2020 FTA Joint State Safety Oversight and Rail Transit Agency Virtual Workshop

October 6-8, 2020

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Building Confidence in Transit during COVID-19

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2020 FTA Joint State Safety Oversight and Rail Transit Agency Virtual Workshop

How much risk is associated with using Public Transit?

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A person could be infected with the novel coronavirus COVID-19 before showing any symptom for several weeks:

- Contagion risk increases with crowding and public transit vehicles could be **crowded or overcrowded**

- Presence of **high-touch surfaces** such as seats, handrails, doors, and ticket machines, that easily transfer germs.

- The extent to which public transit is equipped with **contact tracing** to identify passengers or workers who may be sick

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Traffic & Transit

MTA Was 'Major Disseminator' Of Coronavirus In NYC, Study Argues

Service cuts helped shore up the MTA's financial position, "but it most likely accelerated the spread of coronavirus," an MIT analyst says.

By Kathleen Culliton, Patch Staff
Apr 15, 2020 2:59 pm ET

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The Subways Seeded the Massive Coronavirus Epidemic in New York City

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Updated April 24, 2020

National Bureau of Economic Research Working Paper No. 27021, April 19, 2020
Social Science Research Network No. 3574455, April 13, 2020

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APRIL 17, 2020 9:53AM

Why Are Transit Systems Still Running?

BY RANDAL O'TOOLE

Sit-down restaurants and bars have been shut down. Public officials are discouraging or even forbidding people from doing "unnecessary travel," even if it is to visit a second home where they might be able to socially distance themselves better than in their first, more urban home. All sorts of other rules are being passed, all supposedly for our own good.

So why are urban transit systems still running? A 2018 study found that "mass transportation systems offer an effective way of accelerating the spread of

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CORONAVIRUS PANDEMIC

CORONAVIRUS · Published April 15

NYC's subways blamed as 'major disseminator' of coronavirus, MIT researcher says

USA TODAY

COVID-19   FEATURED   SEPTEMBER EDITORIAL CARTO
Expert Q&As   Hidden Common Ground   Editorial cartoons

News   Sports   Entertainment   Life   Money   Tech   Travel   [Opinion]

Coronavirus unknowns include how fatal it is and if we can make a vaccine. But we've already learned about four things that make the pandemic worse.

