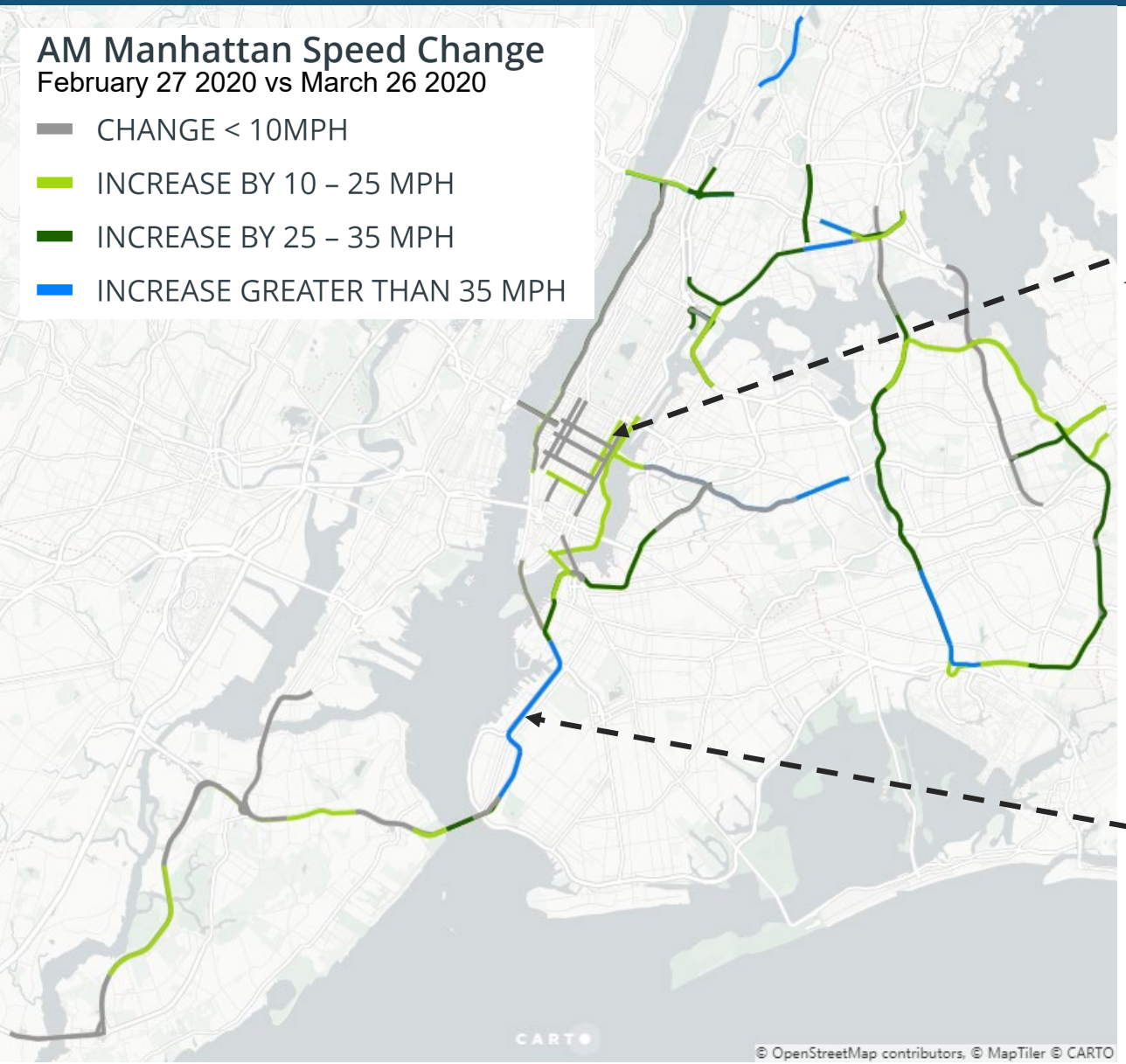
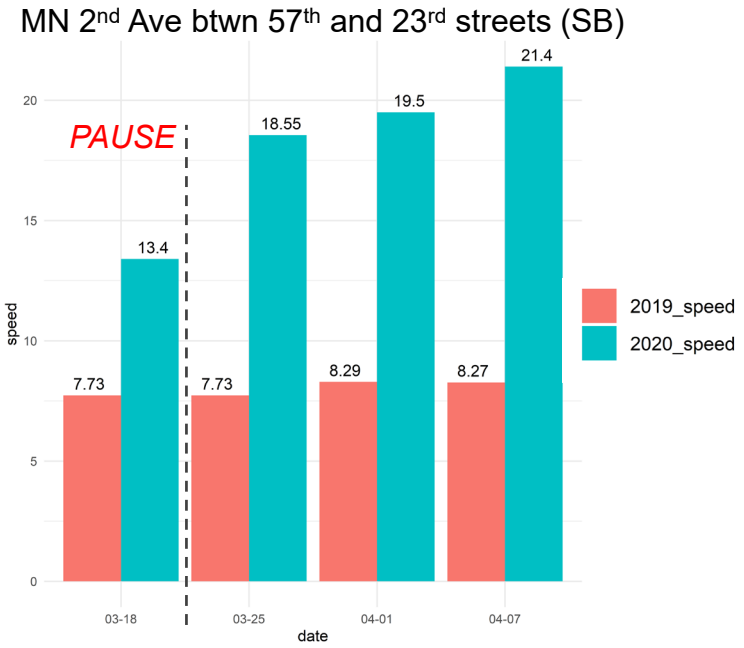
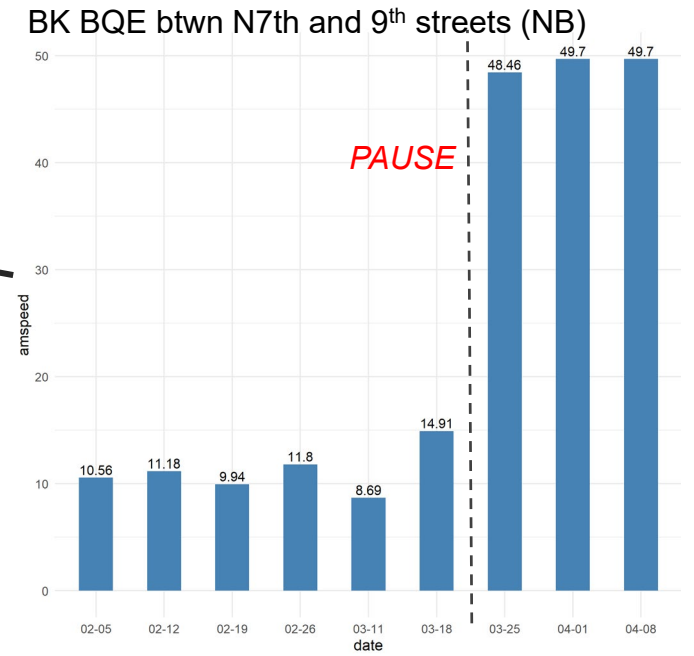


Chart at top refers to 4/7/19-4/13/19 and 4/5/20-4/11/20; Map at right refers to change from 4/10/19 to 4/8/20

NYC AM Peak Road Speed Change







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).

