

COVID19 IMPACTS ON TRANSPORTATION

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

April 8, 2020



- The NYC Department of City Planning's Transportation Division is compiling data to help understand the effects of COVID-19 on the transportation network.
- We intend to produce weekly reports, timed around the MTA's weekly (Saturday) releases of MetroCard swipe data for each station, and incorporating additional data from a variety of sources as they becomes available. This data reflects MetroCard swipes with a two-week lag (so, the release on Saturday, April 4 reflected travel the week of March 21-27).
- MTA Turnstile data is currently available through April 2nd. The data is less reliable than MetroCard swipe data, but helpful in signaling trends and is also available for analysis by time of day (e.g. AM peak trips originating presumably at a place of residence).
- We will be expanding the content of these weekly reports as new data become available to us, and are prioritizing work around understanding how subway travel trends relate to the economic and employment landscape.
- 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) or Ruoran Lin (rlin@planning.nyc.gov) with questions or comments.

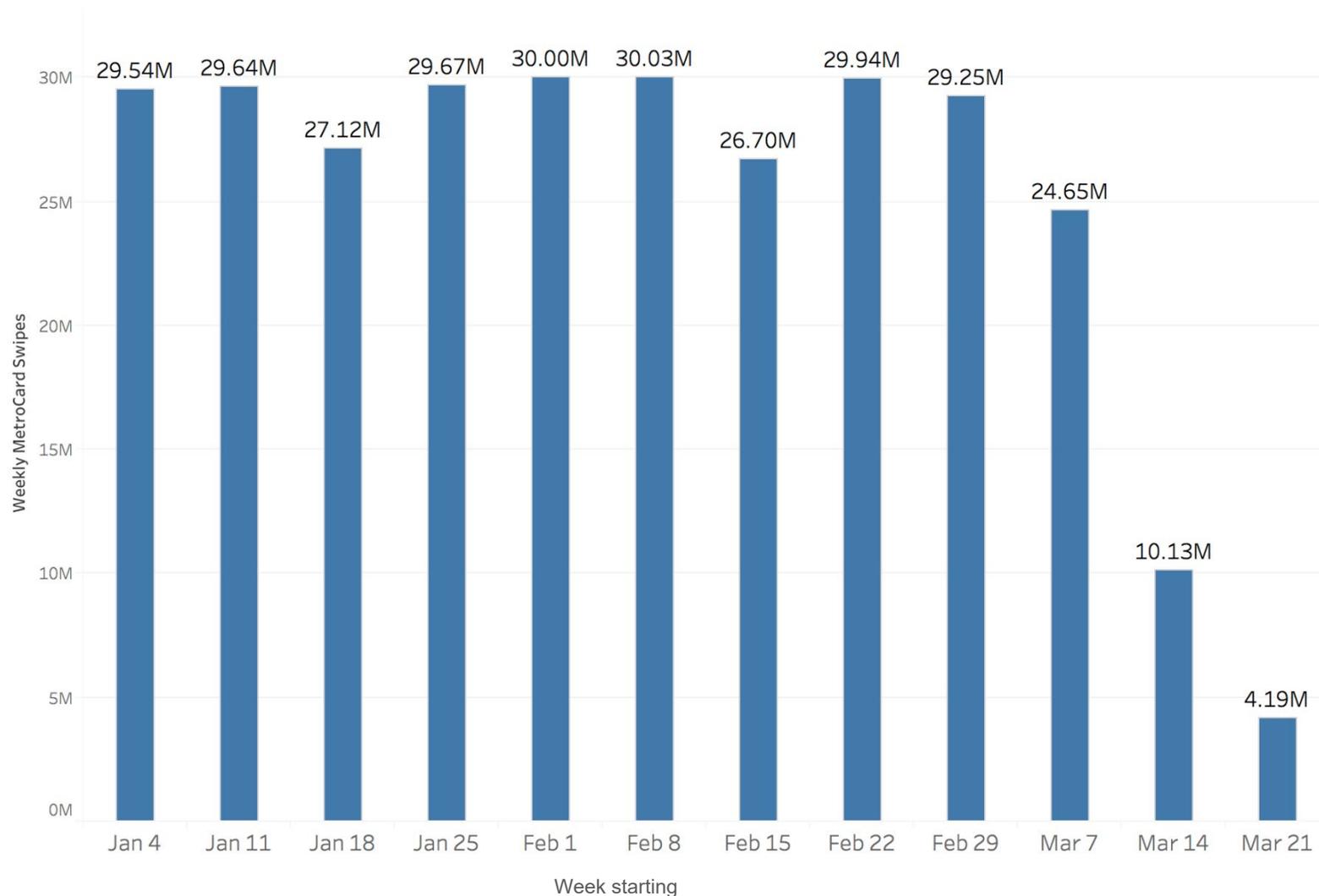


New York COVID-19 Pandemic Timeline

- 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 3rd, 2020: Second confirmed case <https://www.businessinsider.com/new-york-second-coronavirus-case-attorney-law-firm-grand-central-2020-3?r=US&IR=T>
- 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-vmjdxjudbnlrljekashqs3hfou-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 9th: **NYU** announces **suspension of in-person classes**, moving all classes online effective Wednesday 3/11 <https://www.nydailynews.com/new-york/ny-nyu-coronavirus-online-instruction-20200310-jov5akxr4ngwjxhtv4zrz2ypea-story.html>
- 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 16th: **Columbia University** reduces to **essential staff** and operations only <https://preparedness.columbia.edu/news/update-covid-19-0>
- 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 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>

MetroCard Swipes – Weekly trends in 2020

Weekly MetroCard Swipe Trends (Jan 4 - Mar 27)



- The citywide percent change of MetroCard swipes during Mar 21 -27 vs Mar 14-20 is **-58.58%**
- The citywide percent change of MetroCard swipes during Mar 21 -27 vs weekly average of Jan 4- Feb 28 is **-85.58%**.
- There were still more than 10 million subway trips taken during the week of March 14-20 and **more than 4 million subway trips in the week of March 21-27.**