Glenn Harlan Reynolds Opinion columnist

Published 7:39 a.m. ET May 6, 2020 | Updated 11:04 a.m. ET May 6, 2020

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Subway Ridership, Built Environment and Spatial Disparities in COVID-19 Infection Rates in New York City
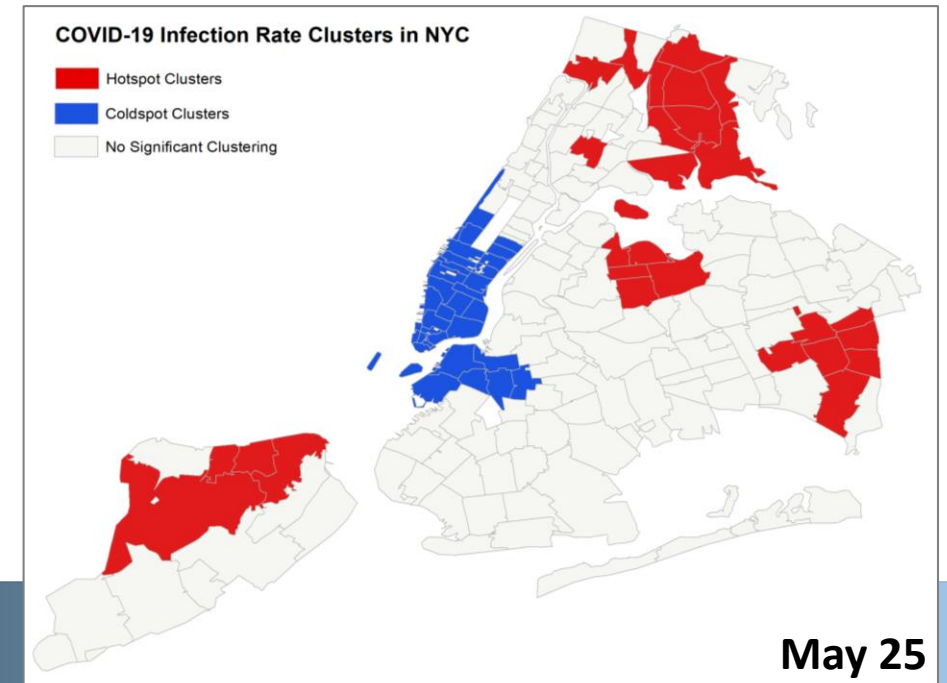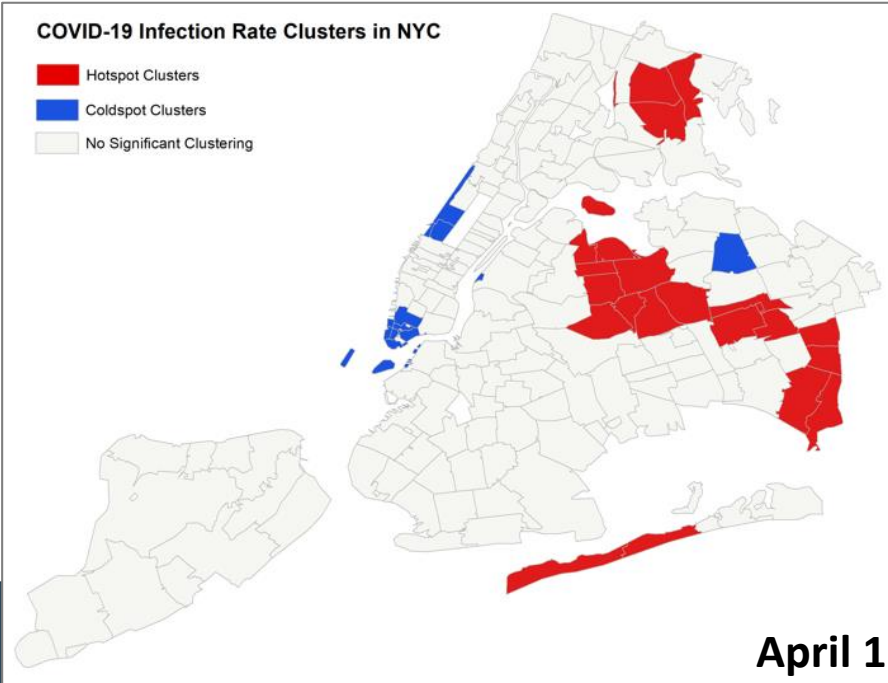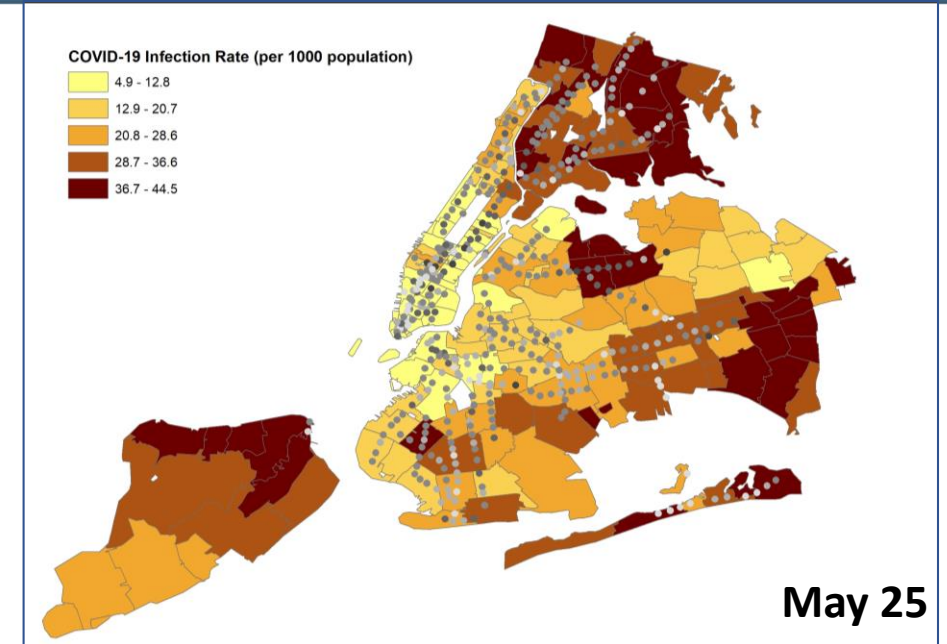
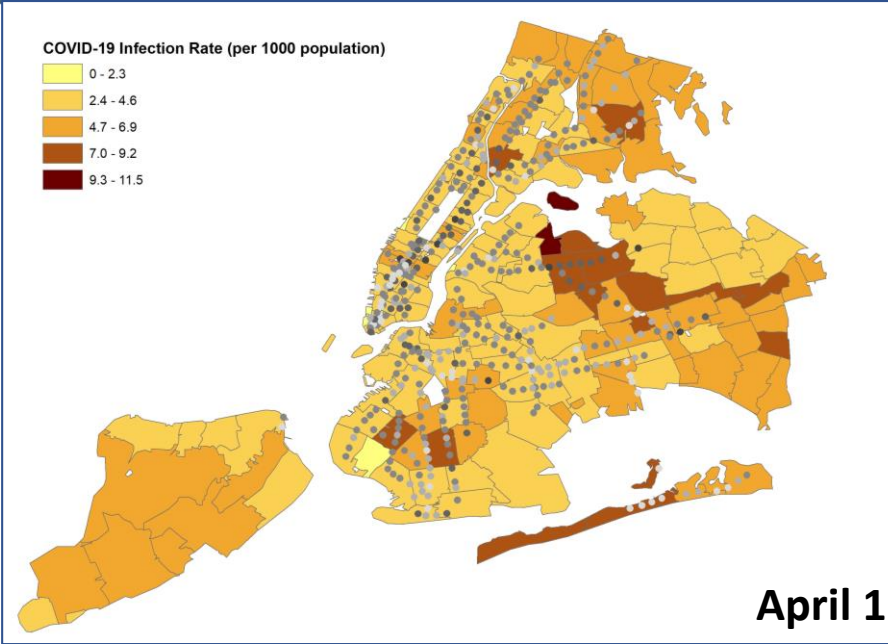Shima Hamidi, PhD

ABSTRACT

Introduction: This study aims to determine whether subway ridership and built environmental factors such as population density and points of interests (POIs) are linked to the per capita COVID-19 infection rate in New York City (NYC) zip codes, after controlling for racial and socioeconomic disparities.

Methods: Spatial lag models were employed to model the COVID-19 per capita infection rate in NYC zip codes (n=177) on April 1 and May 25, 2020, accounting for the spatial relationships among observations. Both direct and total effects (through spatial relationships) are reported.