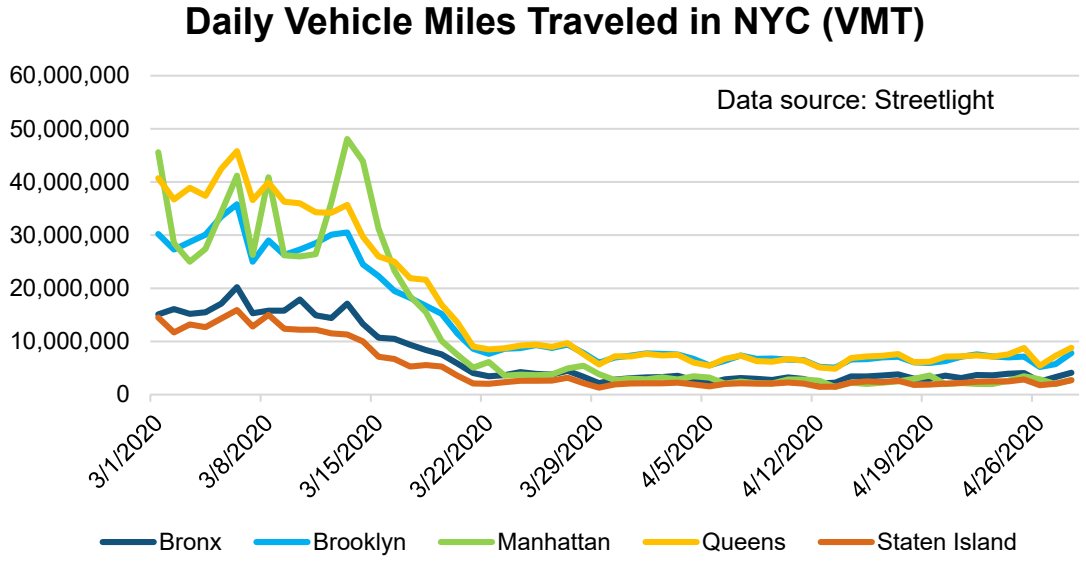
(Weighted speed=Sum (speed 1st length 1st+.....+speed nth*length nth)/Sum(length 1+.....+length nth).

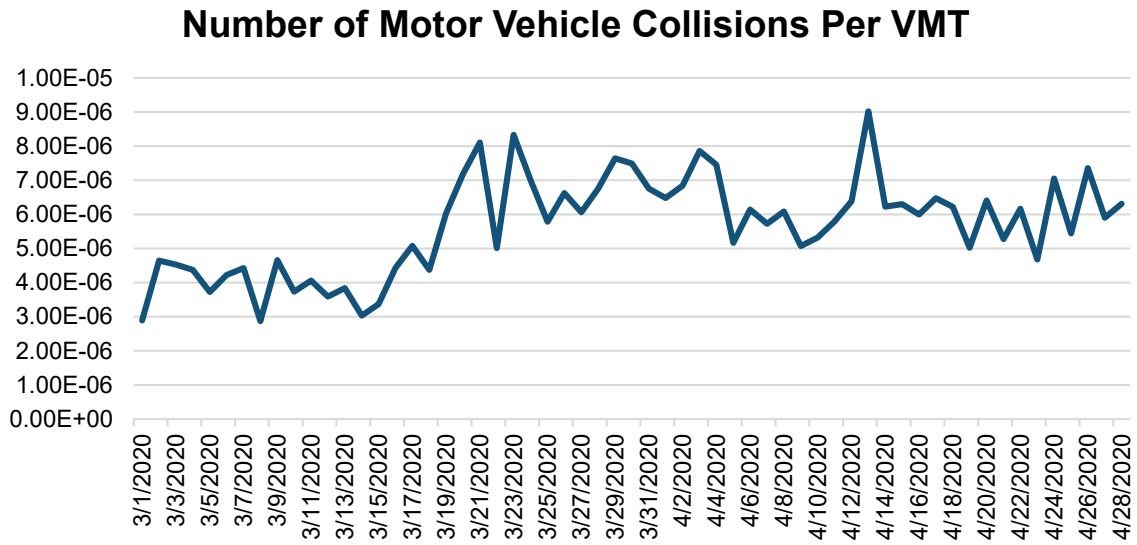
Interactive map: NYC Road Speed Change(03-26 vs 02-27)

Data Source: NYC DOT

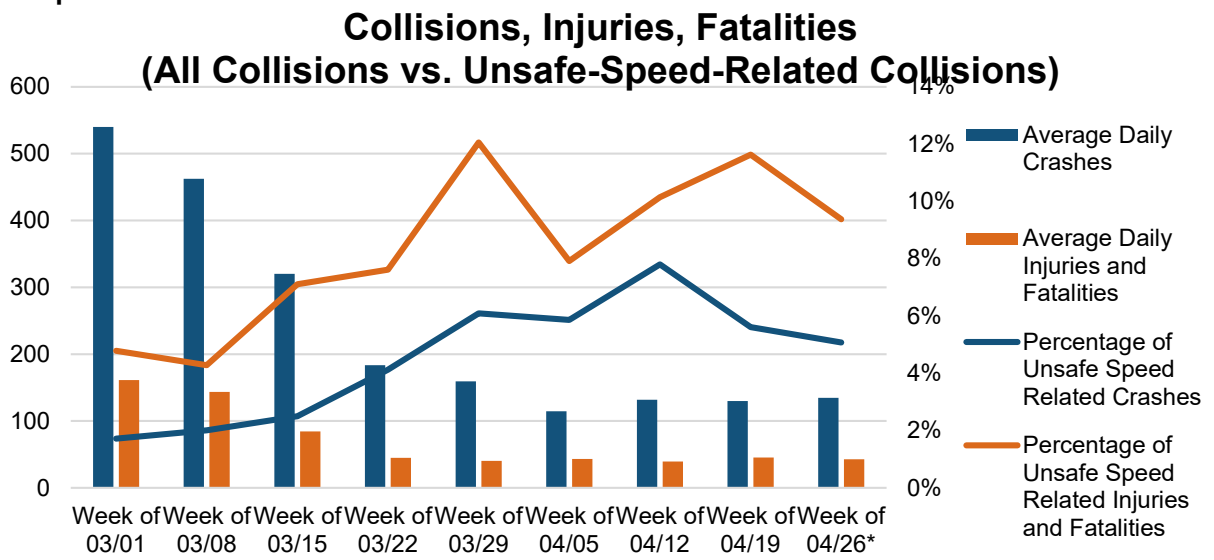
(The date represent that week. For Manhattan data, the baseline is Q1 2019 average speed)

