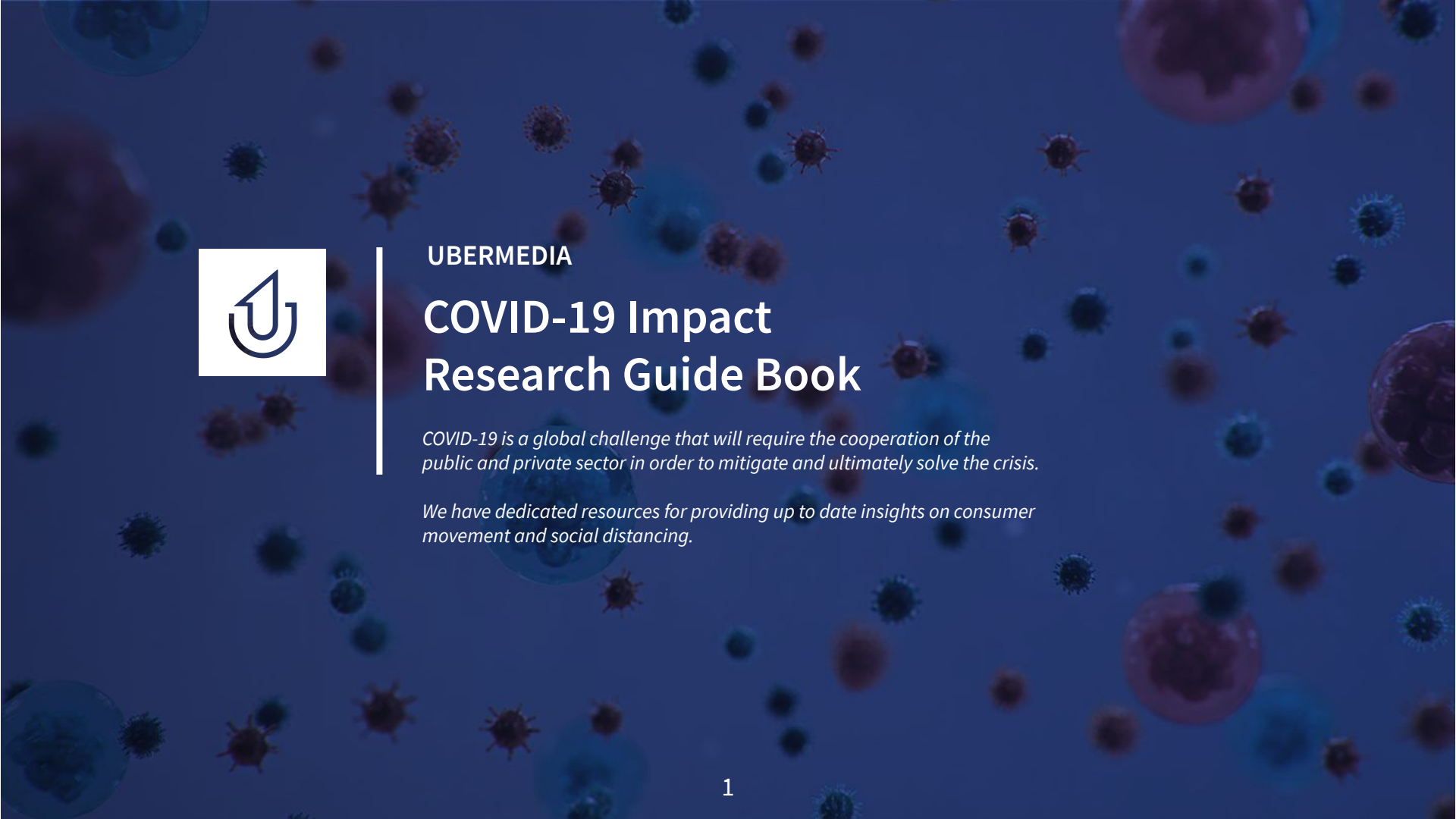

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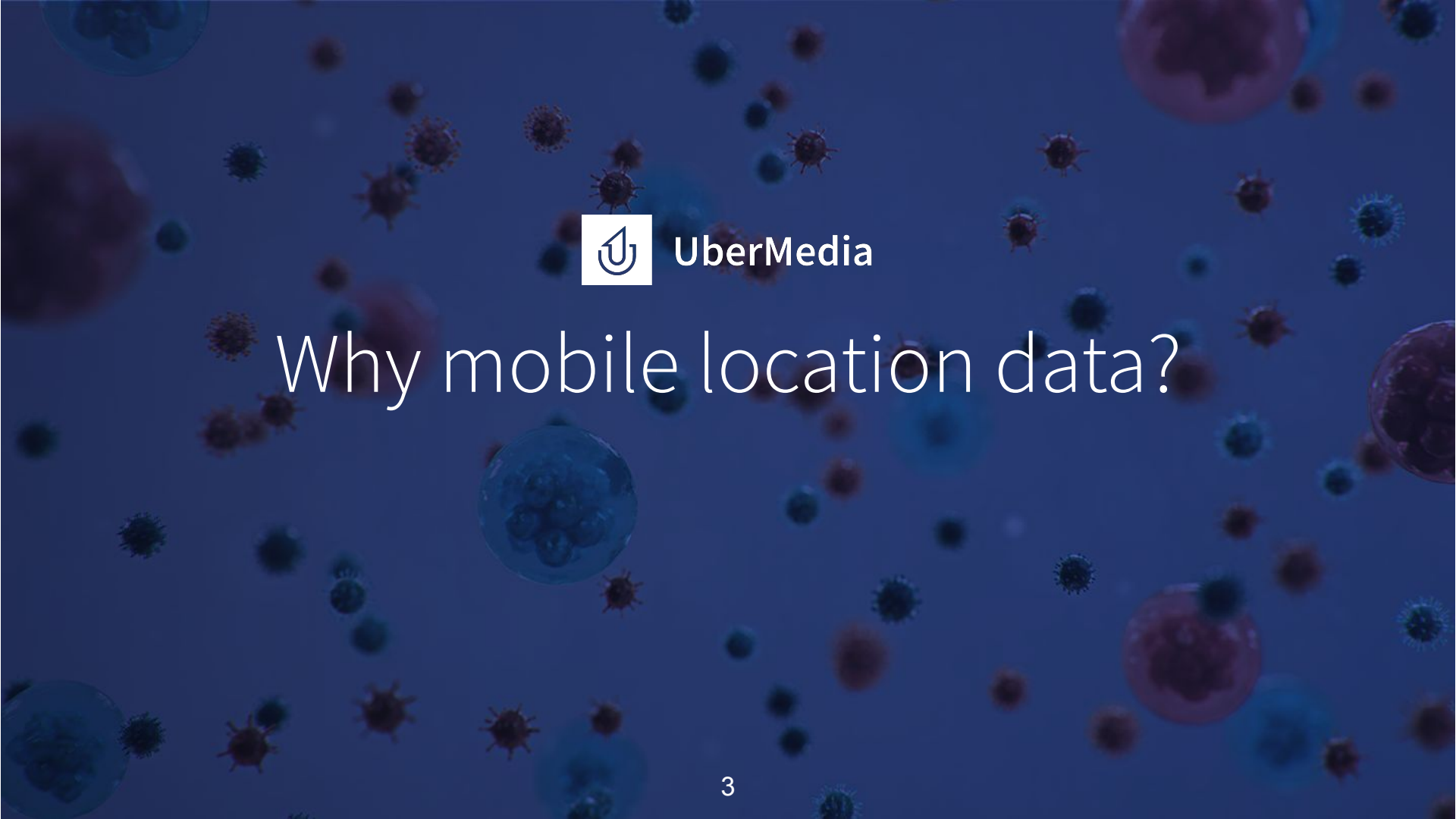
COVID-19 Impact Research Guide Book