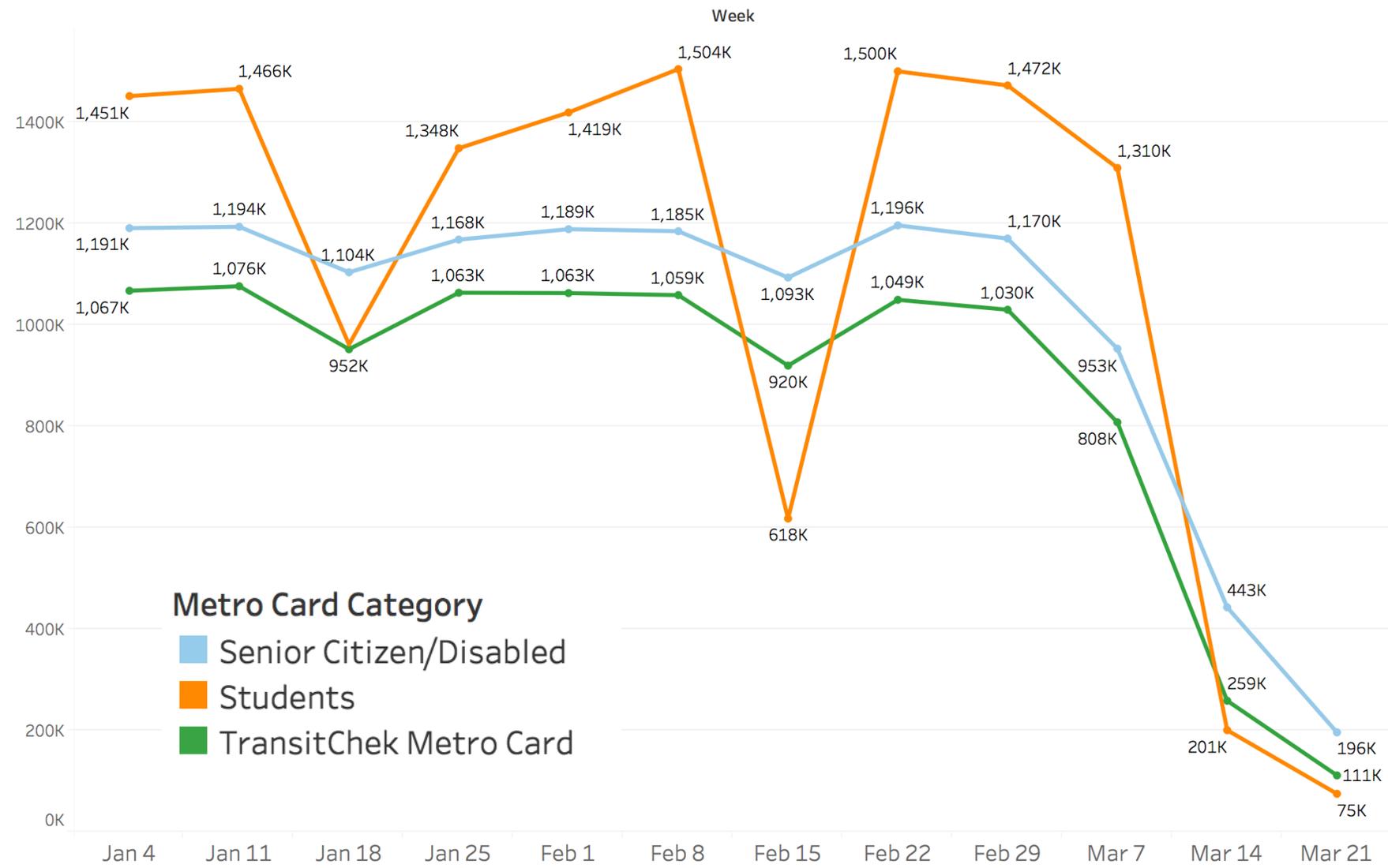
Interactive dashboard link:

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

Data sources: MTA Fare Data

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

MetroCard Swipes – Card Types: TransitChek/ Students/ Senior & Disabled



Reduced-fare cards for senior citizens, people with disabilities, and students, as well as TransitChek metro cards, all saw declines in use starting the week of February 29th, with the steepest declines starting the week of March 14th, when the PAUSE went into effect.

Public schools closed starting Monday, March 16th, but student MetroCard swipes began declining in the weeks leading up to closure.

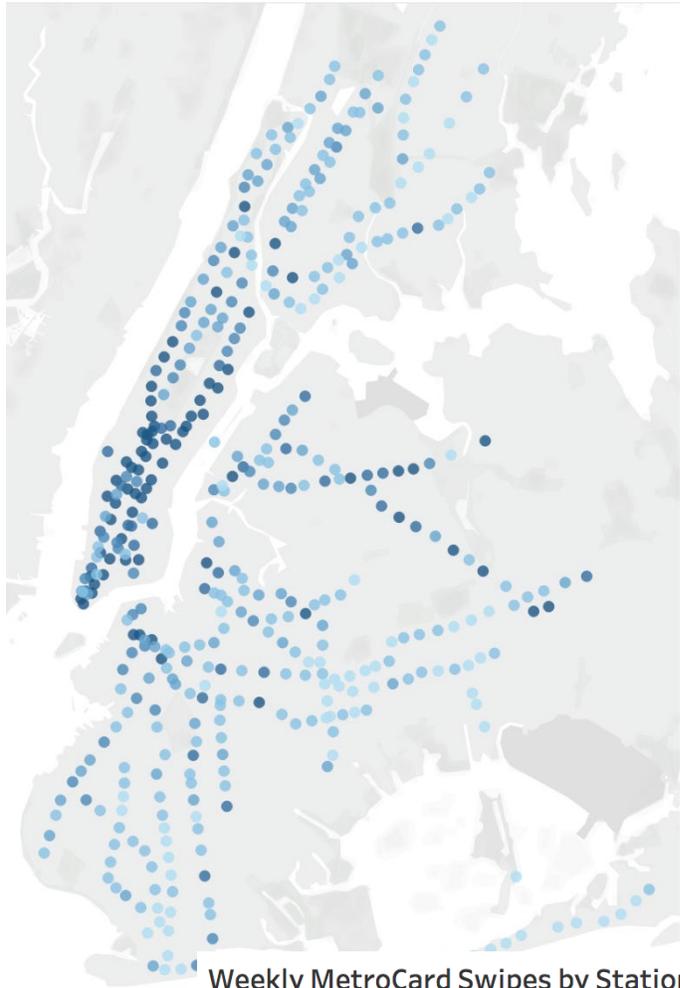
TransitChek MetroCard swipe trends show the workforce starting to reduce travel prior to the PAUSE.

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

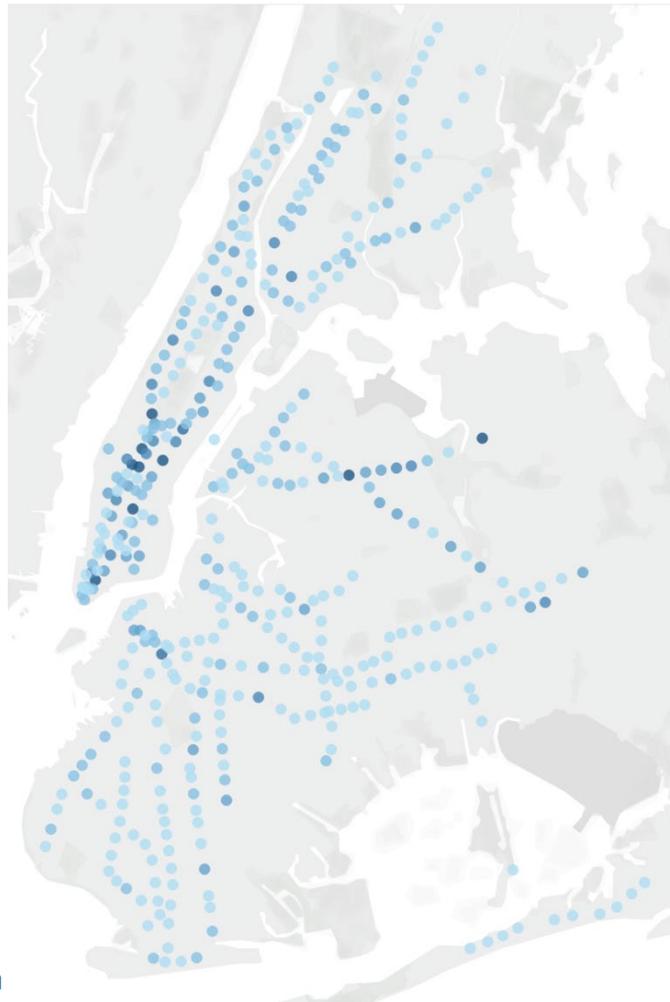
Data sources: MTA Fare Data (<http://web.mta.info/developers/fare.html>)