Motor Vehicle Collisions- March 1st to April 28th 2020





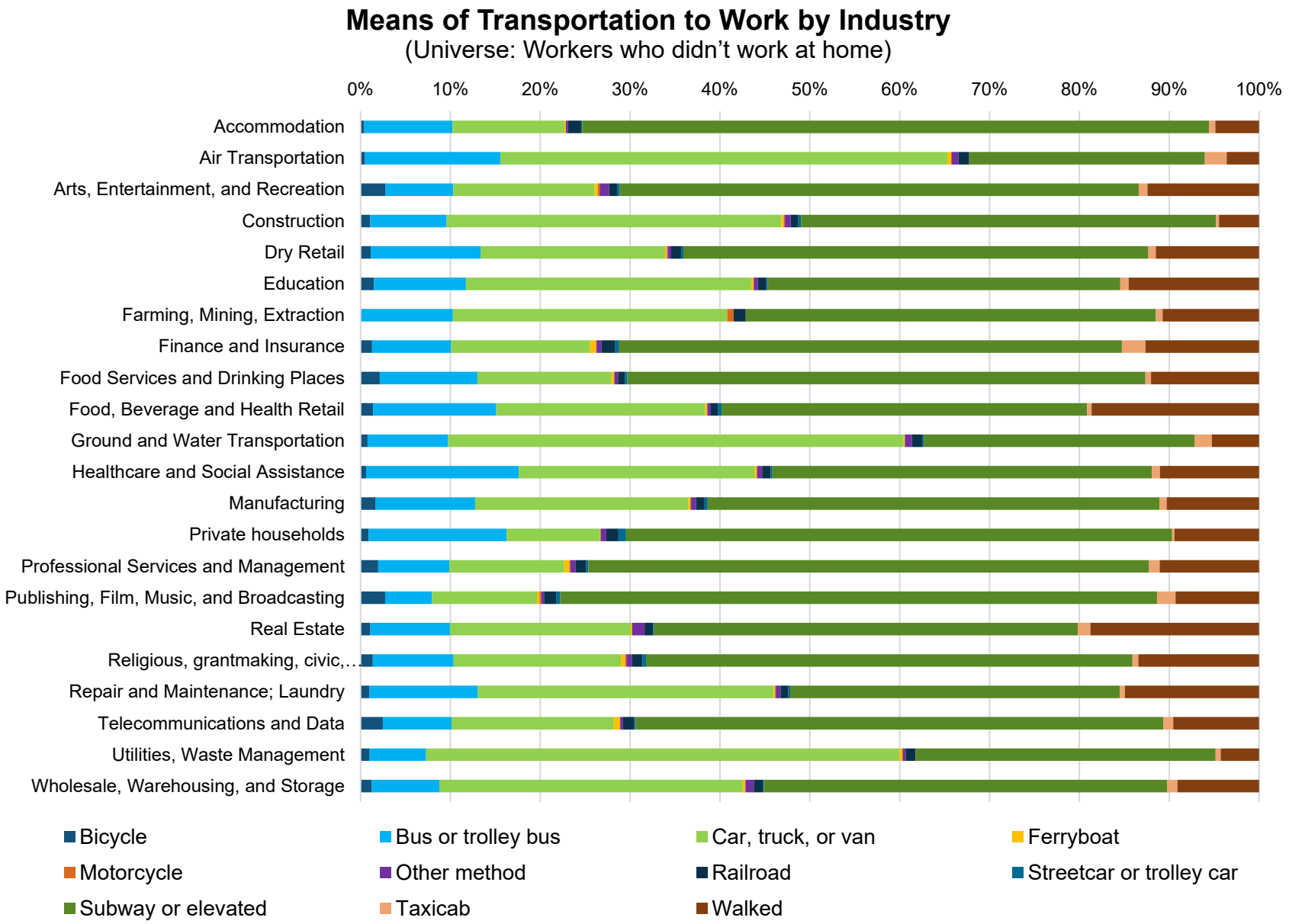
- There were significant declines in vehicle miles travelled (VMT) as the City and State progressively enacted stay-at-home measures.
- The VMT peak after Friday, March 13 may reflect people leaving the city in their cars.
- The number of collisions per VMT has first risen steeply right after PAUSE but started to gradually decline in the past week.
- Although numbers of motor vehicle collisions, injuries and fatalities have plummeted since mid-March, the percentage of crashes, injuries and fatalities related to unsafe speed went up.



*Week of 04/26 is a 6-day average as the data for 05/02 has not been released.

Data source: NYPD Motor Vehicle Collisions (https://data.cityofnewyork.us/Public-Safety/Motor-Vehicle-Collisions-Crashes/h9gi-nx95)

Pre-COVID19 Commute Mode by Industry



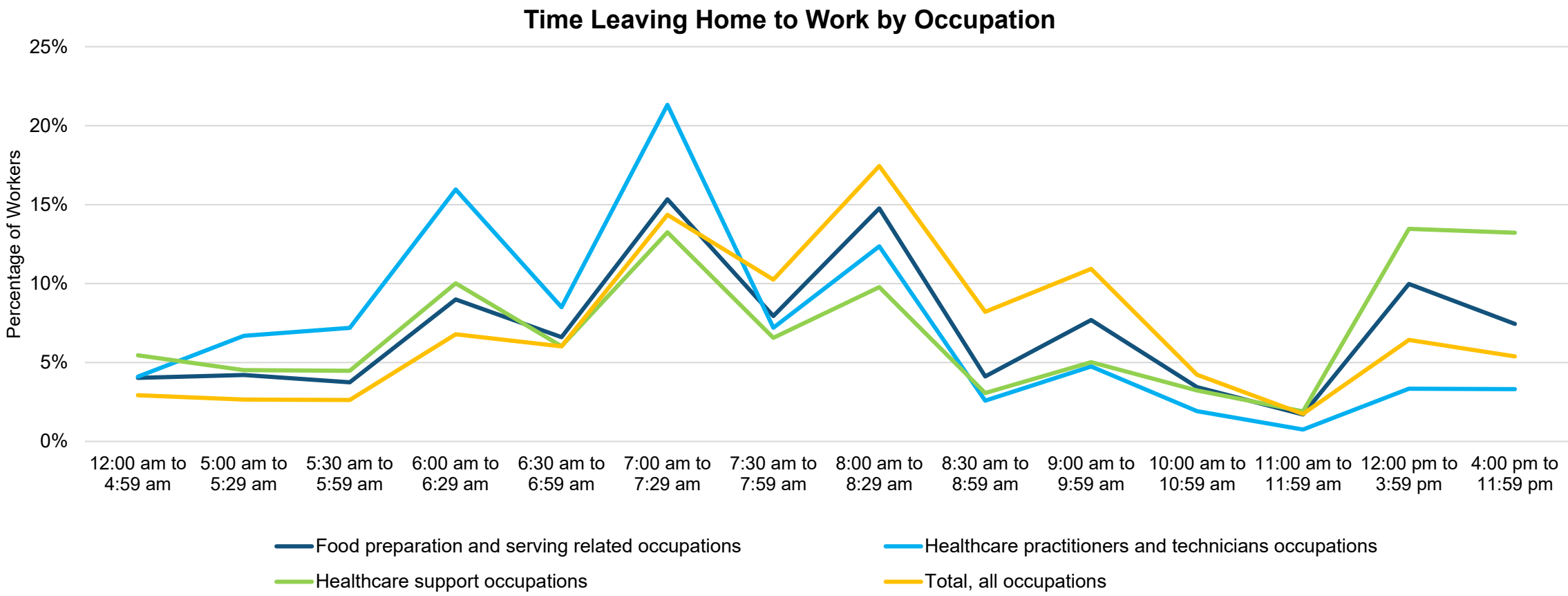
- Subway is the primary commute mode for most industries, except ***Air Transportation***, ***Ground and Water Transportation***, and ***Utilities, Waste Management***, which are predominated by Auto.

- ***Healthcare and Social Assistance*** has the highest percentage of workers commuting by bus.

Data sources: 2014-2018 PUMS. Universe: People who both lived and worked in NYC and didn't work at home.

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.