Results: This study distinguishes between density and crowding, and the findings indicated that crowding (and not density) was associated with the higher infection rate. In fact, population density was negatively associated with the infection rate on May 25. This study found no evidence that a higher per capita subway ridership is related to the COVID-19 infection rate. On the other hand, the racial and socioeconomic disparities were among the most significant predictors of the spatial variation in COVID-19 per capita infection rates in NYC, even more significant than variables such as POI rates, density and nursing home bed rates.

Conclusions: POI destinations not only could facilitate the spread of virus to other parts of the city (that are accounted in this study through indirect effects) but also were significantly associated with the higher infection rate in their immediate neighborhoods during the early stages of the pandemic. Policymakers should pay particularly close attention to these destinations during the early stages of pandemics.

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Subway Ridership, Built Environment and Spatial Disparities in COVID-19 Infection Rates in New York City

COVID-19 Infection Rate (per 1000 population)
- 0 - 2.3
- 2.4 - 4.6
- 4.7 - 6.9
- 7.0 - 9.2
- 9.3 - 11.5

April 1

COVID-19 Infection Rate (per 1000 population)
- 4.9 - 12.8
- 12.9 - 20.7
- 20.8 - 28.6
- 28.7 - 36.6
- 36.7 - 44.5

May 25

COVID-19 Infection Rate Clusters in NYC
- Hotspot Clusters
- Coldspot Clusters
- No Significant Clustering

April 1

COVID-19 Infection Rate Clusters in NYC
- Hotspot Clusters
- Coldspot Clusters
- No Significant Clustering

May 25

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Variable Descriptions, Data Sources and Descriptive Statistics

Variable Description	Data Sources	Mean (SD)*
Dependent Variables		
ln of confirmed cases per 1000 (as of April 1)	NYC Department of Health 2020	4.59 (1.7)
ln of confirmed cases per 1000 (as of May 25)	NYC Department of Health 2020	21.9 (8.5)
Independent Variables		
Ln of % of Black population	ACS 2018	21.7 (24.9)
Ln of % of Hispanic population	ACS 2018	26.1 (19.5)
Ln of average household size	ACS 2018	2.6 (0.51)
Ln of standardized SES index	developed by authors based on data from ACS 2018	100 (25)
Ln of # of POIs per 1000	SafeGraph 2020	11.28 (13.)
Ln of population density	ACS 2018 (5-year estimates)	39,886 (25,06)
Ln of % emptying out	The New York Times 2020	11.0 (10.4)
# of nursing home beds per 1000	HIFLD 2019	5.7 (10.4)
Subway ridership per 1000 (baseline)	MTA 2020	635.3 (1,919)
% Changes in subway ridership	MTA 2020	-35.3 (28.2)
Ln of # tests per 1000 (as of April 1)	NYC Department of Health 2020	9.1 (2.6)
Ln of # tests per 1000 (as of May 25)	NYC Department of Health 2020	72.2 (21.9)

April 1

| variables	b	S.E.	t-ratio	p-value	Total effects
Intercept	-0.3432	0.66	-0.52	0.601	
Ln of percent Black	0.0287	0.01	2.31	0.021	0.0291
Ln of percent Hispanic	0.0067	0.03	0.25	0.802	0.0068
Ln of average household size	0.6929	0.11	6.09	<0.001	0.7021
Ln of SES index	-0.3057	0.11	-2.84	0.004	-0.3098
Ln of POI per 1000 population	0.1065	0.04	2.90	0.004	0.1079
Ln of population density	0.0120	0.02	0.57	0.570	0.0122
Subway ridership per 1000 population (baseline)	-0.00001	0.00003	-0.38	0.707	-0.00001
% Change in subway ridership on the third week of March	0.00002	0.00005	0.30	0.761	0.00002
# of nursing home beds per 1000 population	0.0014	0.0014	1.005	0.315	0.0014
Ln of # tests per 1000 population (April 1)	1.074	0.06	19.48	<0.001	1.088

May 25

Variables	b	S.E.	t-ratio	p-value	Total effects
Intercept	10.87	0.45	24.18	<0.001	
Ln of percent Black	0.0297	0.008	3.75	0.008	0.0293
Ln of percent Hispanic	0.0438	0.017	2.63	<0.001	0.0432
Ln of average household size	0.3381	0.075	4.50	<0.001	0.3330
Ln of SES index	-0.2383	0.070	-3.41	<0.001	-0.2347
Ln of POI per 1000 population	-0.0371	0.024	-1.57	0.115	-0.0365
Ln of population density	-0.0316	0.015	-2.13	0.033	-0.0311
Subway ridership per 1000 population (baseline)	0.000006	0.00002	0.31	0.756	0.000006
% Change in subway ridership on the third week of March	0.000008	0.00003	0.23	0.814	0.000008
# of nursing home beds per 1000 population	0.0026	0.0009	2.91	0.003	0.0026
Ln of % emptying out	-0.1110	0.018	-6.06	<0.001	-0.1093
Ln of # tests per 1000 population (May 25)	0.9503	0.042	22.76	<0.001	0.9360

- We found no evidence that a higher per capita subway ridership is related to the COVID-19 infection rate.

- On the other hand, the racial and socioeconomic disparities were among the most significant predictors of the spatial variation in COVID-19 per capita infection rates in NYC, even more significant than variables such as POI rates, density and nursing home bed rates.