COVID-19 is a global challenge that will require the cooperation of the public and private sector in order to mitigate and ultimately solve the crisis.

We have dedicated resources for providing up to date insights on consumer movement and social distancing.

Table of contents



Why mobile location data?

OUR HISTORY

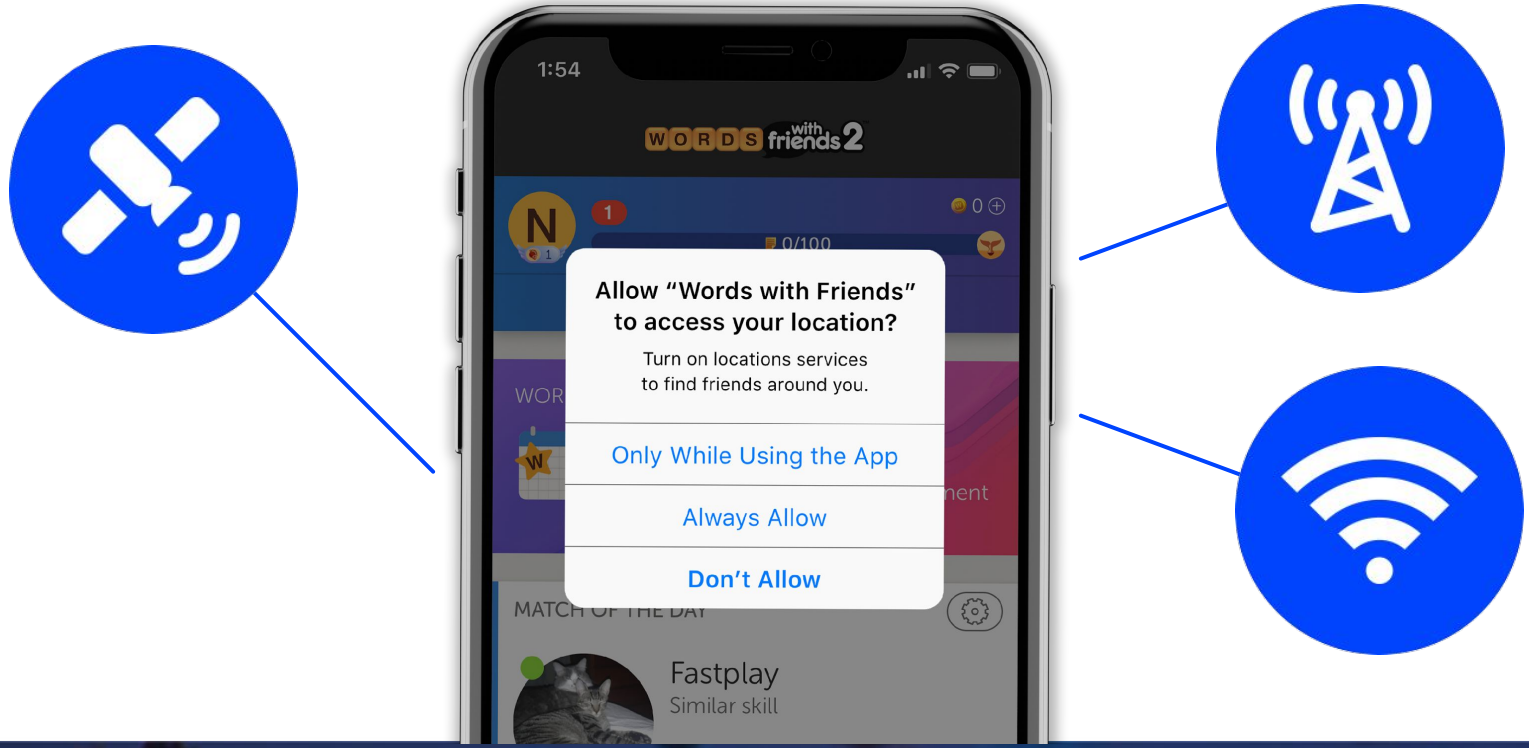
Mobile data experts, continually evolving to leadership positions in the mobile ecosystem.