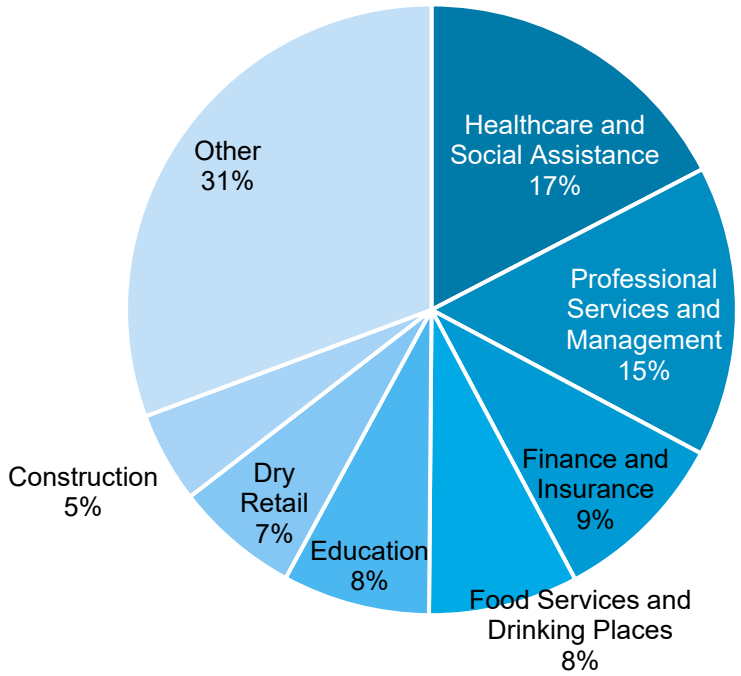
Pre-COVID19 Public Transportation Commuters by Industry

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.

56%
All worker average

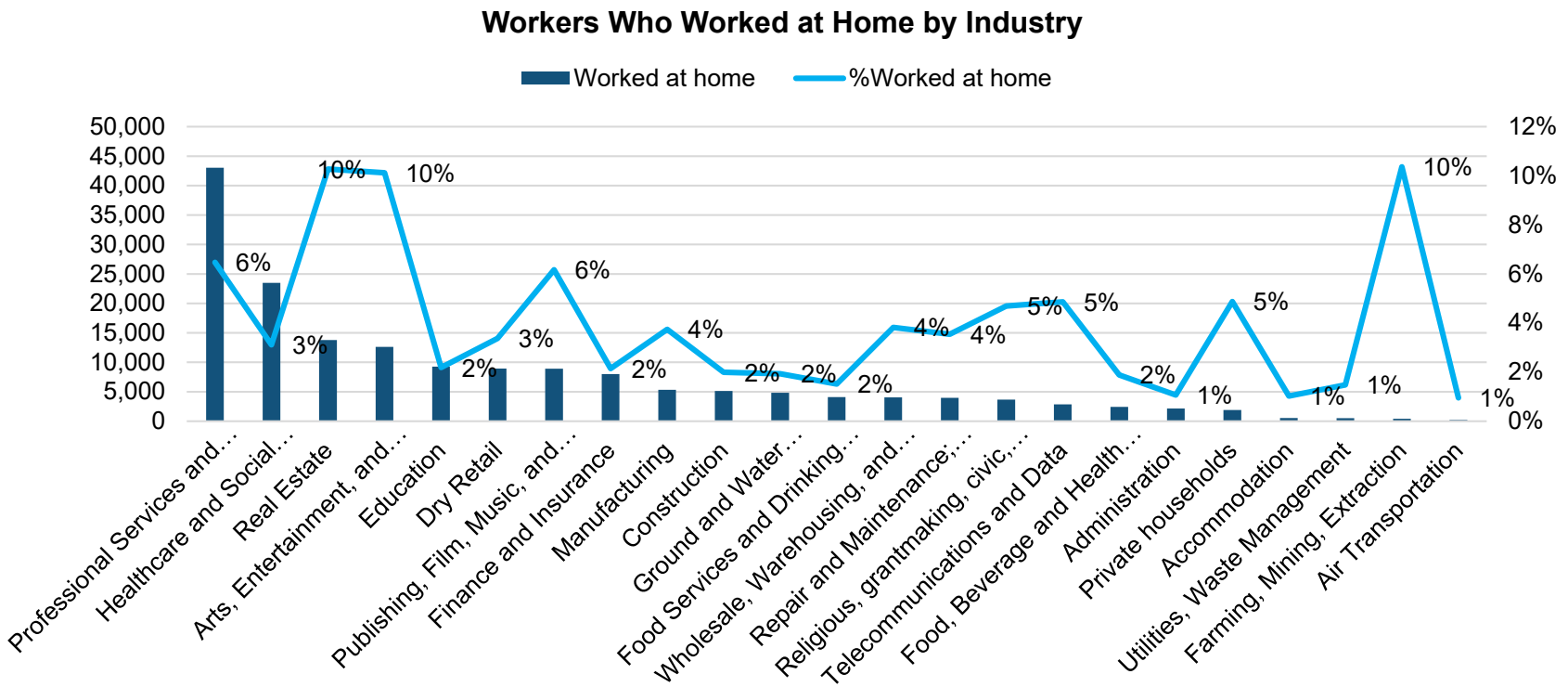
Public Transportation Commuters by Industry



Data source: 2014-2018 PUMS

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.