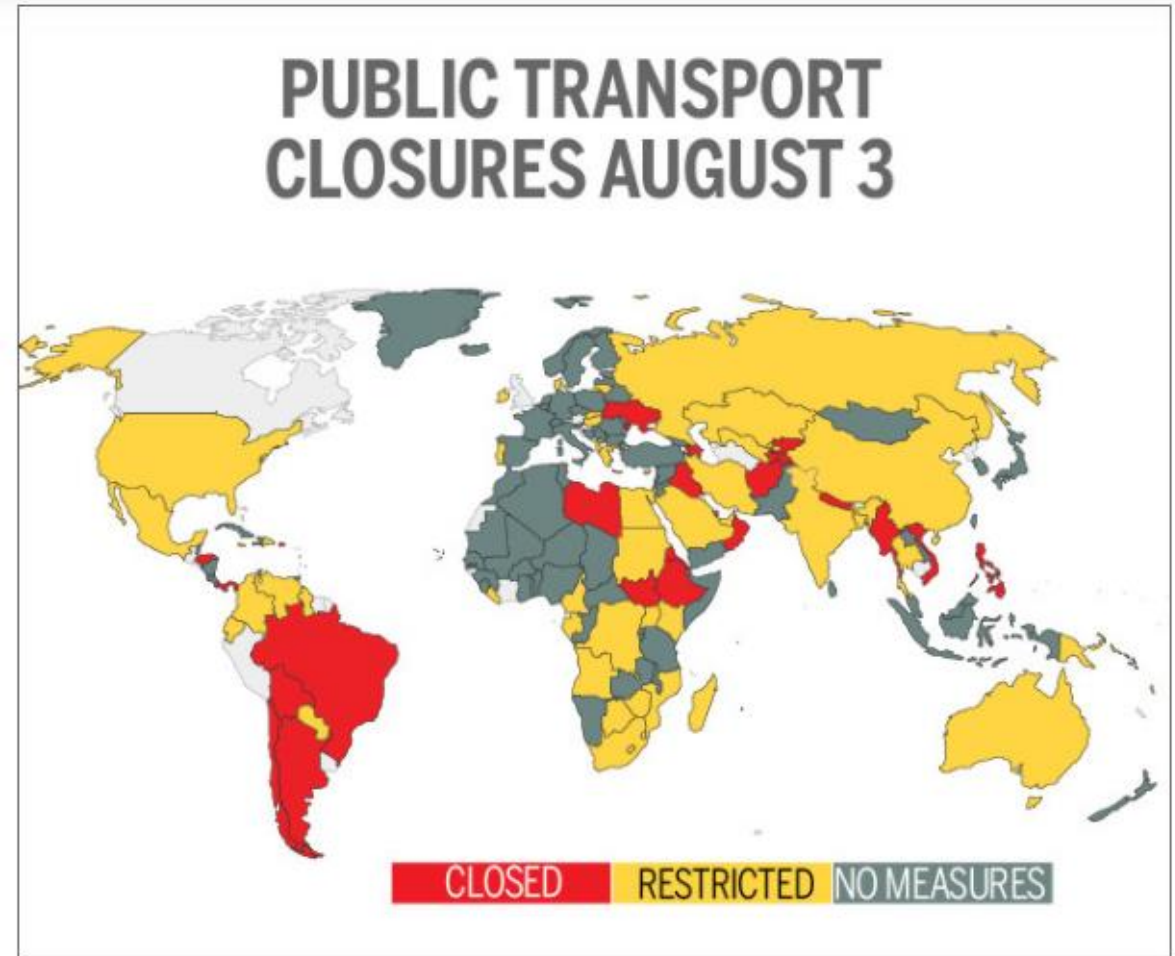U.S. Department of Transportation
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Subway ridership, relative to pre-pandemic levels, risen to
- in Beijing: 60 %
- in Berlin, 60-70%
- In Paris, 45 %

- In **Paris**, none of the 150 infection clusters identified between early May and June were linked to the city's public transportation. As of July, 4 out of 386 clusters (less than 1%) were linked to public transit.

- A study of coronavirus clusters in April and May in **Austria** did not tie any to public transit.

- Studies in **Hong Kong** show that it has not seen a big outbreak associated with public transit