MetroCard Swipes: Week of January 4-10 vs March 14-20 vs March 21-27

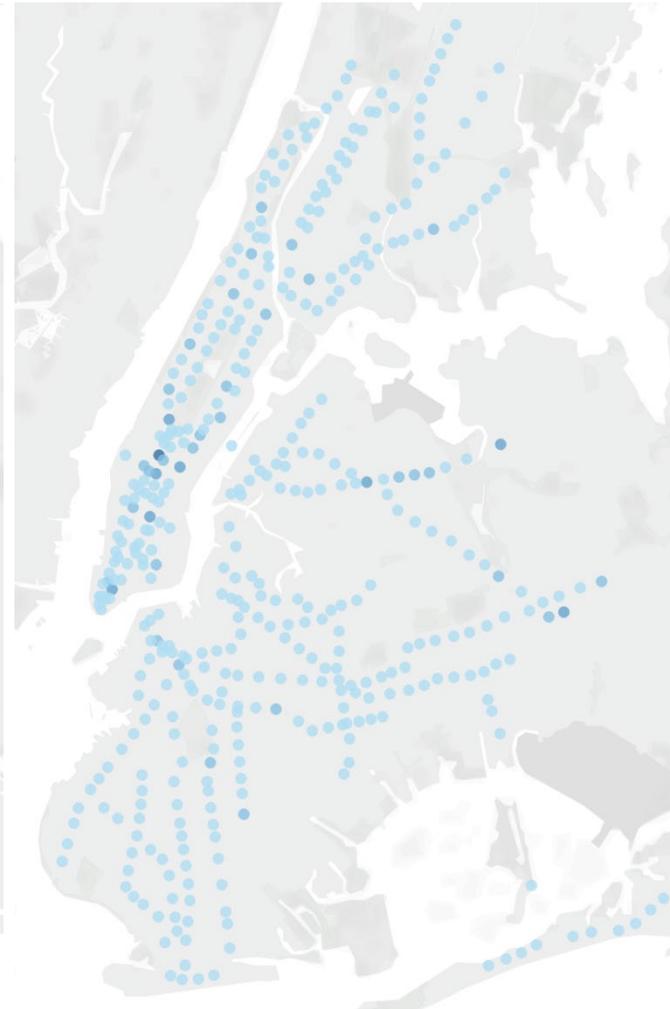
January 4-10 2020



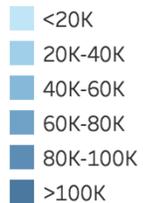
March 14-20 2020



March 21-27 2020



Weekly MetroCard Swipes by Station

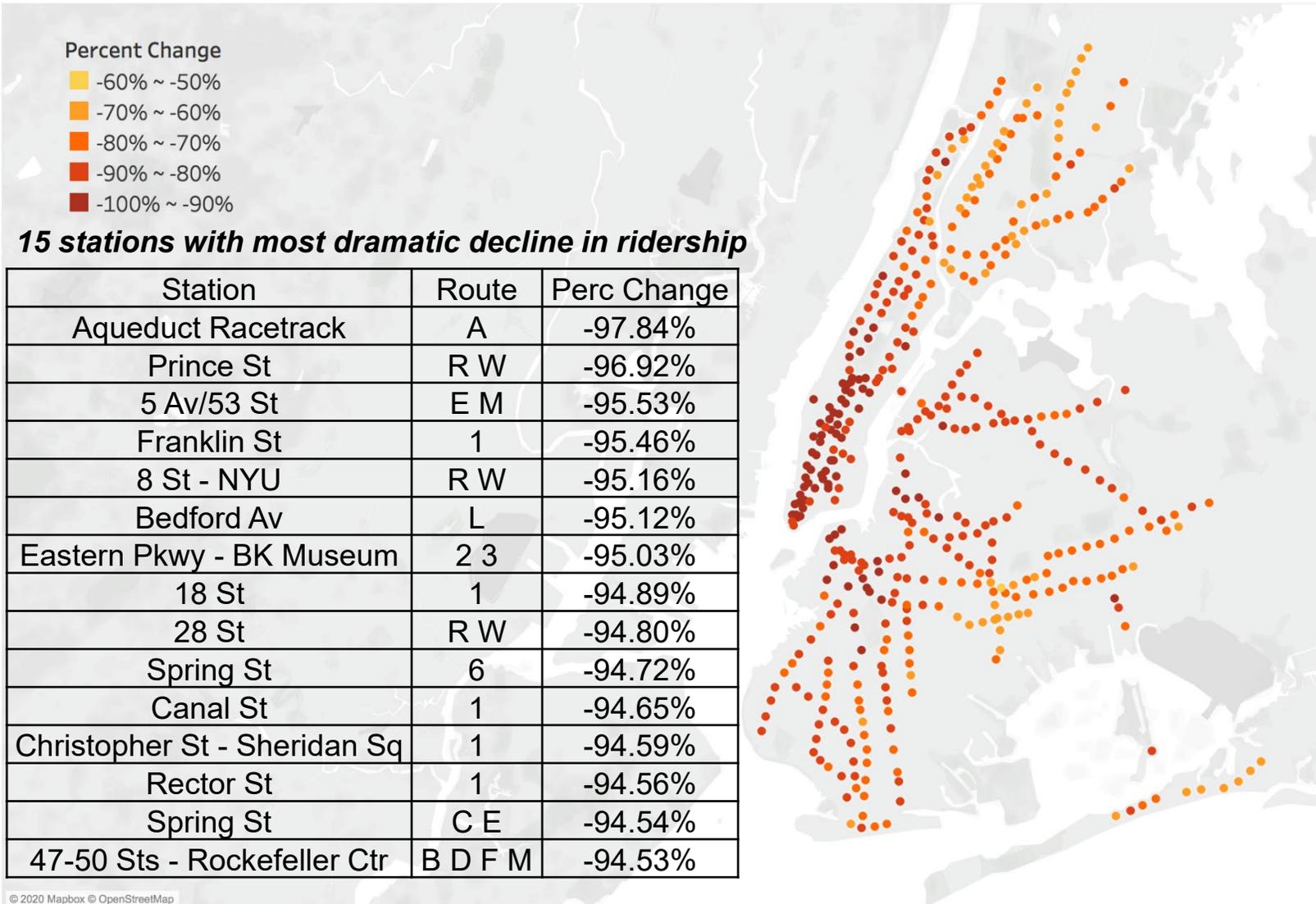


Substantial declines have been observed across the system, though several stations that were busy before the pandemic continue to see tens of thousands of swipes during the week of March 21st.

An [interactive dashboard](#) allows you to explore statistics associated with individual stations. Note that you can toggle to adjust the date.