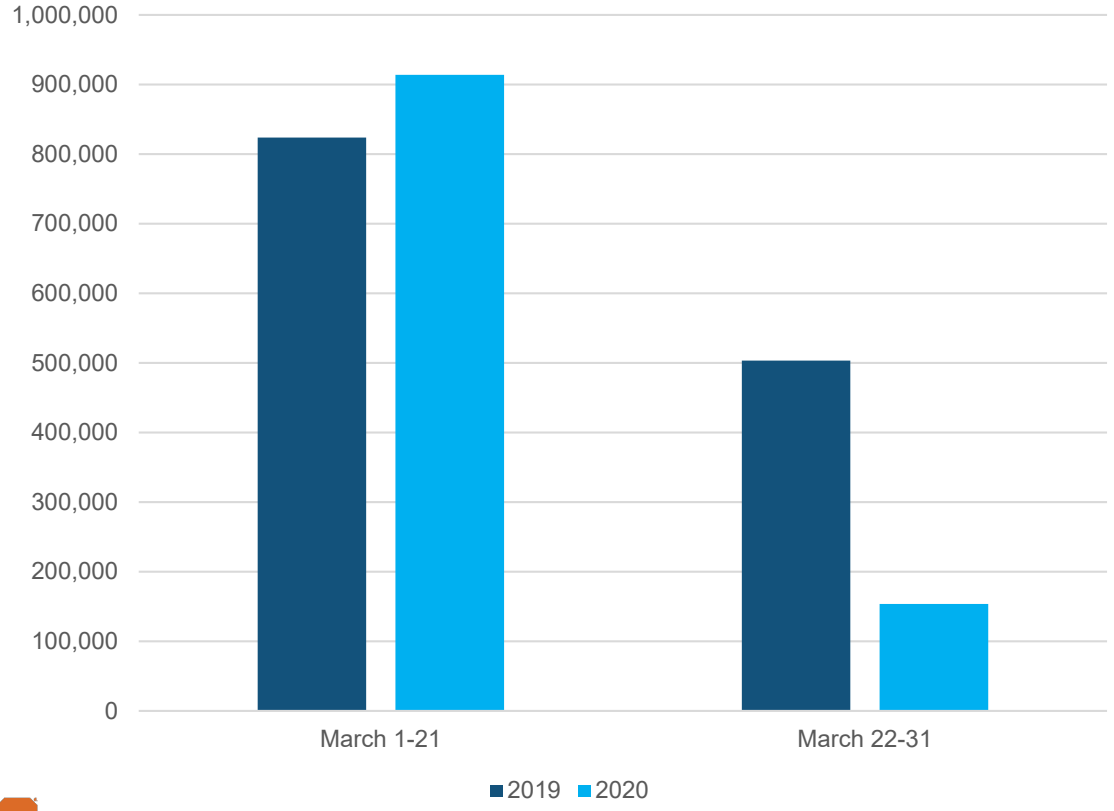


Industry	Worked at home	%Worked at home
Professional Services and Management	43,042	6%
Healthcare and Social Assistance	23,498	3%
Real Estate	13,786	10%
Arts, Entertainment, and Recreation	12,613	10%
Education	9,269	2%
Dry Retail	8,940	3%
Publishing, Film, Music, and Broadcasting	8,918	6%
Finance and 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%**

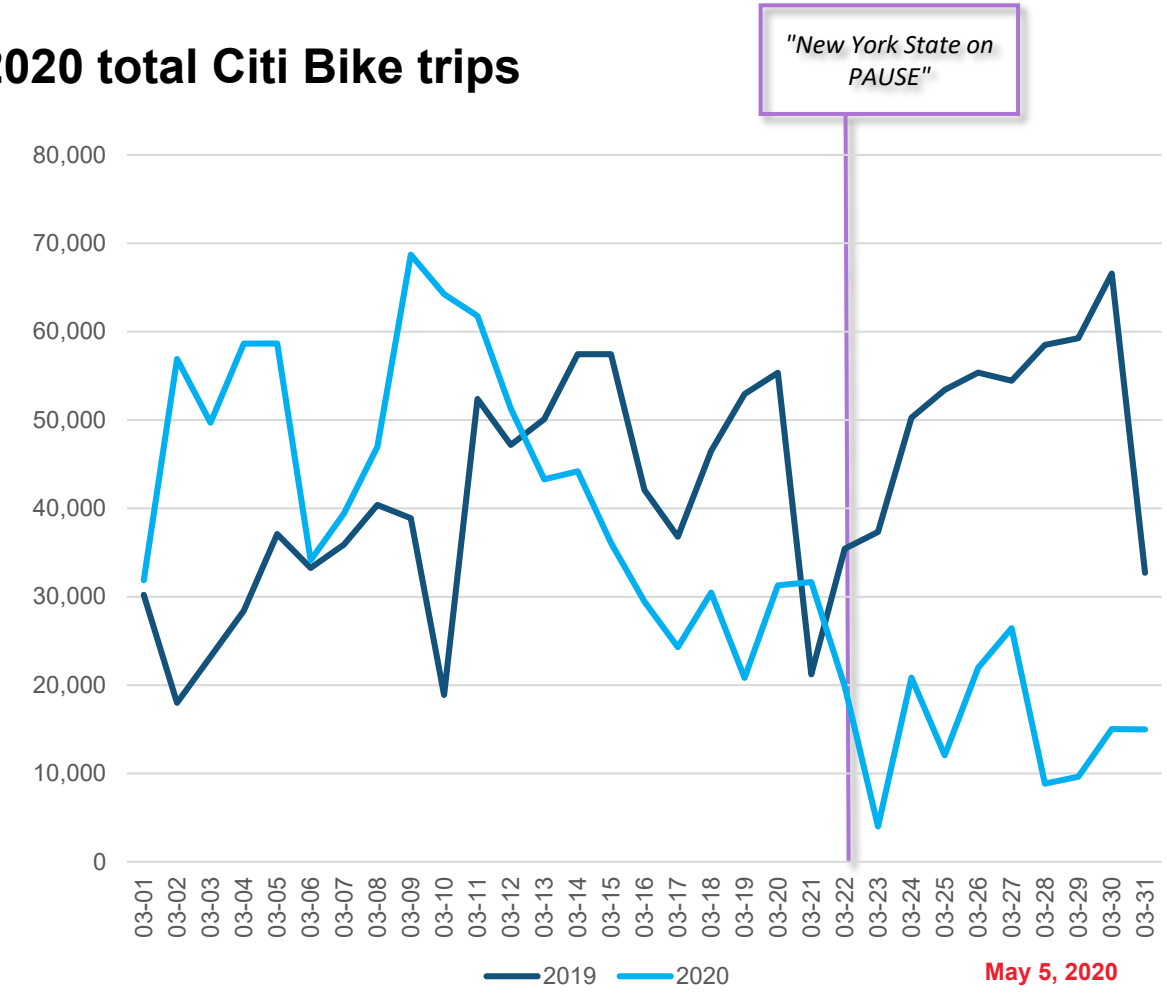
Data source: 2014-2018 PUMS. Note: Industry clusters are classified by HED; military and administrative industries are not on the HED industry cluster list thus not listed in this analysis. However, workers in those two industries are counted in Grand Total. Universe is all NYC workers.