2010
Founded as an app publisher and social media company

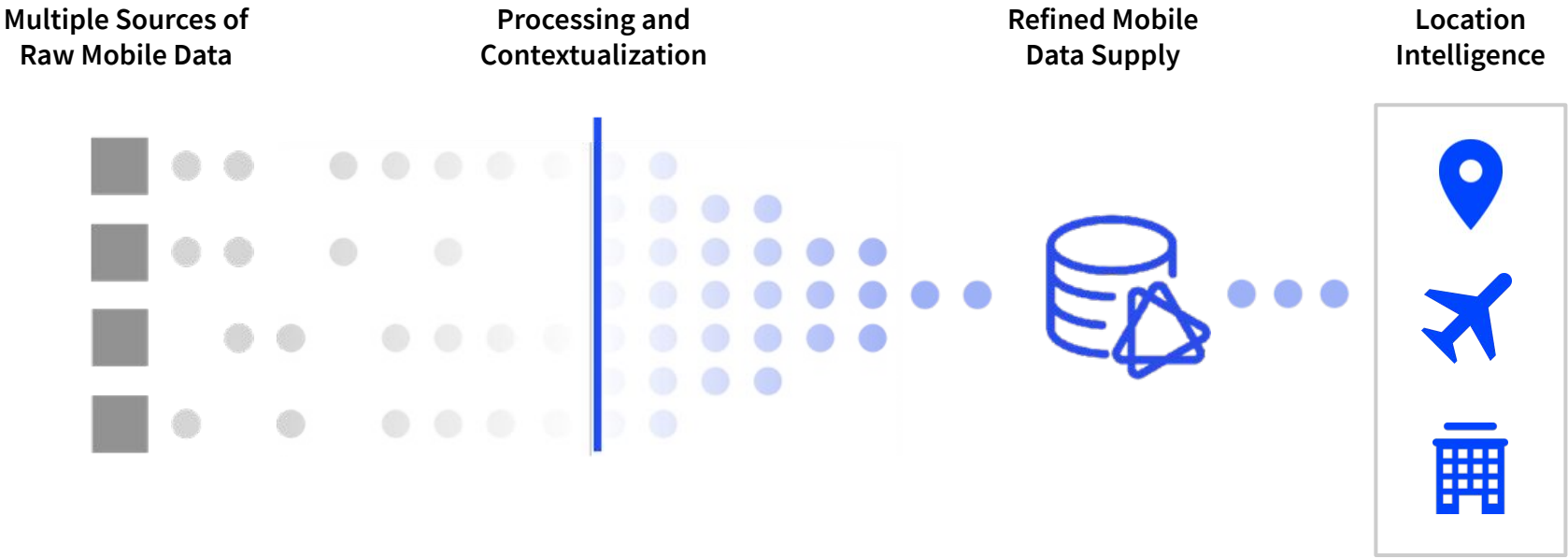
2013 - 2015
Media platform, powered by machine-learning optimization

2015
Evolution to market leadership position in location intelligence

How Mobile Location Data is Gathered



Multiple Sources of Data Refined Into Solutions



Accessing data on

14 Trillion

TOTAL LOCATION OBSERVATIONS

1 Billion

MONTHLY GLOBAL DEVICES

300 Million

MONTHLY AMERICAN DEVICES

5 Years

OF HISTORIC DATA

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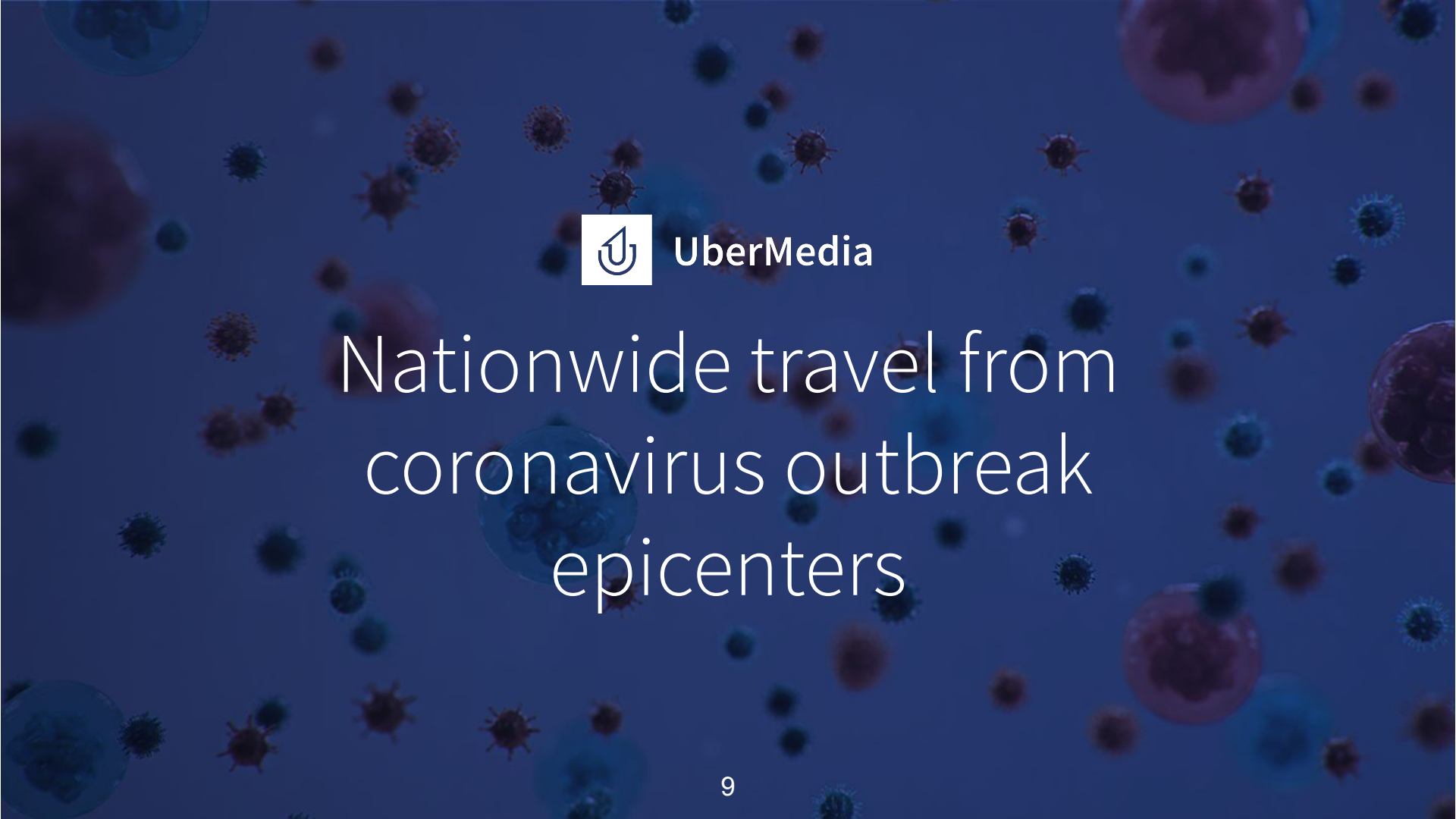
Public Policy Research Examples

Public policy experts are faced with challenging decisions related to the Covid-19 Pandemic.