MetroCard Swipes – Degrees of change Jan/Feb 2020 vs March 21-27

Perc Change of Swipes (Mar 21-27 vs Week Avg of Jan 4-Feb28)



Looking at percent changes in MetroCard swipes:

- The week of March 21, the first 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 50%.

Interactive dashboard link:

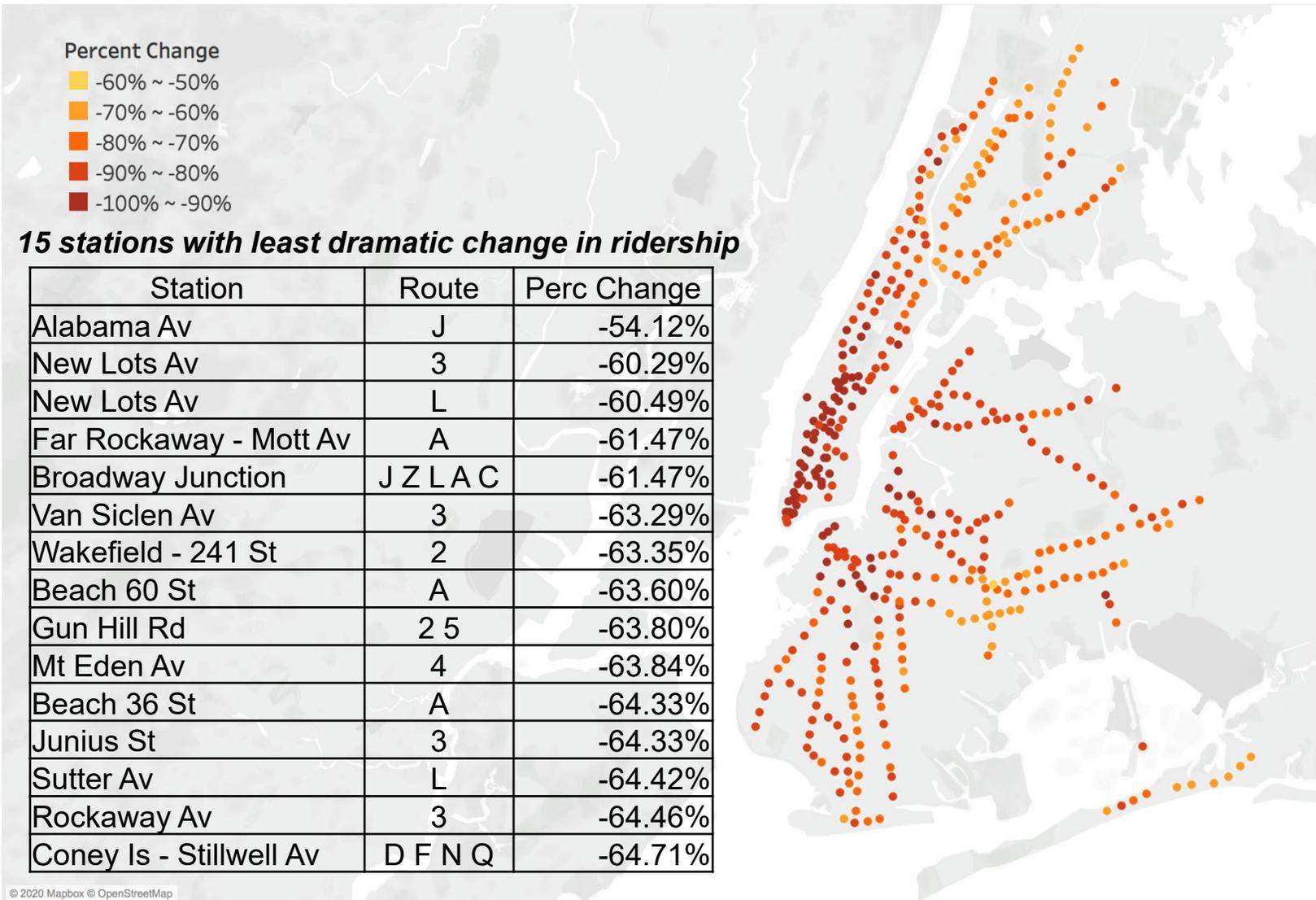
<https://public.tableau.com/profile/dcptransportation#!/vizhome/MetroCardSwipes/PercentChange>

Data sources: MTA Fare Data

(<http://web.mta.info/developers/fare.html>) April 8, 2020

MetroCard Swipes – Degrees of change Jan/Feb 2020 vs March 21-27

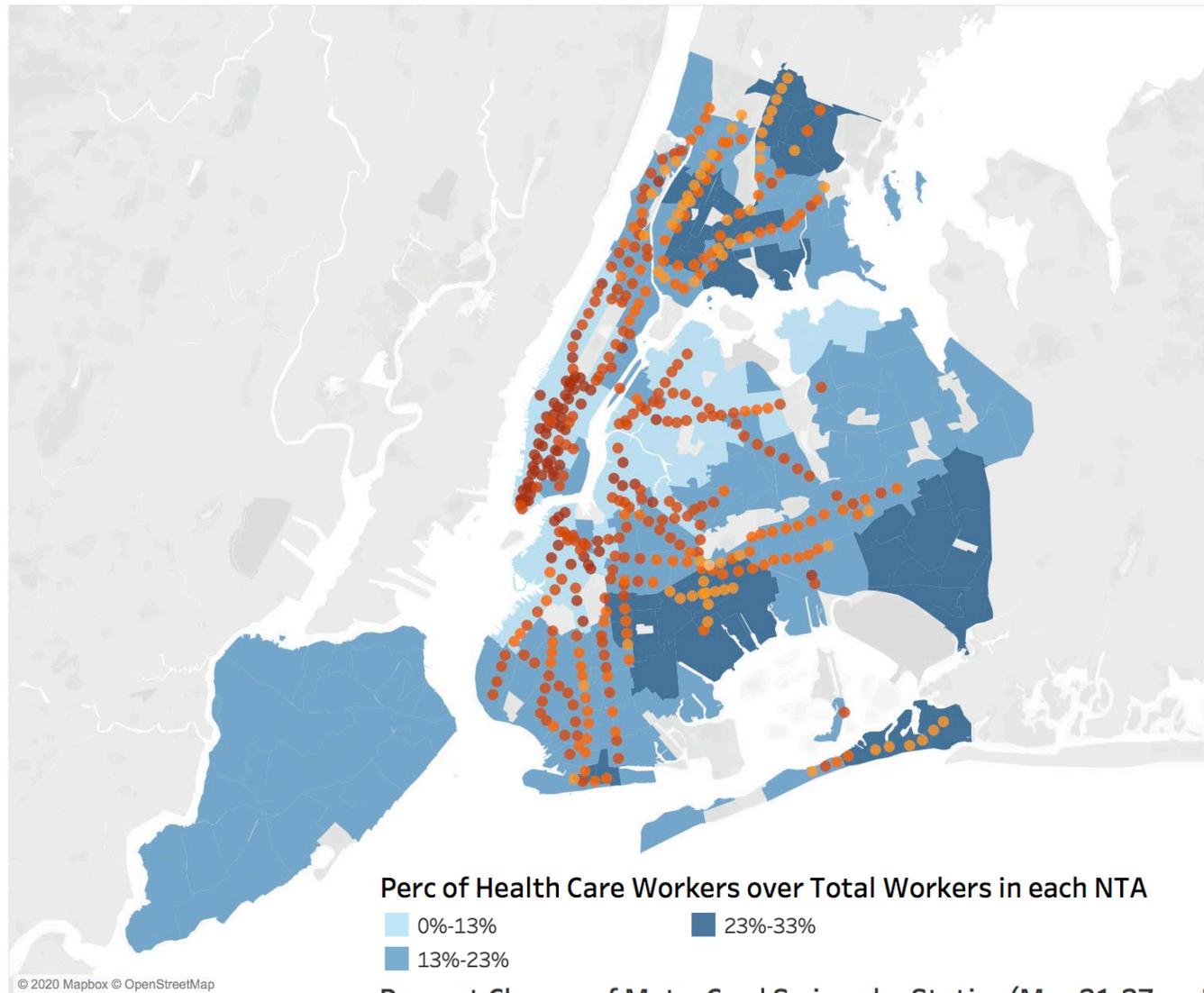
Perc Change of Swipes (Mar 21-27 vs Week Avg of Jan 4-Feb28)