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

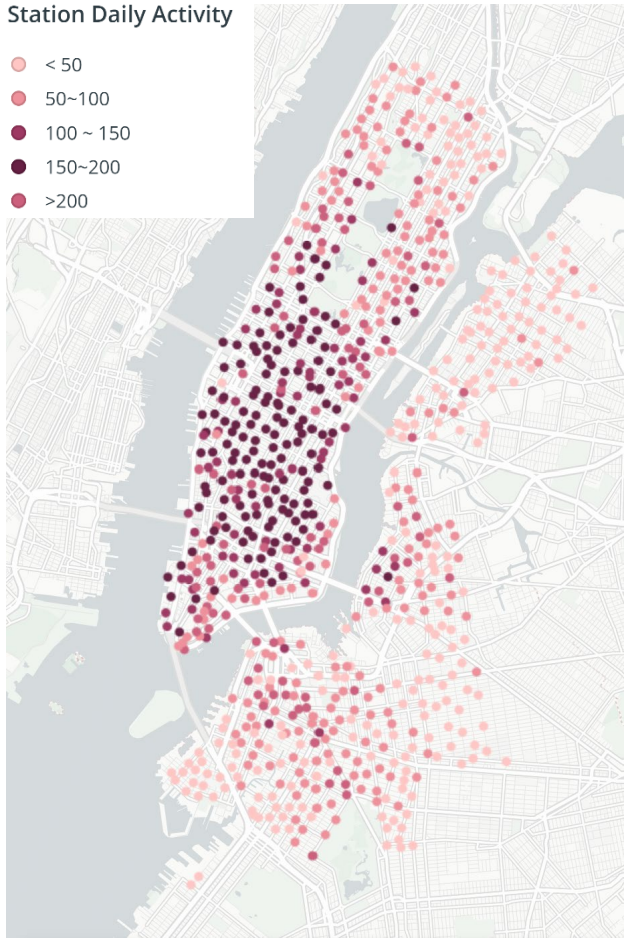


Data sources: Citi Bike Open Data

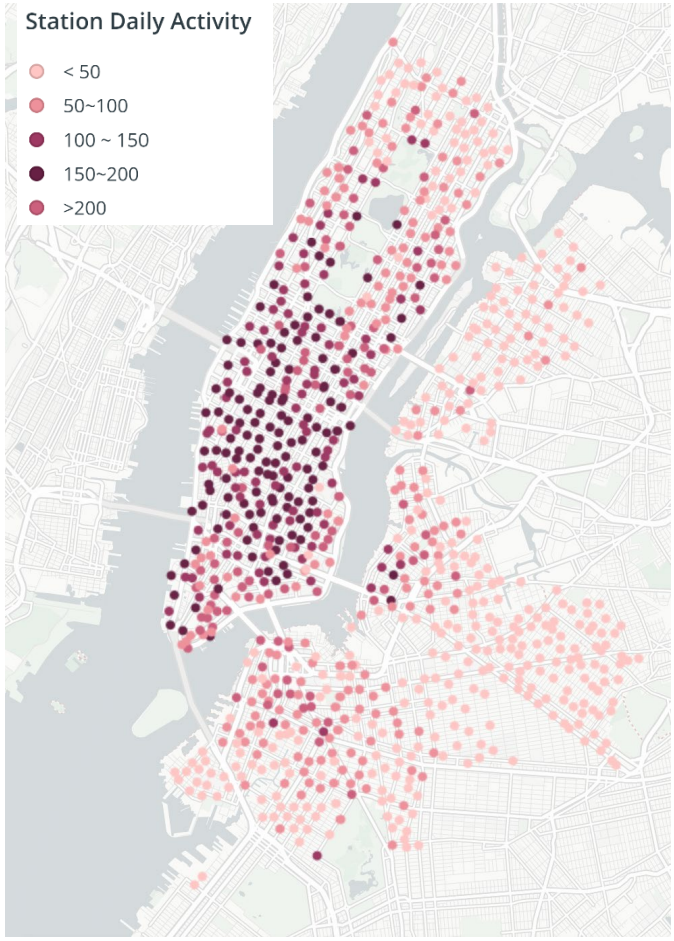
Overall Citi Bike Station Daily Activity