These include recommendations around social distancing and stay-at-home orders as well as challenges providing emergency services to communities.



Nationwide travel from coronavirus outbreak epicenters

What responses and variables have impacted nationwide travel from outbreak epicenters?

The first COVID-19 case in the United States was confirmed in Washington on January 20, 2020. Since then, the virus has spread throughout the country at an increasing rate.

A handful of places/events have been identified as “epicenters” to regional outbreaks, including the Life Care Center of Kirkland in Washington, the Young Israel of New Rochelle Synagogue in New York, and the Biogen Conference in Massachusetts.

These three examples provide interesting perspectives into various responses, their effectiveness, and other variables that played a role in the national travel of potentially infected persons.

The timelines associated with the exposure of COVID-19 at these gatherings and the steps that state and business leadership took to contain the spread of the disease in the first few weeks of exposure is crucial to the effectiveness of their efforts, but the data shows that other variables, including the inability to travel due to the nature of the epicenter, have had a lasting impact on national spread.

Biogen Conference – Boston

Response: Conference Attendees Directed to Work from Home
Response Time: 7 days
Median Distance Traveled of Devices from Epicenter: 37.8 miles
Average Distance Traveled of Devices from Epicenter: 336.6 miles

One week after 175 Biogen executives met at the Marriott Long Wharf hotel in Boston for an annual conference and 2 days after attendees began reporting symptoms, Biogen directed conference attendees to work from home.

Although Biogen's response to COVID-19 was fast and communicative, the reach of the exposure quickly became global: Biogen executives traveled from all over the world to meet in Boston and had already traveled home.

Before receiving any confirmation that a Biogen Conference attendee had COVID-19, Biogen was already communicating with state health officials and its employees about the importance of working from home and social distancing.