- Outer borough stations experienced a less dramatic decline in ridership than Manhattan Core stations
- The Bronx, eastern Brooklyn and the Rockaways in particular still show a relatively high number of riders compared to pre-PAUSE.

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

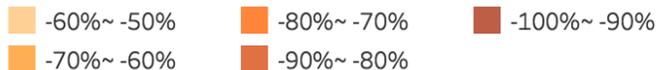
MetroCard swipes and healthcare workers



Perc of Health Care Workers over Total Workers in each NTA



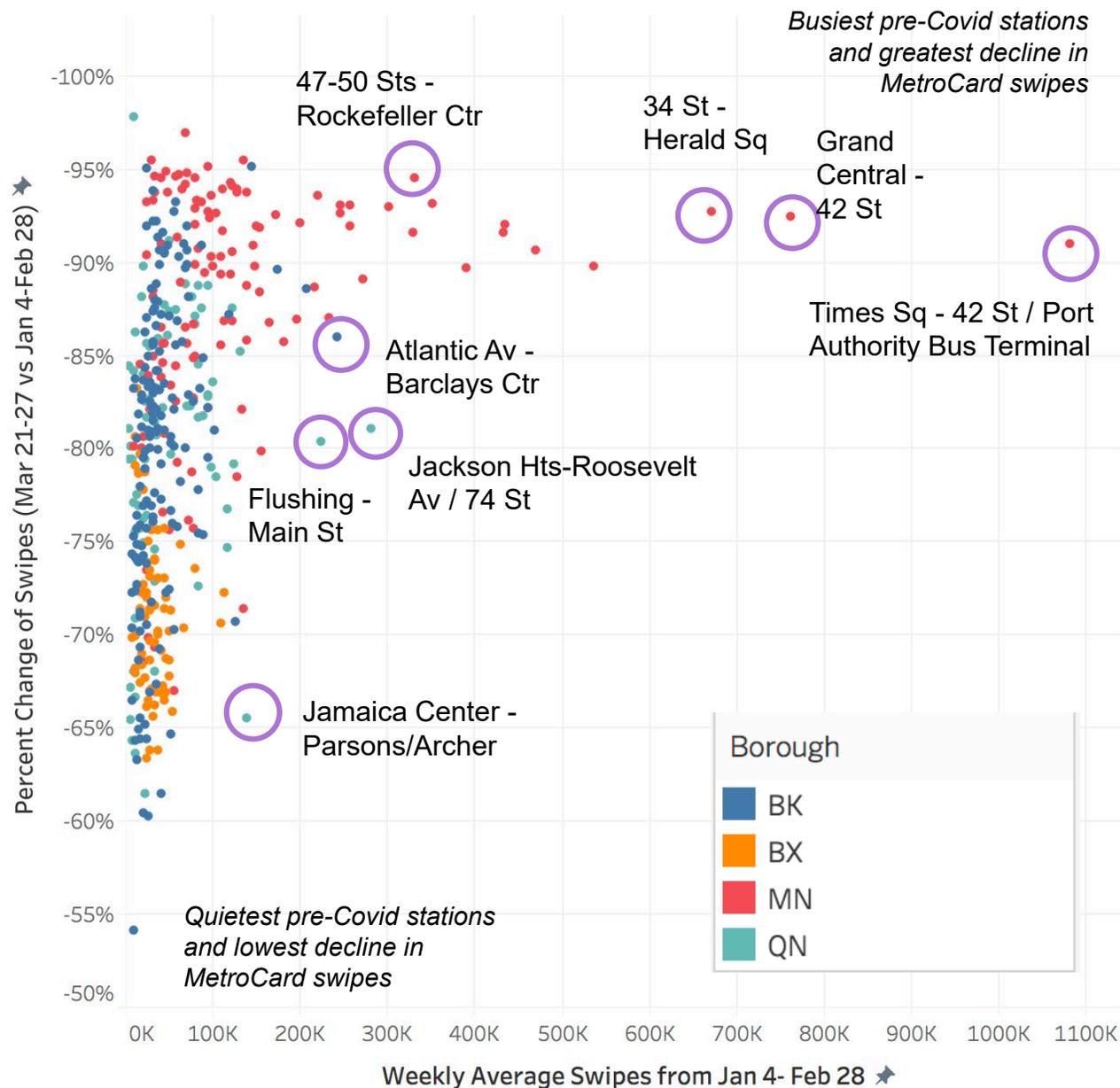
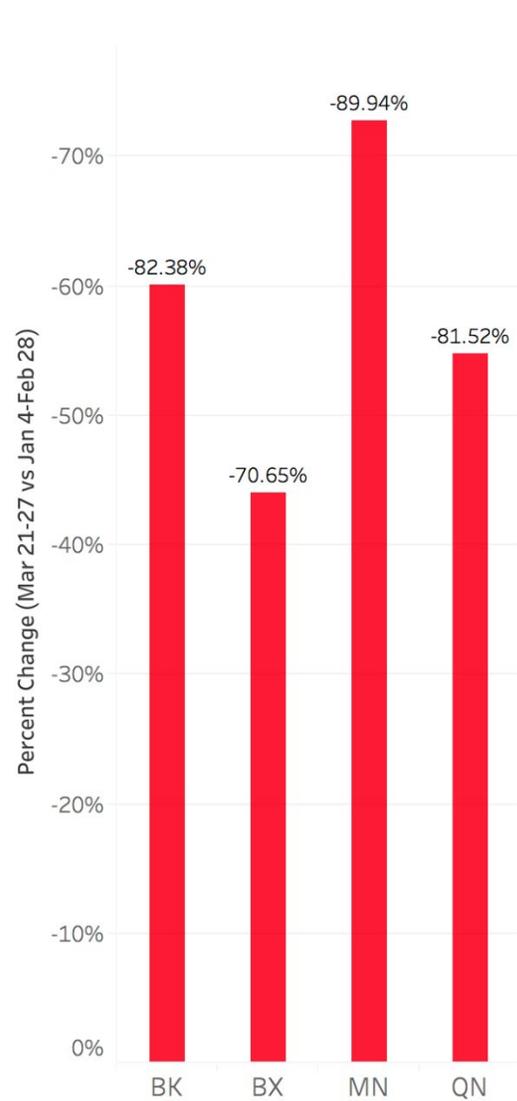
Percent Change of MetroCard Swipes by Station(Mar 21-27 vs Jan 4-Feb 28)



- 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 – Degrees of 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.