Station Activity : Pick ups & Drop offs

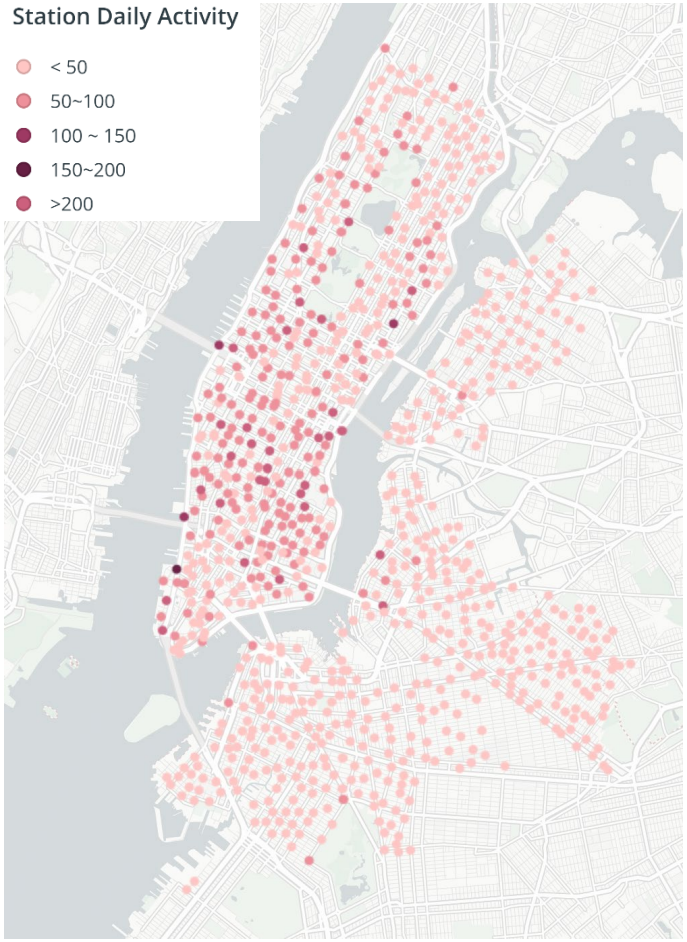
March 1-31 2019



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

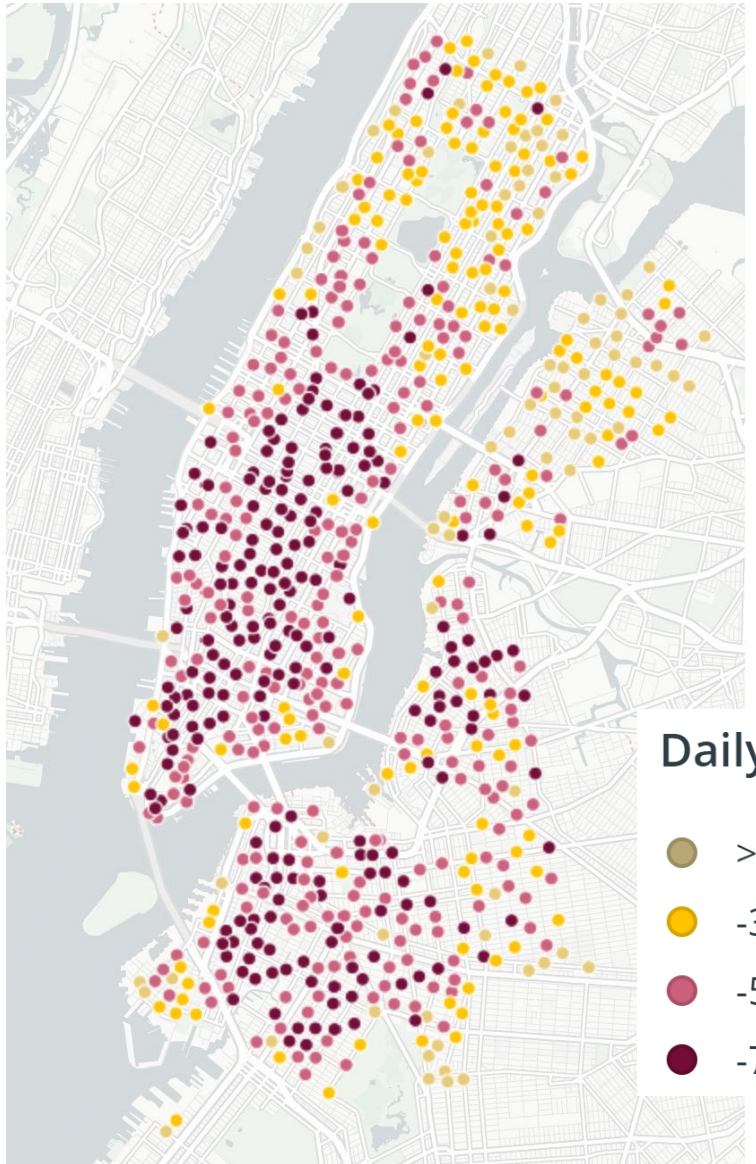
Data sources: Citi Bike Open Data

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



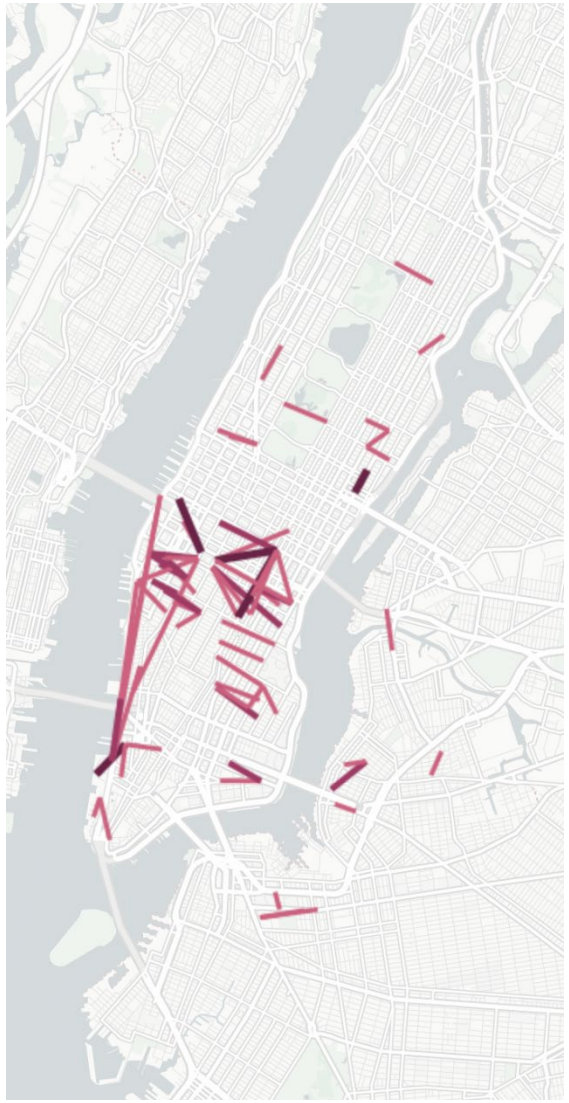
- Under the PAUSE, average daily station activity is less than half of what it was in March 2019.
- Stations on the periphery have seen the least amount of change.

Origin Destination Trends- weekday

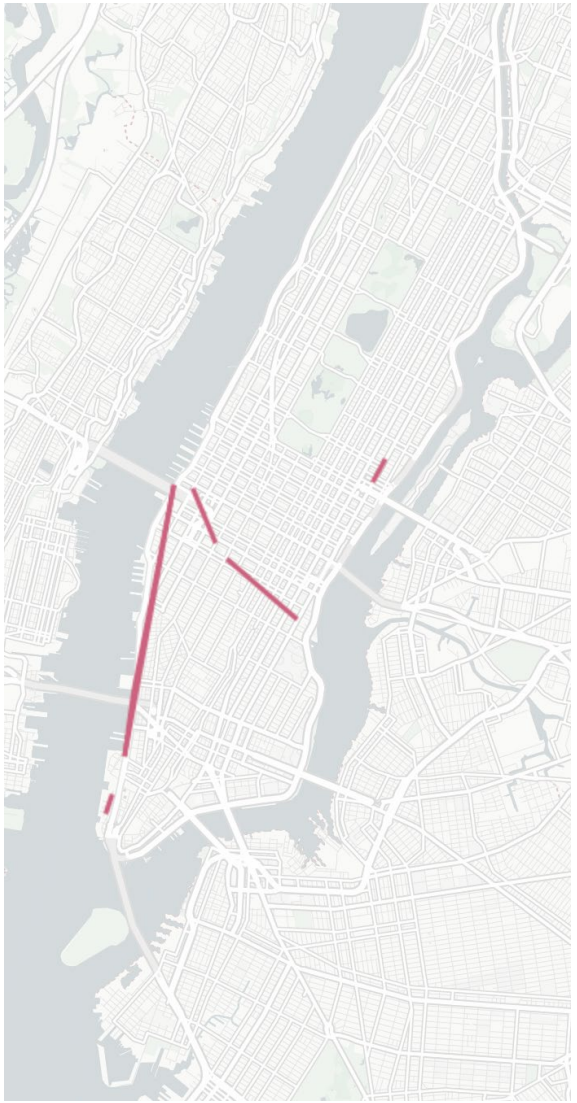
Origin Destination Average Daily Trips >10

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.

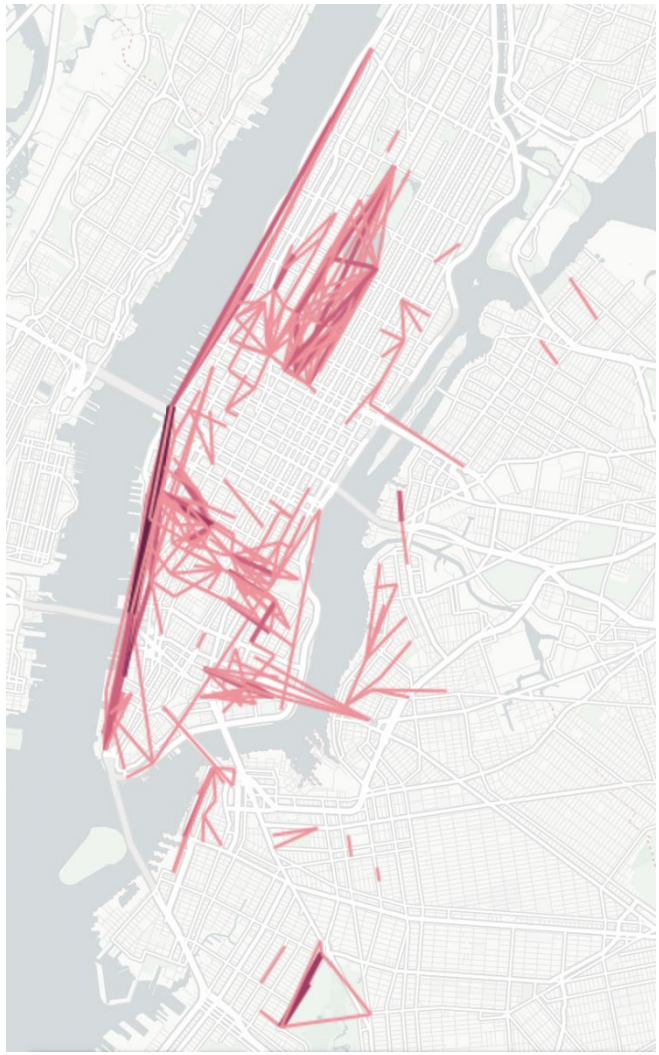
https://nycplanning.carto.com/u/dcptransportation/builder/bbd50dae-b848-4e9c-8dea-bcab1c5aa395/embed