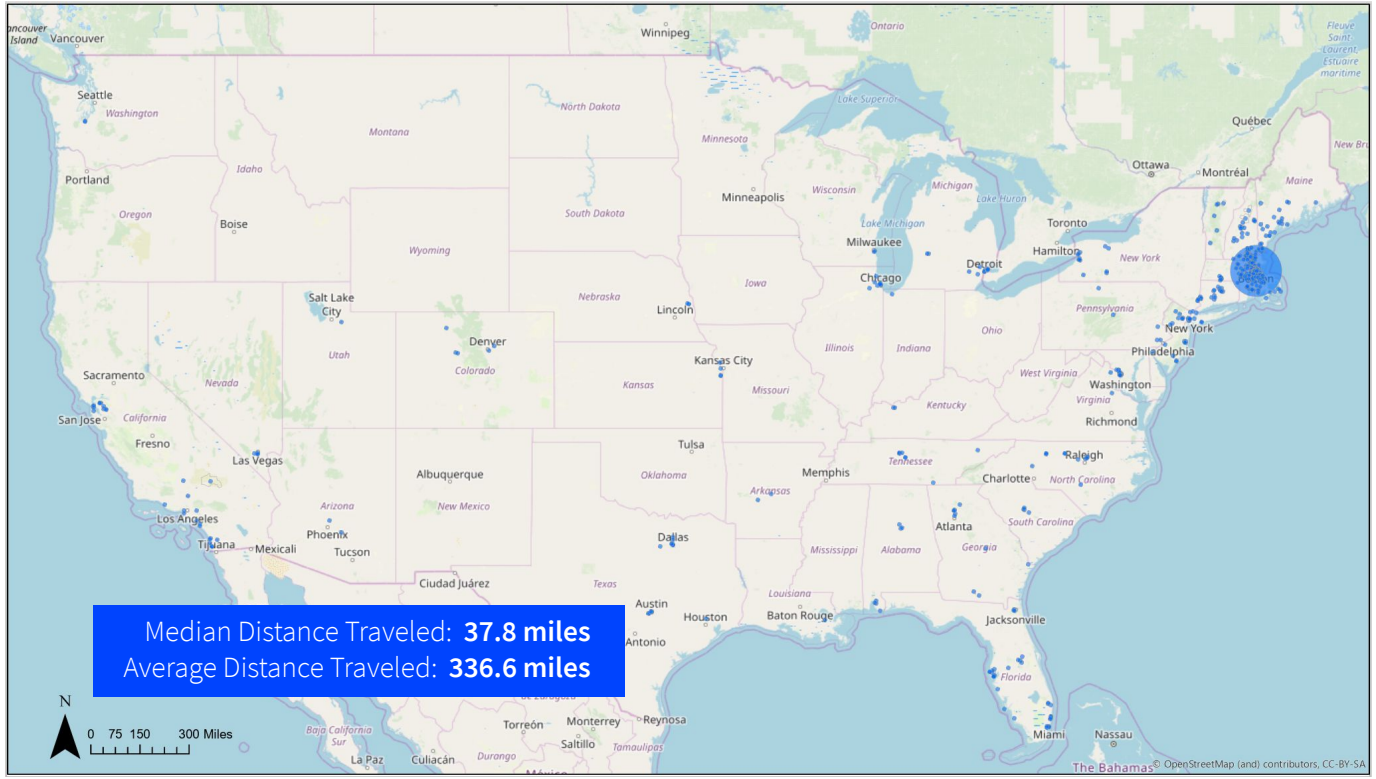
Biogen Conference – Boston

Boston Marriott Long Wharf, Massachusetts

Conference Dates:
February 26-27

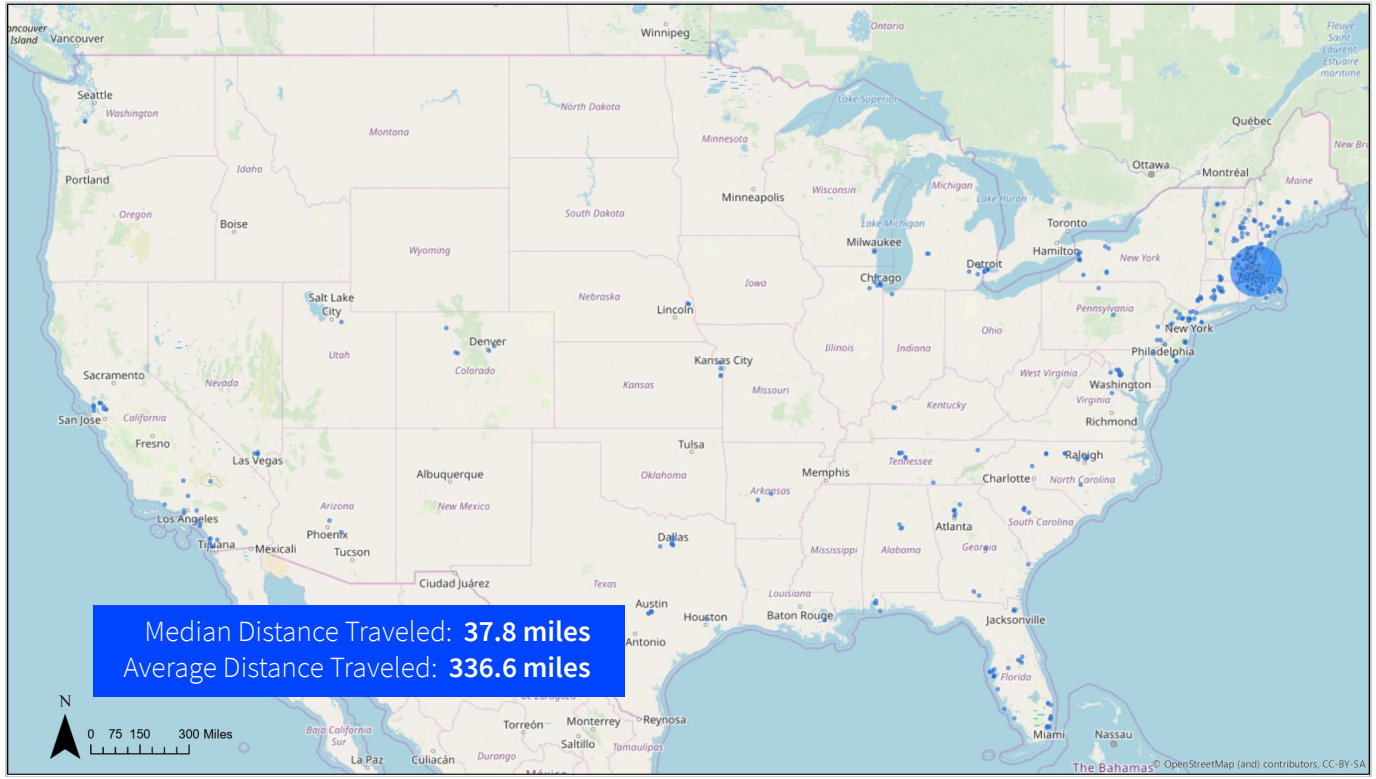
First Reported Case:
2 days after conference

2 weeks after first ping in study polygon



Biogen Conference – Boston

The fast response was marred by the “off-site” nature of the event and the fact that attendees had to travel to/from its location. That fact is present in the data and evident in the map showing that those at the epicenter during the exposure window were able to travel an average of 336.6 miles after the event.



Young Israel of New Rochelle Synagogue – New York

Response: State Directed Containment Area
Response Time: 7 days
Median Distance Traveled of Devices from Epicenter: 19.6 miles
Average Distance Traveled of Devices from Epicenter: 110.8 miles

One week after the first confirmed case of COVID-19 in New York (Manhattan) and within days of the obvious spike in cases in New Rochelle, NY, Gov. Andrea Cuomo mandated a containment area of a 1-mile radius around its epicenter, the Young Israel of New Rochelle Synagogue.

The containment zone around the epicenter limited travel of those potentially exposed with the goal of mitigating risk of further exposure to other communities.

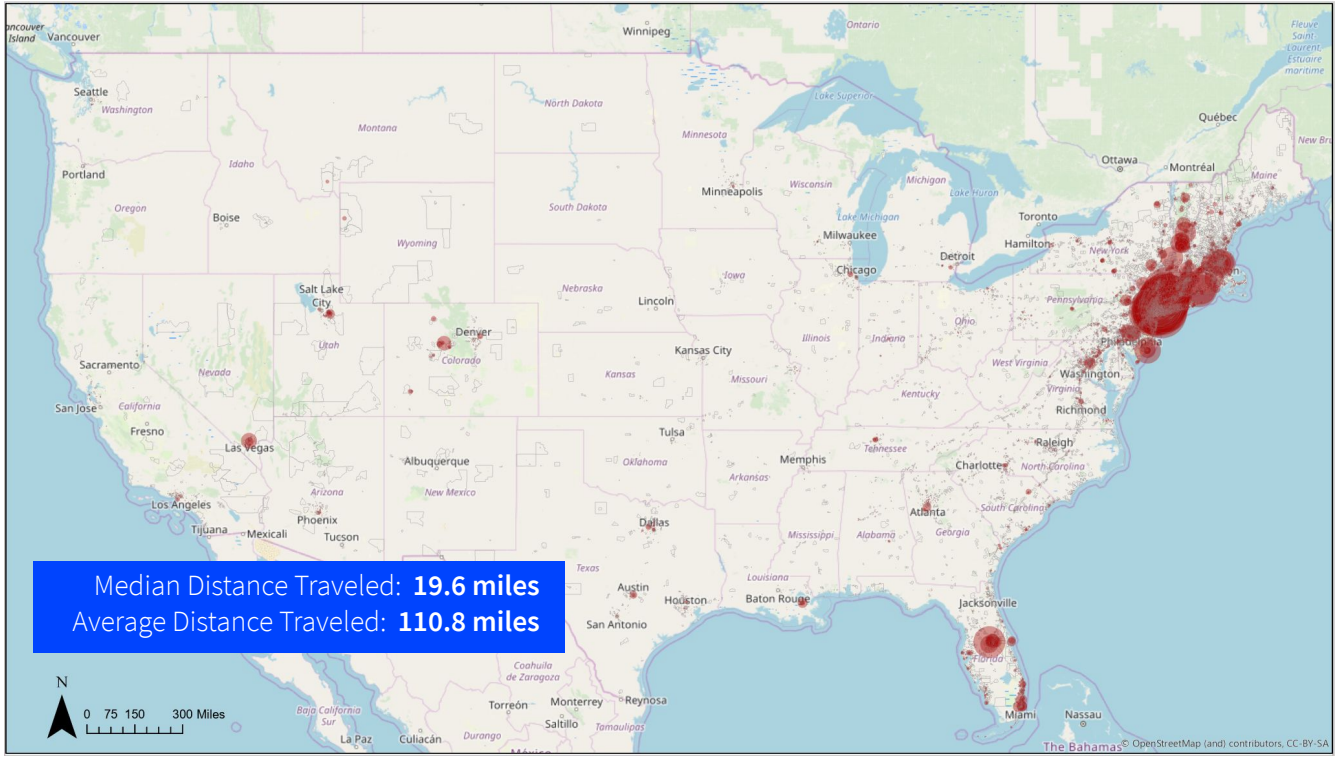
Young Israel of New Rochelle Synagogue – New York