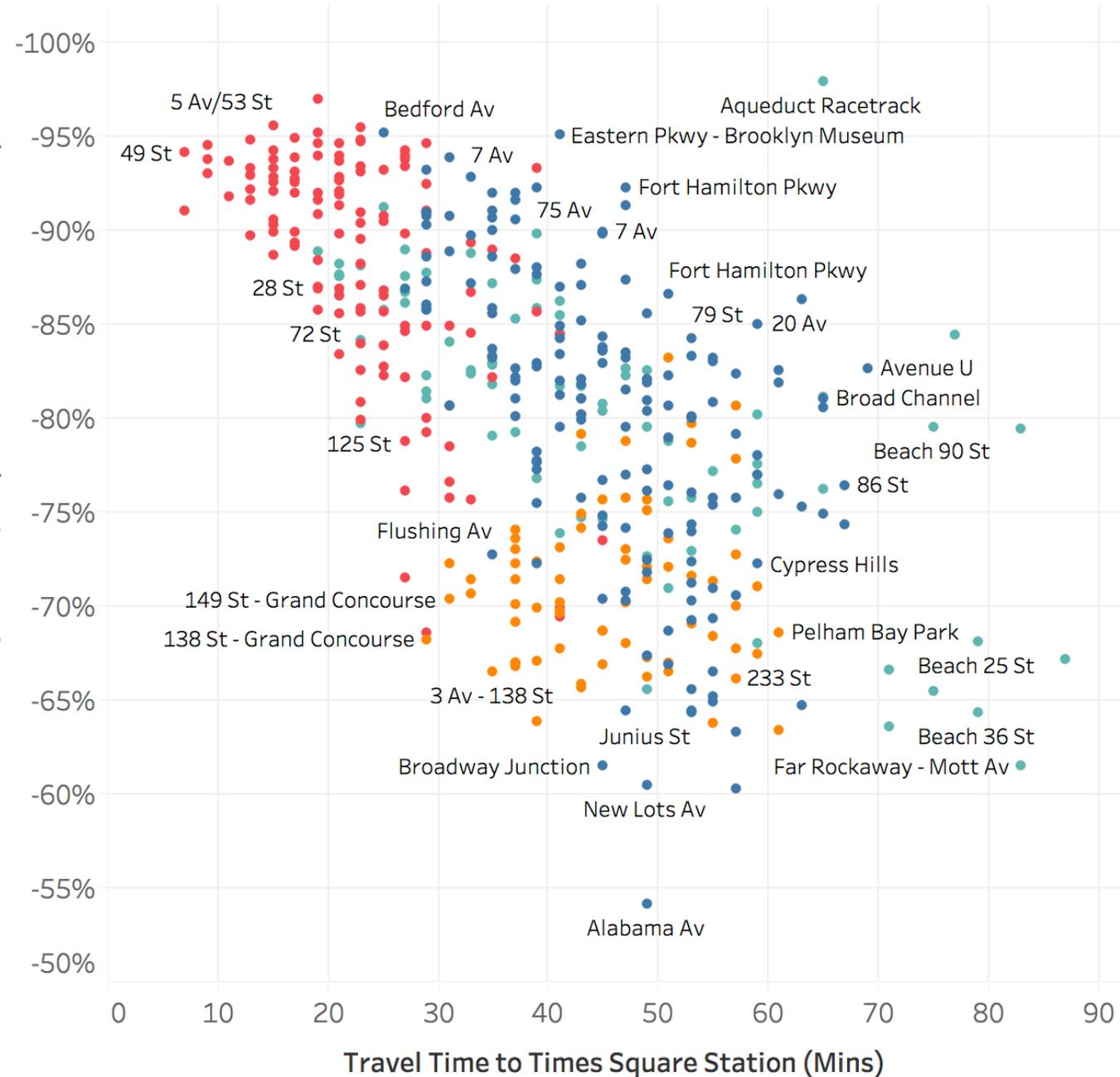
In the Bronx, relatively quiet stations on average saw less dramatic declines; a greater share of its riders continued riding.

Change is measured by comparing the weekly average of January 4 – February 28th against the week of March 21-27.



MetroCard Swipes – Percent Change by Distance to the Core

★ Percent Change of Swipes (Mar 21-27 vs Jan 4-Feb 28)



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 March 21-27.