- In **Tokyo**, where public health authorities have aggressively traced virus clusters, none have been linked to the city's famously crowded rail lines.
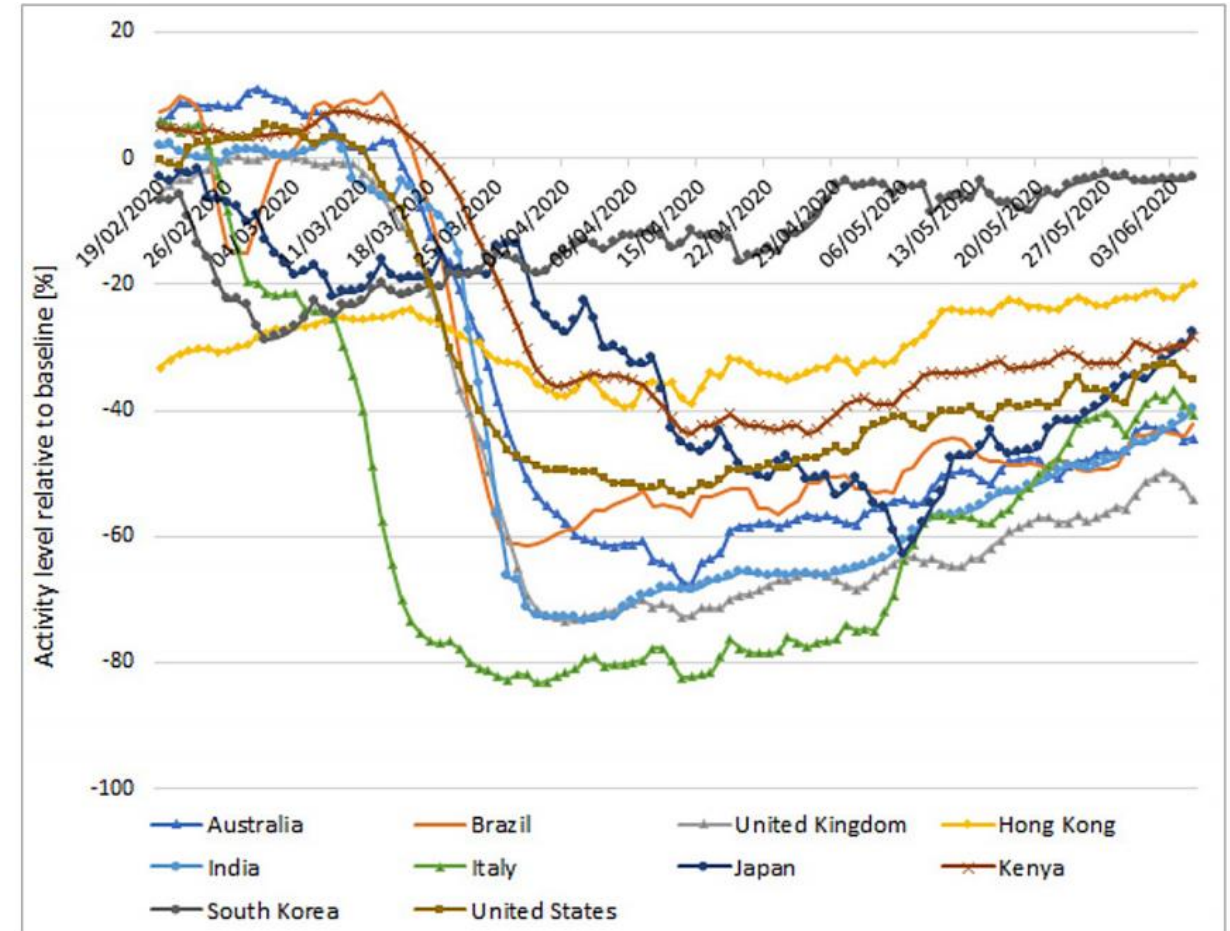
Tirachini, A., & Cats, O. (2020). COVID-19 and Public Transportation: Current Assessment, Prospects, and Research Needs. *Journal of Public Transportation*, *22*(1), 1.

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- **U.K:** "You should avoid using public transport where possible" and "Consider all other forms of transport before using public transport" (DfT 2020)

- **Netherlands:** "only if it is really necessary and you do not have any other means of transport, and travel outside the rush hours as much as possible" (Rijksoverheid n.d.)

- **U.S**, "offer employees incentives to use forms of transportation that minimize close contact with others (e.g., biking, walking, driving, or riding by car either alone or with household members)" (CDC 2020).

- Metro trains in **Taiwan, Singapour and South Korea** are running with large occupancies at peak periods beyond the usual COVID19 physical distancing suggestions (one or two meters of distance between people) as long as passengers wear masks

PUBLIC TRANSPORT CLOSURES AUGUST 3

CLOSED   RESTRICTED   NO MEASURES

https://timesofindia.indiatimes.com/india/how-cities-around-the-world-resumed-public-transit/articleshow/77367323.cms

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What needs to be done to bring back Confidence and Ridership?

- Contagion risk increases with crowding and public transit vehicles could be **crowded or overcrowded**

- Presence of **high-touch surfaces** such as seats, handrails, doors, and ticket machines, that easily transfer germs.

- The extent to which public transit is equipped with **contact tracing** to identify passengers or workers who may be sick

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OPINIONS OF RIDERS AROUND THE WORLD VARY ON HOW TO MAKE MASS TRANSIT SAFER DURING COVID-19

Most favoured safety measure based on percent of respondents who consider it necessary

63% of Americans ranked **disinfection between trips** first

53% of Canadians ranked **disinfection between trips** first

53% of British ranked **handwashing stations in subway stations** first

69% of Spanish ranked **disinfection between trips and mandatory masks for riders** first

76% of French ranked **mandatory masks for riders** first

51% of Germans ranked **disinfection between trips** first

72% of Italians ranked **mandatory masks for riders** first

69% of Chinese ranked **mandatory masks for riders** first

45% of Australians ranked **disinfection between trips** and **handwashing stations in subway stations** first

Source: Oliver Wyman Traveller Sentiment Survey

© Oliver Wyman

Traveller Sentiment Survey, Addressing health concerns around the world

Image: Oliver Wyman

https://www.weforum.org/agenda/2020/07/masks-subway-disinfectant-how-to-make-commuters-feel-safe-after-covid-19/

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Incorporating Public Health into Service Planning

- Hygiene, Sanitization, and Ventilation

- Contact Tracing

https://earlymetrics.com/disinfection-tech-ensuring-cleaner-safer-post-covid/

https://www.theverge.com/2020/5/20/21265221/nyc-mta-ultraviolet-light-uvc-coronavirus-disinfect-puro-pictures

A survey of 1,000 mass transit riders conducted by New York-based advocacy group Tri-State Transportation Campaign found that cleaning topped a list of actions people wanted before they would feel comfortable riding mass transit again.

Incorporating Public Health into Service Planning

- Physical Distancing, wearing masks or both?