New York

Patient started showing signs of illness:
February 22

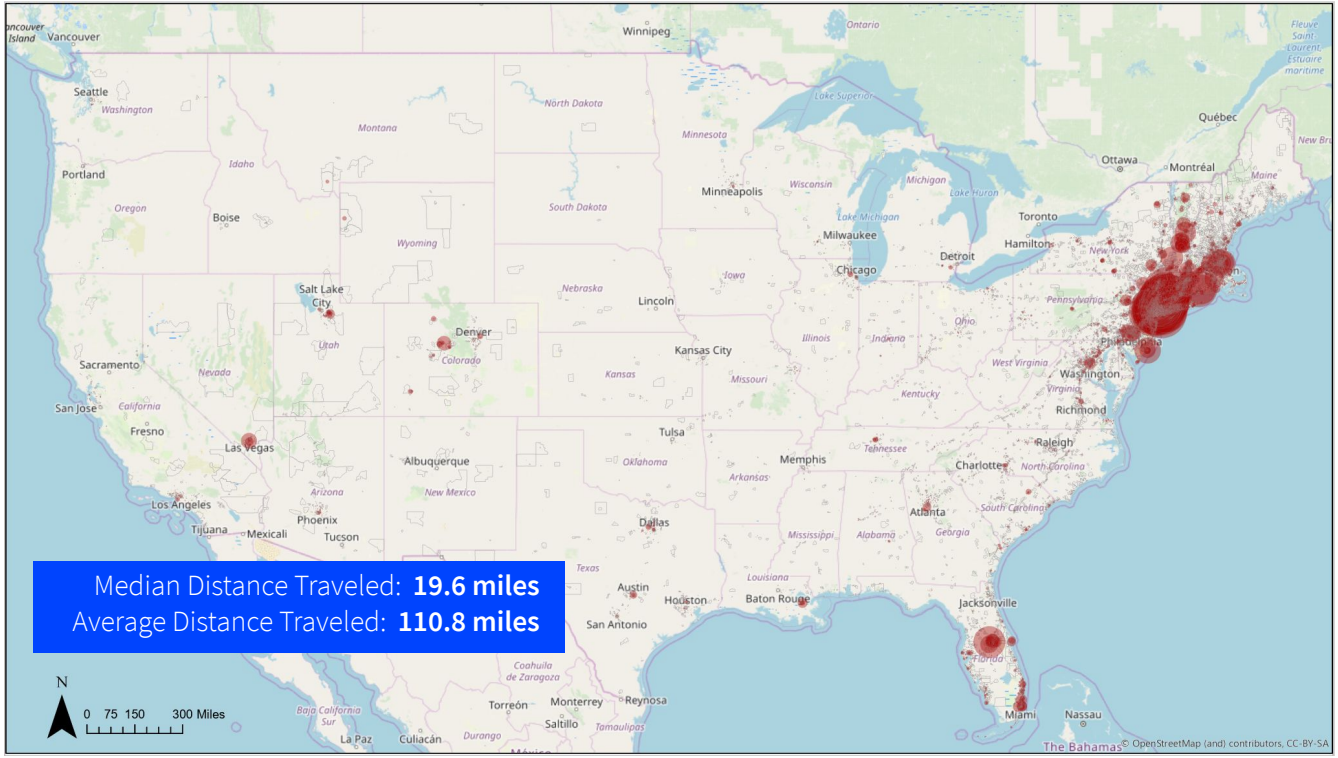
Analysis Dates:
February 15 to March 15

2 weeks after first ping in New Rochelle



Young Israel of New Rochelle Synagogue – New York

In the 7 days after the confirmation of New Rochelle's first case but before the containment, however, still left time for those at the epicenter during the exposure window to travel to other communities across the United States, with an average distance traveled of 110.8 miles. The median distance traveled for those devices was 19.6 miles.



Life Care Center of Kirkland – Washington

Response: staff members were banned from working at other facilities
Response Time: 3 days
Median Distance Traveled of Devices from Epicenter: 7.2 miles
Average Distance Traveled of Devices from Epicenter: 98.0 miles

The Life Care Center of Kirkland, a long-term care and nursing facility in Washington state, began reporting dozens of residents with COVID-19 symptoms on February 29. By March 3, a case was confirmed to have come from Life Care and staff was instructed to stop working at other facilities. Only one week later, on March 11, there were 374 confirmed cases statewide and 31 deaths due to COVID-19. 23 of those deaths were linked to Life Care.

The first official response from Life Center regarding COVID-19 came on March 14, when a cleaning crew arrived to disinfect the still-occupied facility. On March 18, Life Care updated its policy to say that “all visitors, nonessential healthcare personnel and vendors had been restricted from entering the chain’s facilities.”

The response Life Care Center had to the outbreak has recently undergone criticism. For almost two weeks, their main prevention tactic was to ban their staff from working at other facilities, a practice that is followed by many in the Life Care community.