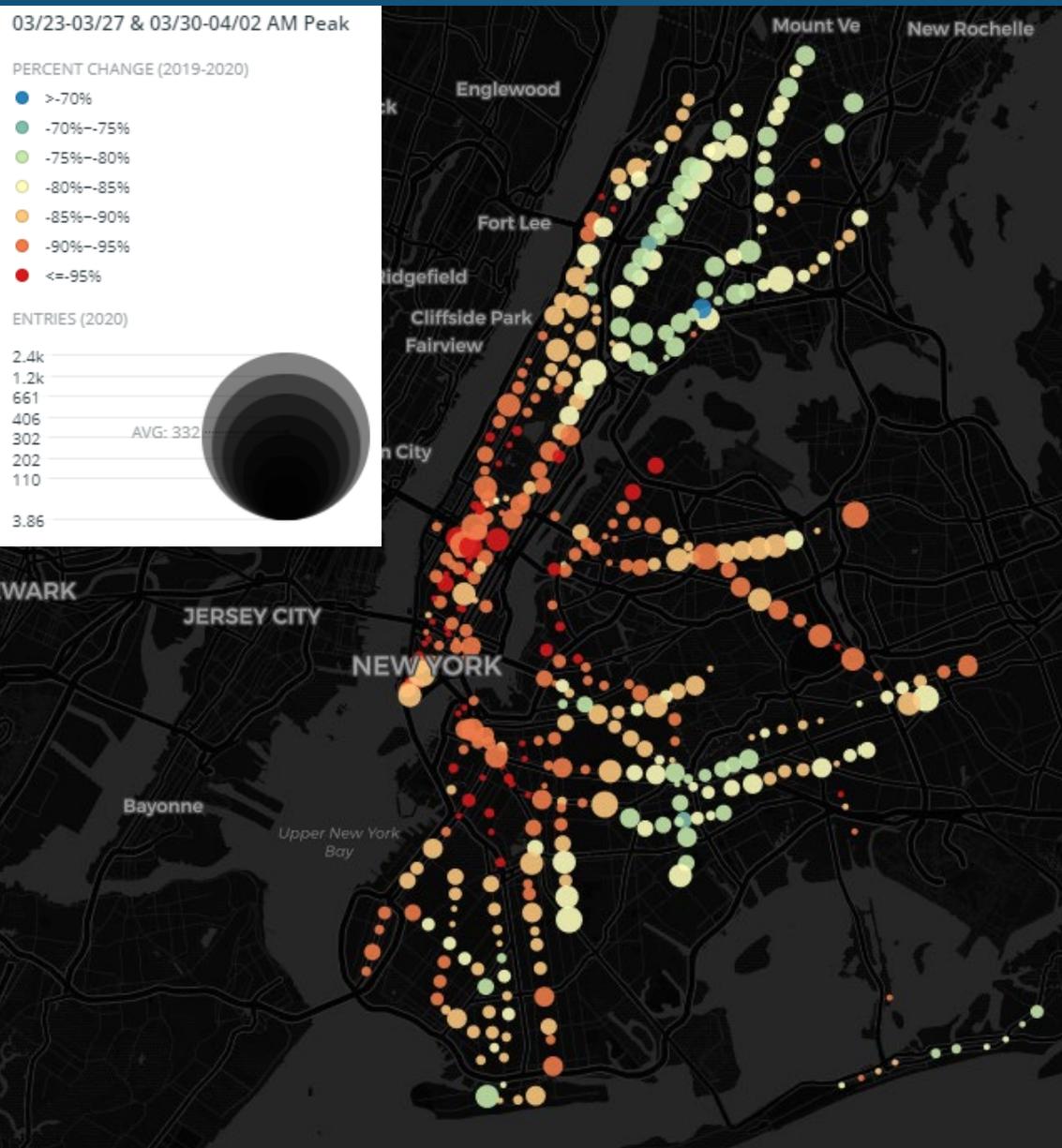
Borough

- BK
- BX
- MN
- QN

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

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

MTA AM Peak Weekday Turnstile Data: March 23-April 2 2020 vs 2019



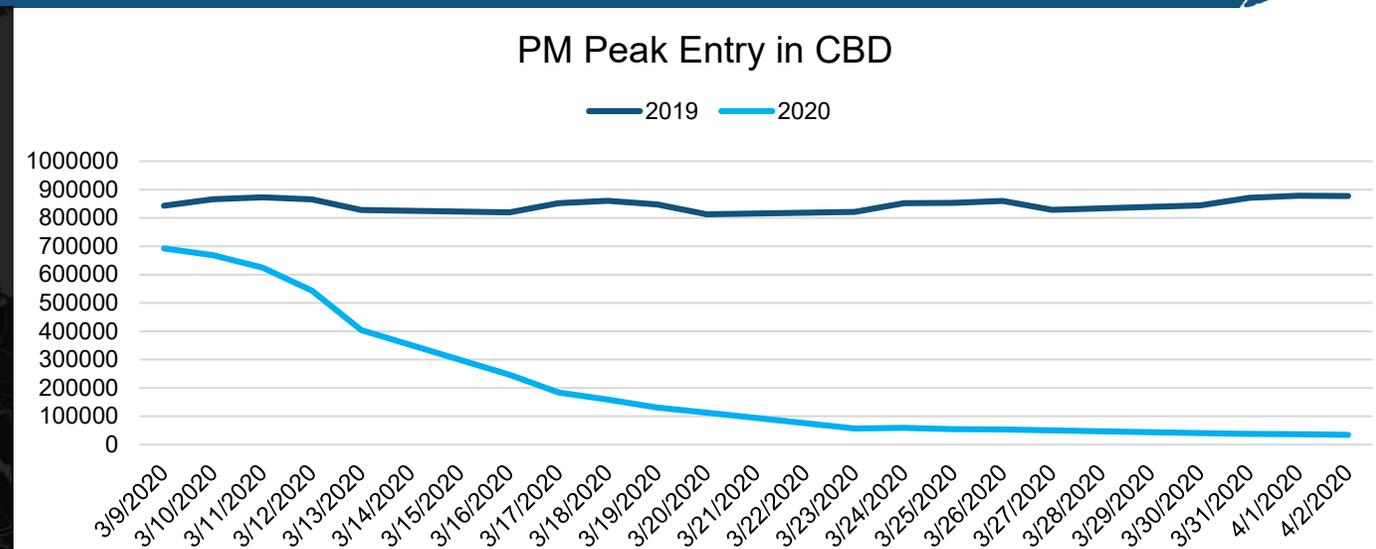
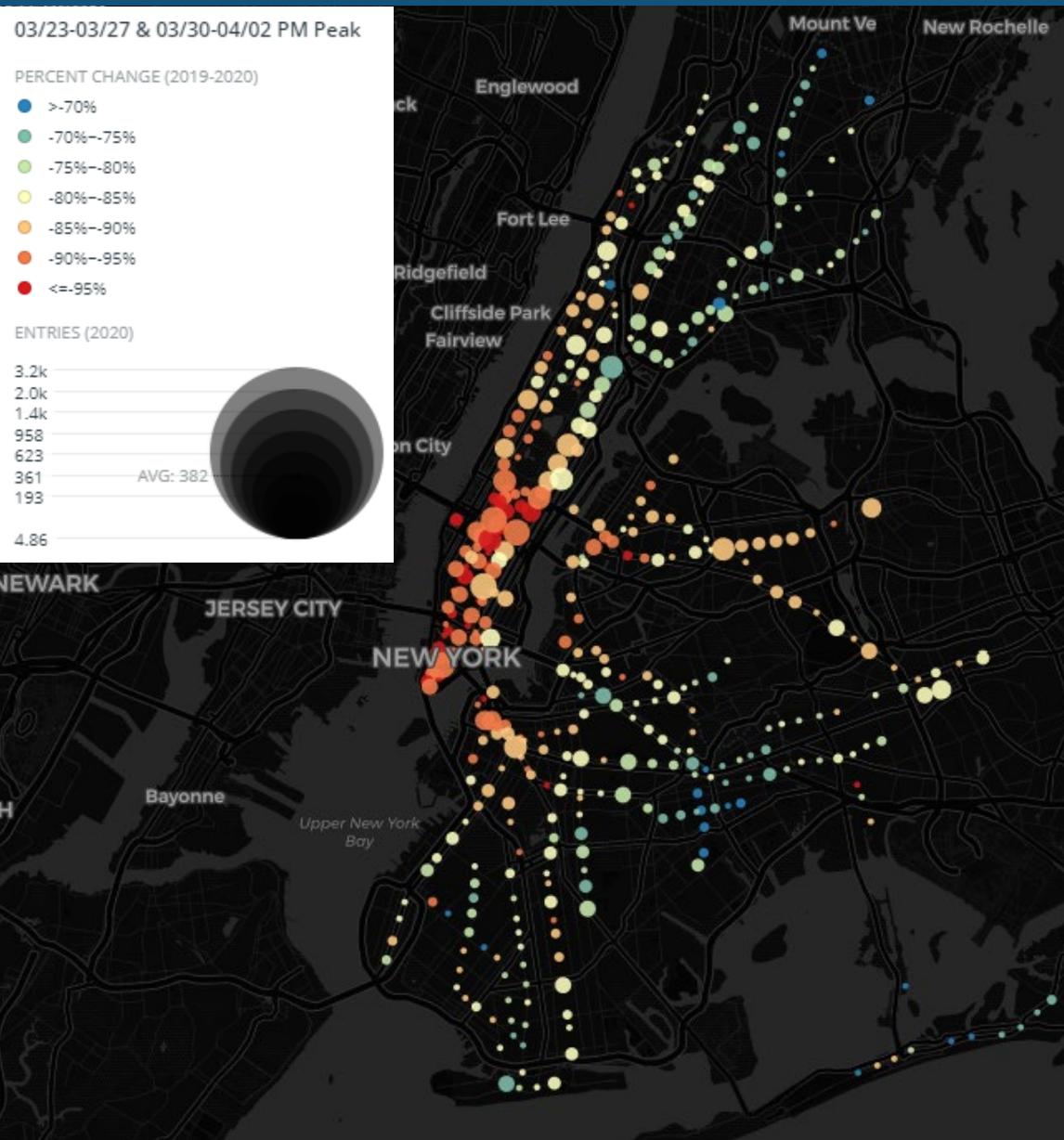
AM peak hour trips generally indicate where people are commuting *from*:

- MTA turnstile data map compares weekday ridership during the last week of March and first week of April in 2019 vs those same weeks in 2020. It considers riders only travelling during the AM peak 4-hour travel window*.
- Size is the actual ridership during the last week of March 2020 and the color is the percent change.
- The largest AM peak ridership declines are observed in the Manhattan Core and Inner Ring, and along the E train.
- 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>)

MTA PM Peak Weekday Turnstile Data: March 23-April 2 2020 vs 2019



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

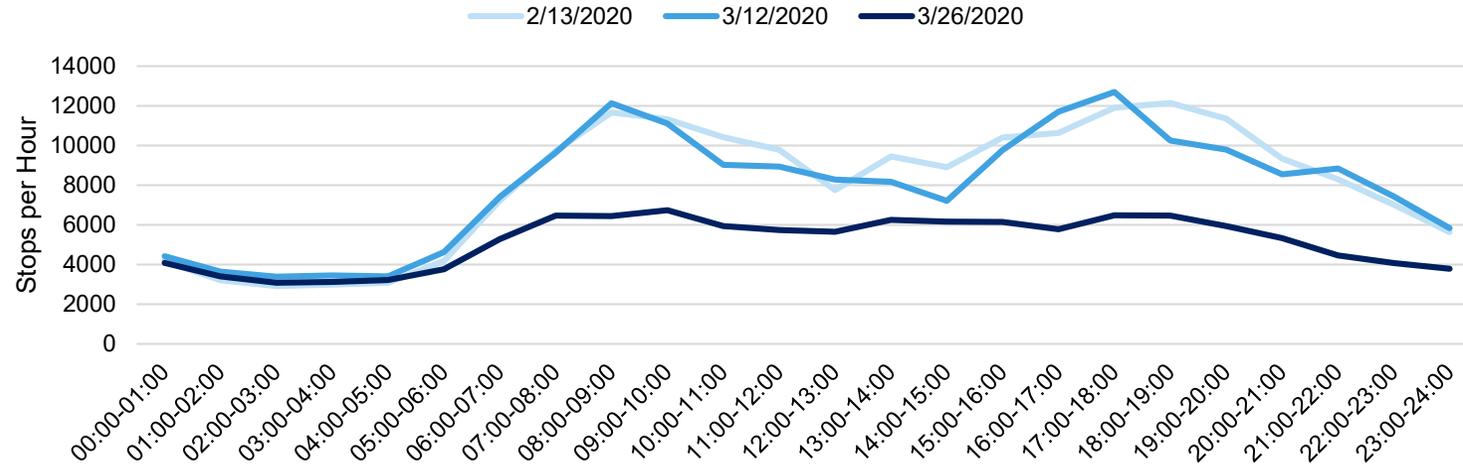
- The CBD area has seen the largest decreases in weekday entries during the PM peak 4-hour window*. The ridership has dropped approximately 95%.
- However, the CBD stations remain to have the highest ridership across the city, with about 35,000 entries per 4 hours in total in the PM peak.

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

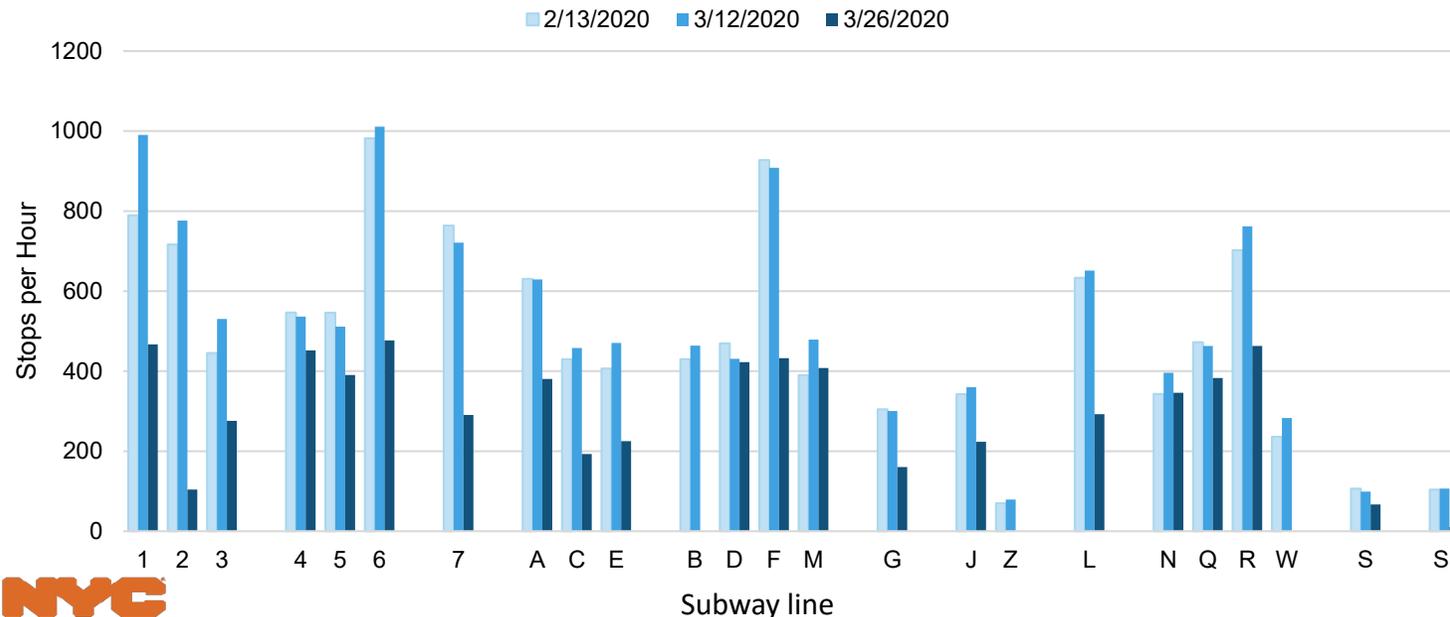
Data sources: MTA Turnstile data (<http://web.mta.info/developers/turnstile.html>)

Subway system service changes

System-wide Weekday Service Change by Hour



Weekday Peak Hour Service Change



- MTA Subway started operating the essential service on March 25, 2020.
- The weekday peak hour services have been cut down to about 50% capacity.
- 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)
- Service changes, coupled with social distancing protocol, have profound impacts on the subway system's overall capacity.

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

For more detailed information

Additional station-level data can be found through the interactive dashboards. We will expand the date ranges as new data become available.

Weekly total MetroCard swipes:

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

Percent changes in MetroCard swipes:

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

Subway Turnstile Entries:

<https://nycplanning.carto.com/u/dcptransportation/builder/bf91d388-3c36-4b85-a402-b3631366e8c4/embed>