- Effective Management of Crowding to Reduce Public Health Risks

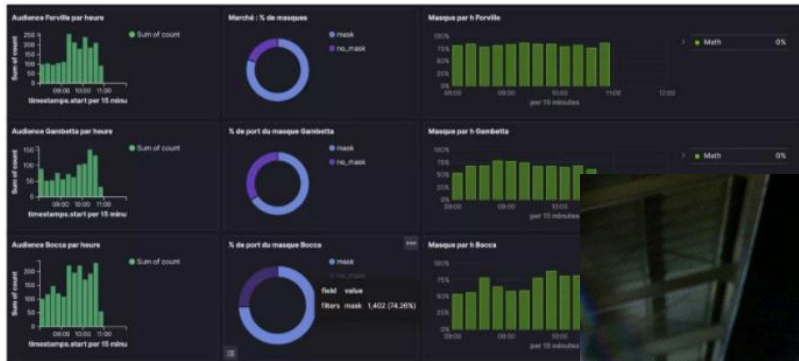- Clear guidelines and effective enforcement efforts

https://www.theverge.com/2020/5/7/21250357/france-masks-public-trans
surveillance-camera-software
*xample statistical data generated by DatakaLab's software.* | Screenshot: DatakaLab

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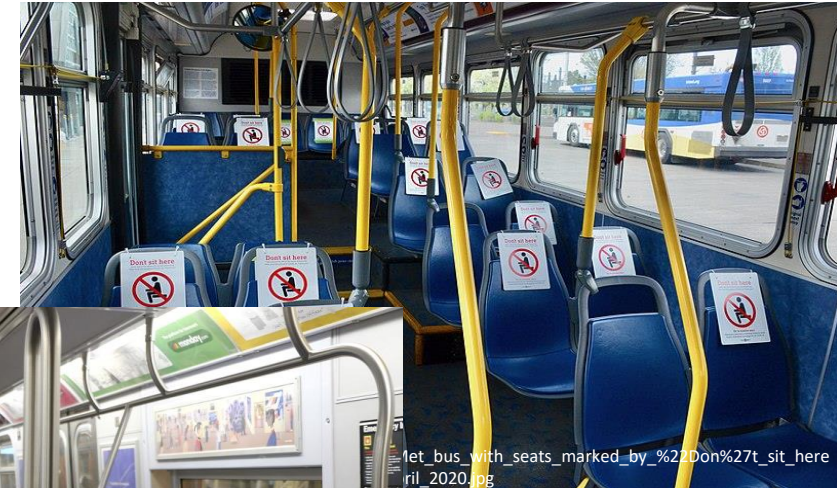
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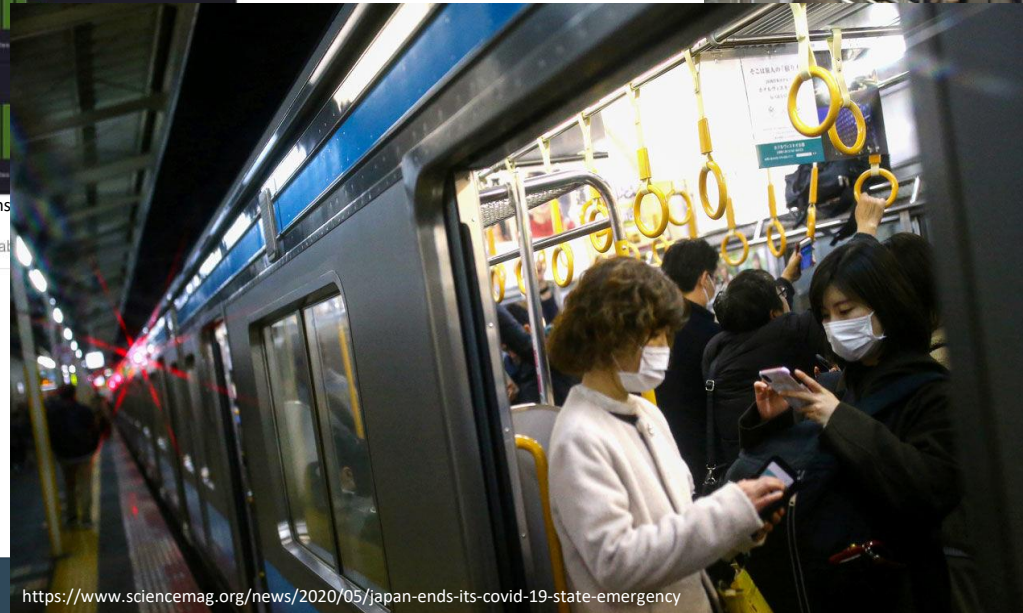
https://www.sciencemag.org/news/2020/05/japan-ends-its-covid-19-state-emergency

https://www.dart.org/healt

Effective Communication

- Effective communication of what are being done to maintain safety and quality service