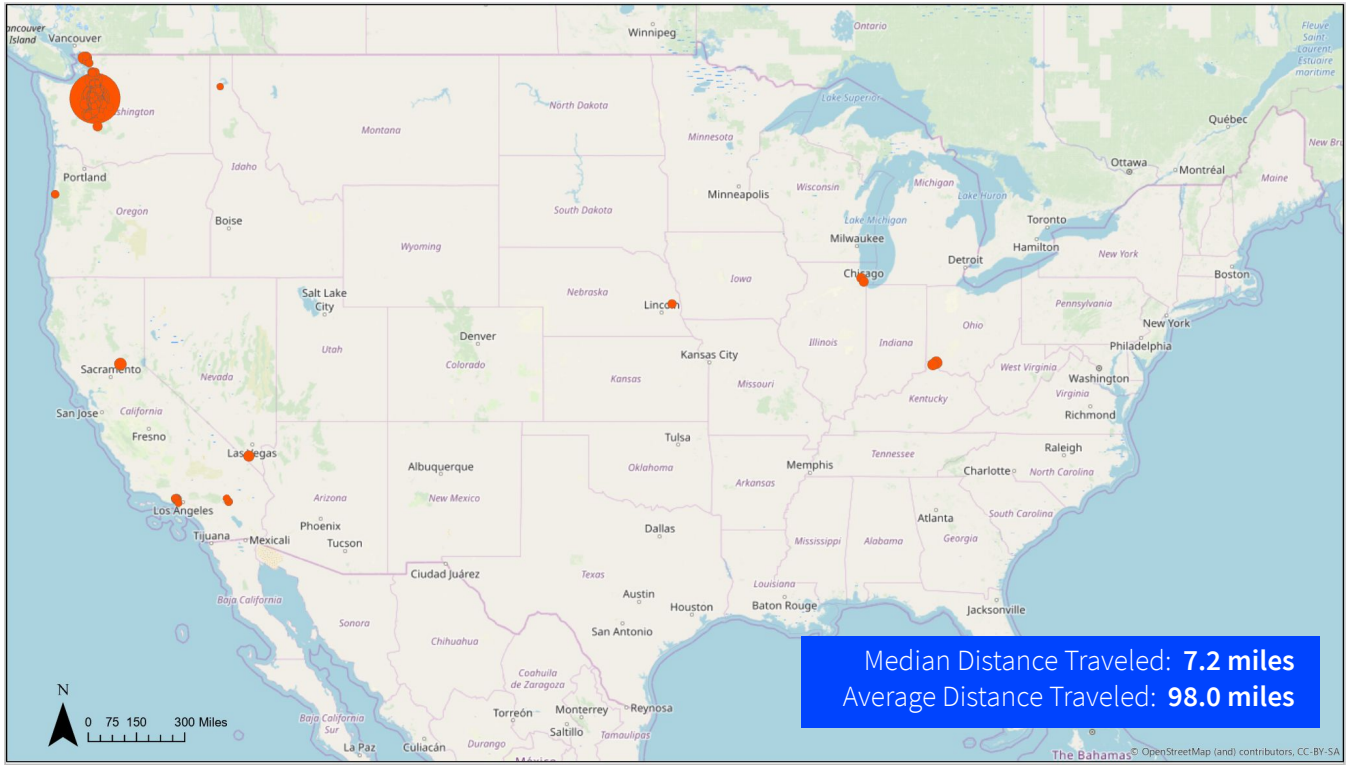
Life Care Center of Kirkland – Washington

Washington State

First Reported Case:
February 19

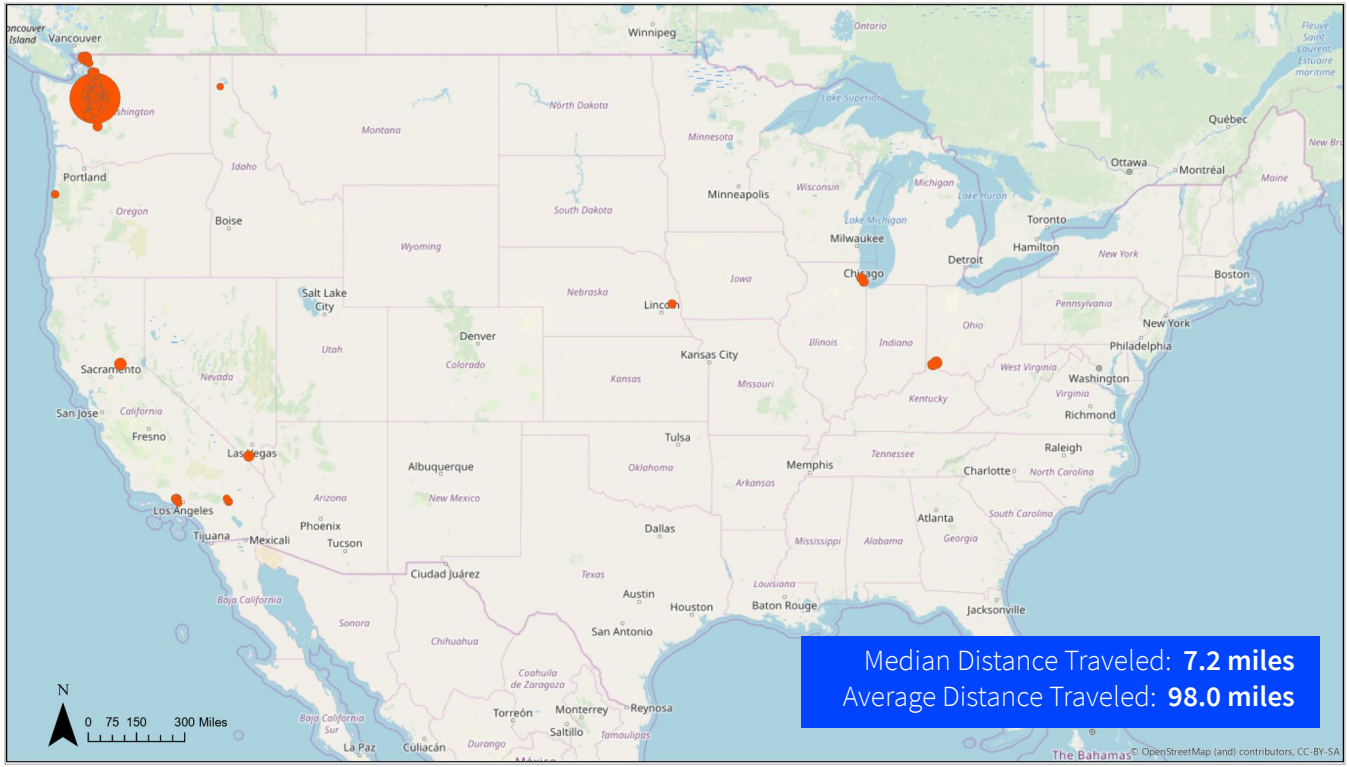
Analysis Dates:
February 15 to March 7

2 weeks after first ping in study location



Life Care Center of Kirkland – Washington

Regardless of how ineffective Life Care Center's response was to COVID-19, the actual travel associated with those at the epicenter during the exposure window is low compared to other outbreaks. This is likely due to the nature of life care facilities and the inability for residents to travel.