Origin Destination Trends- Weekend

Origin Destination Average Daily Trips >5

March 1-31 2019

March 1-22 2020

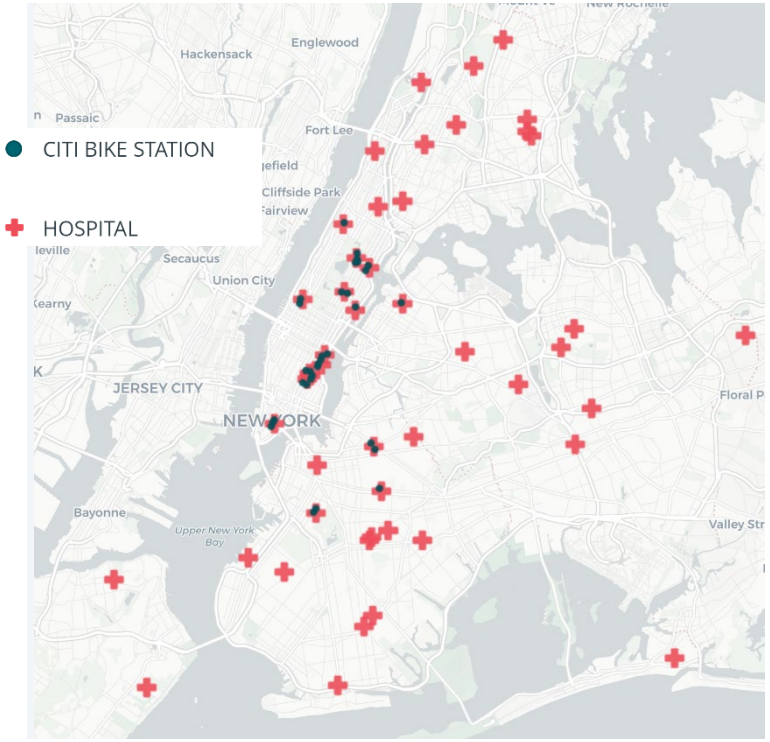


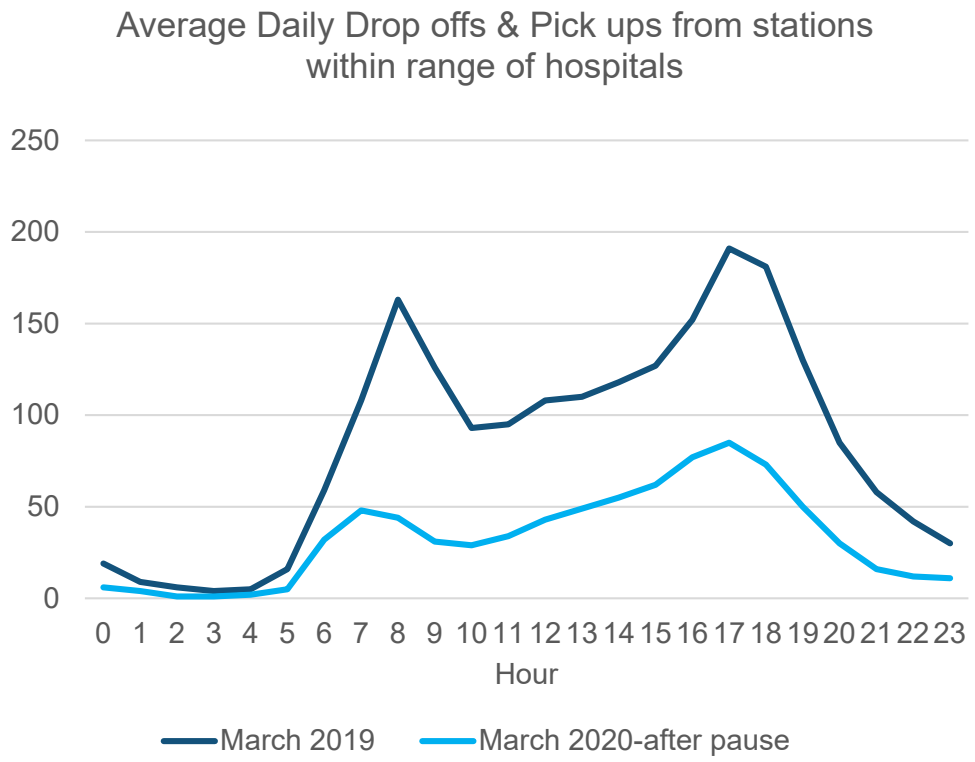
March 23-31 2020

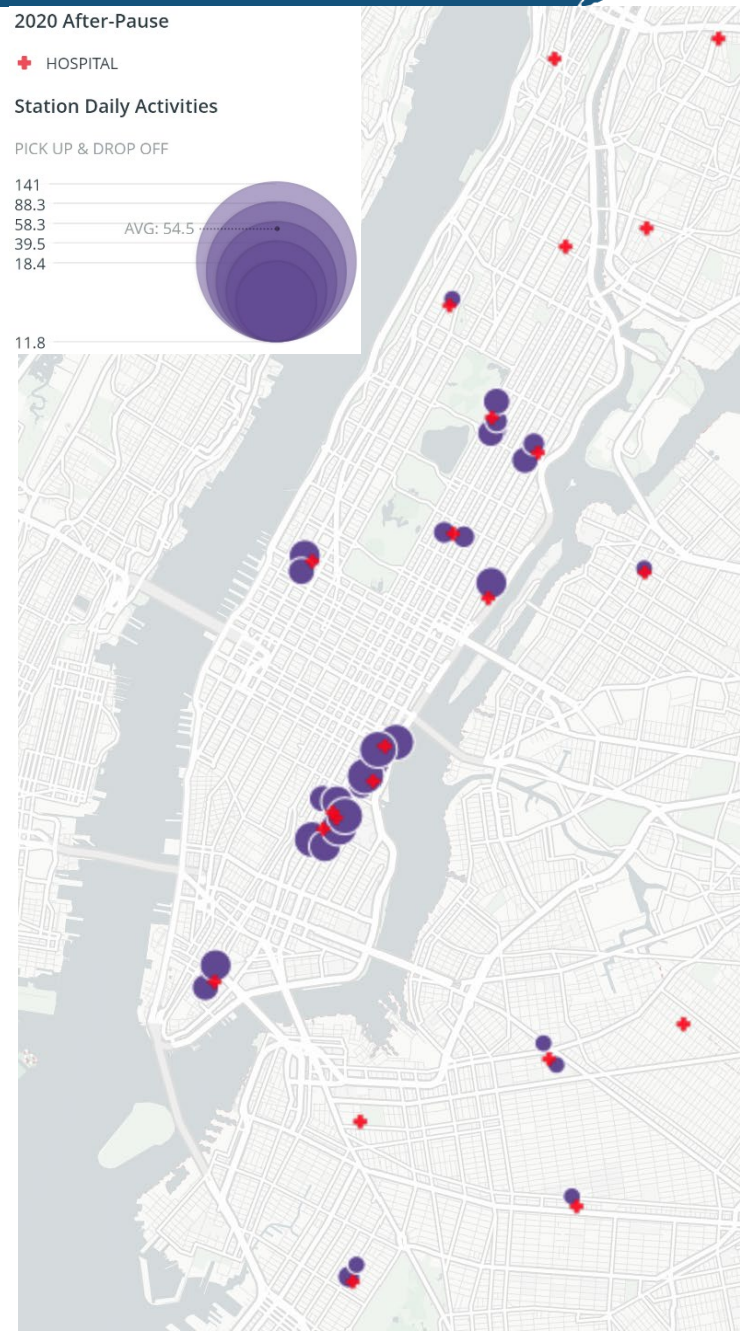
- Under normal conditions, weekend Citi Bike ridership routes appear more recreation- and entertainment-based.
- Under the PAUSE, the most common weekend O/D pairings include the same West Side Greenway route as appears during weekdays, and the route along Prospect Park West, in Brooklyn.

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.







Data sources: Citi Bike Open Data