- Communication with citizens via in-depth incident reporting, email alerts

- Posters and station displays to encourage hygiene practices

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Effective Communication

Provide **real-time information** to help passengers

with informed decision-making to avoid crowded

times/stations and promote costumer confidence
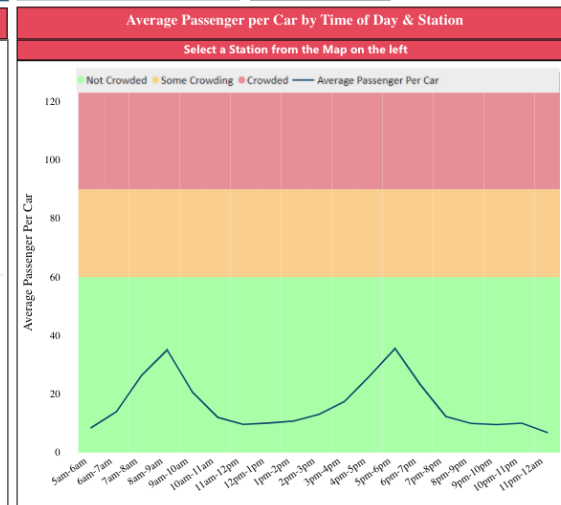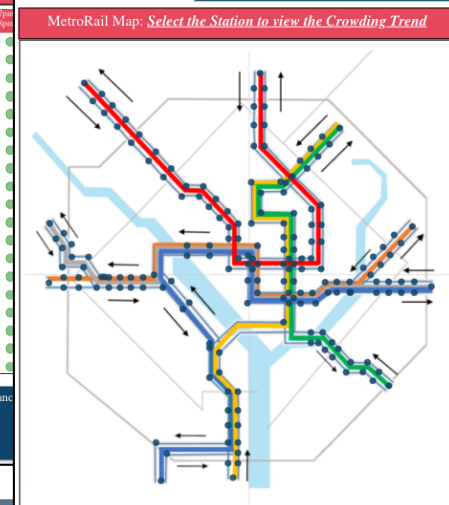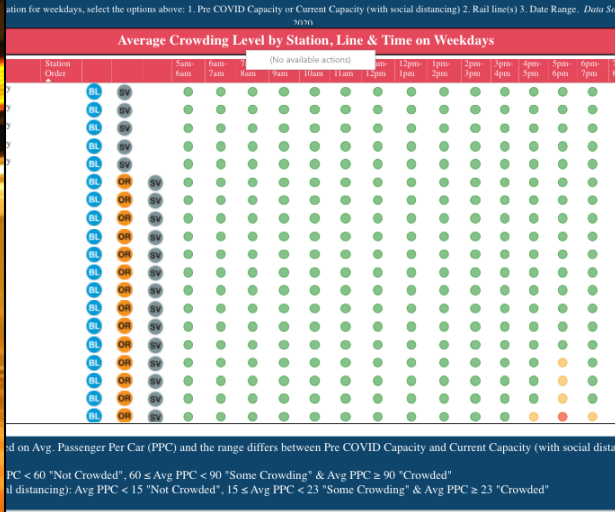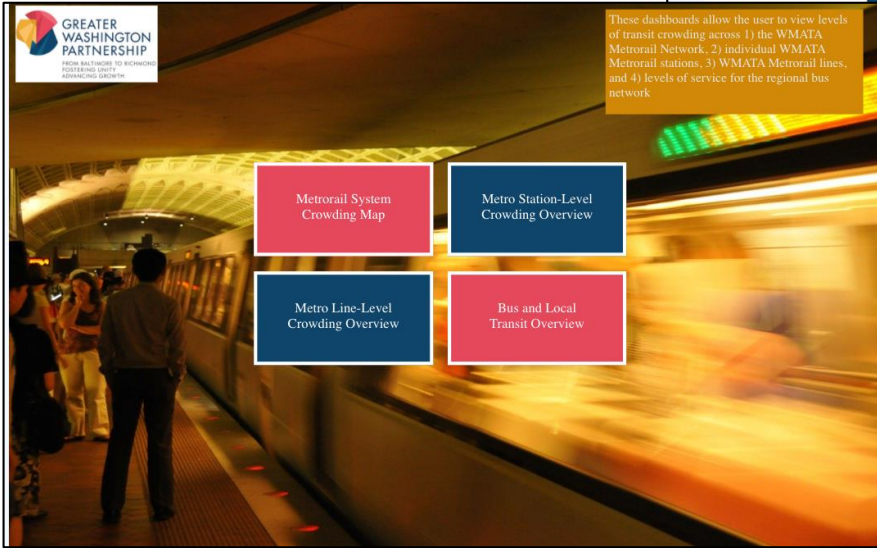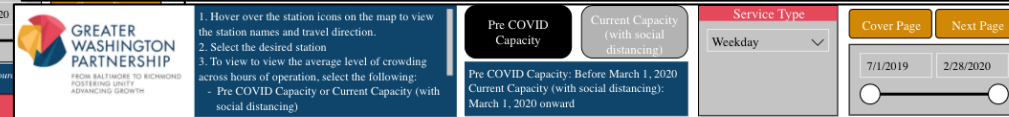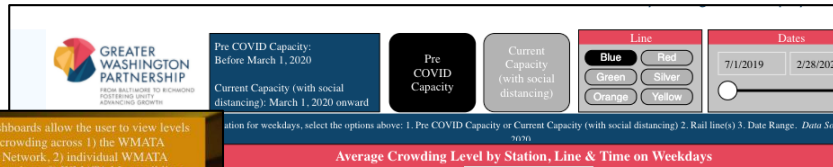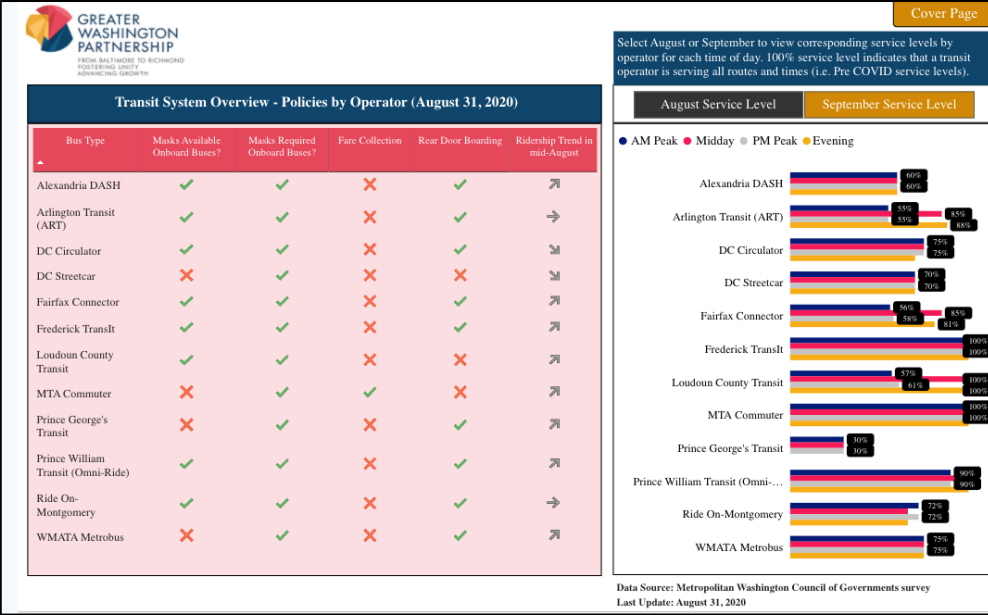
Conducting and Communicating Evidence-based Research
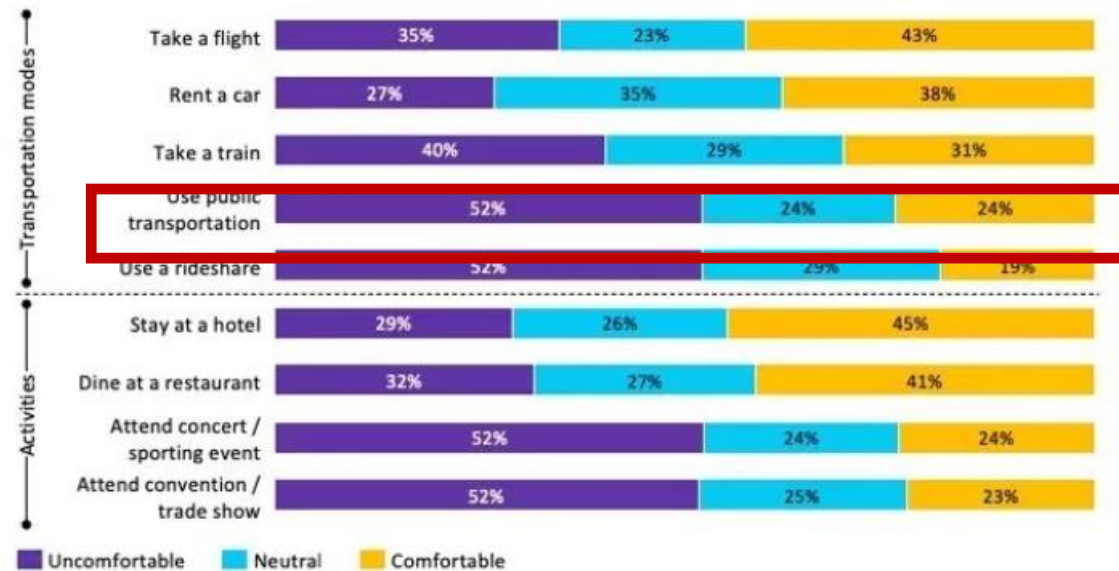
COVID-19 CONTINUES TO MAKE CONSUMERS WARY OF SOME ACTIVITIES

After the COVID-19 outbreak ends and travel restrictions are lifted, how comfortable will you feel doing each of these activities?[1]
Percent of respondents, (n=4,594)

Transportation modes

Activity	Uncomfortable	Neutral	Comfortable
Take a flight	35%	23%	43%
Rent a car	27%	35%	38%
Take a train	40%	29%	31%
Use public transportation	52%	24%	24%
Use a rideshare	52%	29%	19%

Activities

Activity	Uncomfortable	Neutral	Comfortable
Stay at a hotel	29%	26%	45%
Dine at a restaurant	32%	27%	41%
Attend concert / sporting event	52%	24%	24%
Attend convention / trade show	52%	25%	23%

■ Uncomfortable ■ Neutral ■ Comfortable

1. Uncomfortable = "Very uncomfortable" or "Somewhat uncomfortable"; Comfortable = "Very comfortable" or "Somewhat comfortable"
Source: Oliver Wyman Traveller Sentiment Survey, Oliver Wyman analysis

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Traveller Sentiment Survey, Comfort after COVID-19

Image: Oliver Wyman

https://www.weforum.org/agenda/2020/07/masks-subway-disinfectant-how-to-make-commuters-feel-safe-after-covid-19/

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Effective Management of Limited Capacity

- Understanding the demand, User characteristics, needs and behaviors

  - Current estimates from Stanford University show that about 42% of American employees are working from home

  - Conducting surveys and behavioral research to uncover people's perception and attitudes

- Use of micro-mobility options such as app-based on-demand shuttle services

- Spreading Passenger Demands

  - Coordination with major employers to spread Passenger Demand

  - Incentives to passengers for peak spreading

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The key in bringing back confidence is that potential passengers feel safe using public transit. This can be achieved by:

• Incorporating public health measures into service planning

• Effective management of limited capacity

• Effective communication between transit authorities and passengers

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