Limited Travel Before COVID-19 Onset Crucial

Life Care Center's response to COVID-19 is much less aggressive than other epicenters, but surprisingly we found that the potential exposure to other communities across the United States is low when compared to Biogen, a company that went above and beyond to communicate with its public health officials and employees to limit the spread of COVID-19, and New Rochelle, a community that aggressively enacted a containment zone within one week of its first confirmed case.

That effect is likely due to the nature of life care facilities and the inability of travel for the majority of residents. Unfortunately for both Biogen and New Rochelle, the "genie was out of the bottle" in the few days after exposure as people unknowingly traveled with the virus.

Modeling the Impact of Public Gatherings on COVID-19 Spread

State governments have implemented many strategies to motivate its communities to adopt social distancing, but how can public events impact those efforts?

As of Monday, March 30, 31 states have implemented stay-at-home orders advising citizens to stay home except for food, gas, medical, or other essential services. Other states have responded to COVID-19 by closing non-essential businesses or advising at-risk people to shelter in place. In most cases, houses of worship have been designated as essential and remain open.

In the early days of coronavirus in the United States, some groups gathered and unknowingly sparked outbreaks of the disease. These examples of known outbreak epicenters can be used as baselines for officials to better understand what they should expect when confronting COVID-19 in their own communities. If an event is at a high risk of exposure to novel coronavirus, this type of analysis can be applied to better understand the specific risks of an event should it not be cancelled or postponed.

The River at Tampa Bay

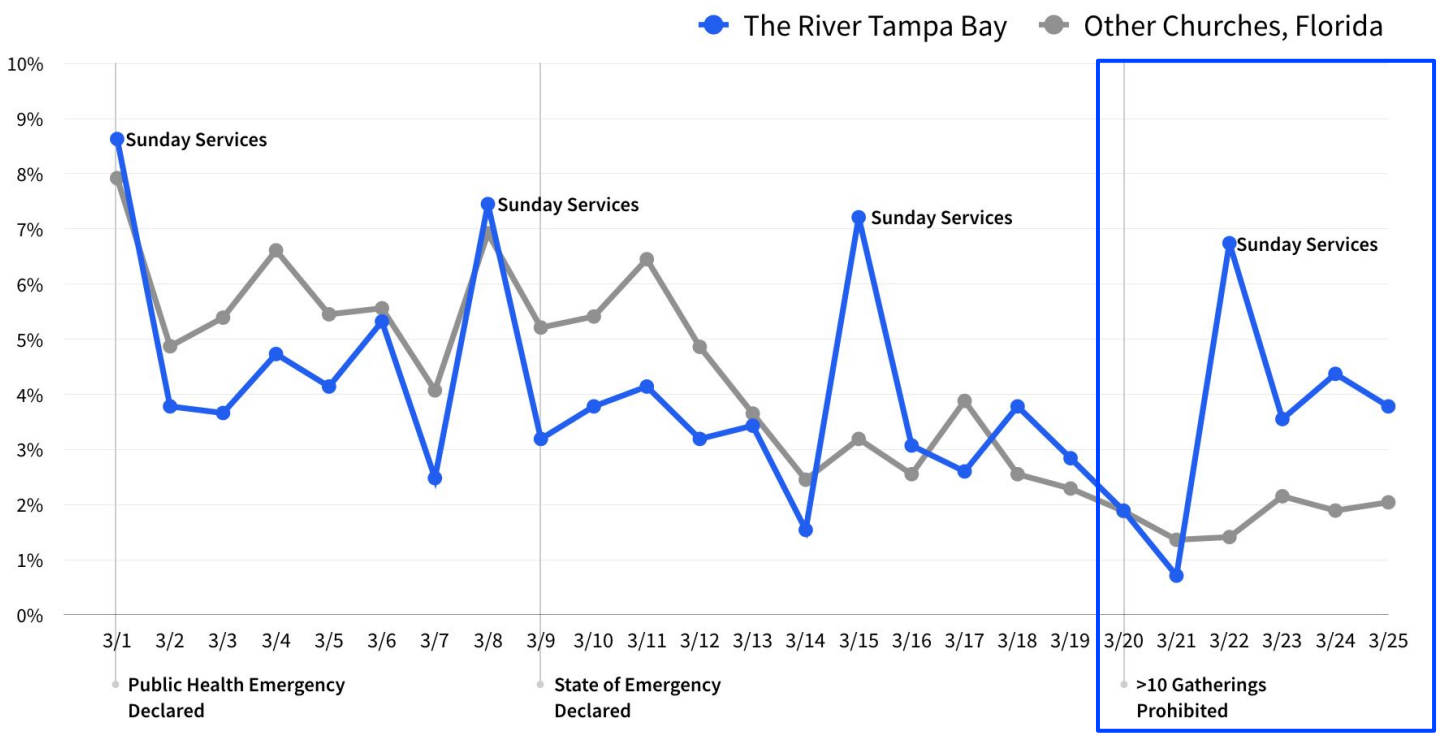
The River at Tampa Bay continues to hold large in-person services despite pleas from local officials and state directives limiting public gatherings. Hillsborough County, where The River is located, currently has 218 cases of novel coronavirus (as of Mar 29, 2020 at 10 AM).

As of March 25, The River is still hosting in-person events at similar rates each week, while visitation to other churches in Florida has decreased significantly.

People who attend large in-person events at The River have traveled to other communities across Florida and the United States, with a cumulative distance traveled of 102.9 miles from March 15 to present.

The River at Tampa Bay

In March, The River was still hosting in-person events at similar rates each week, while visitation to other churches in Florida had decreased significantly.

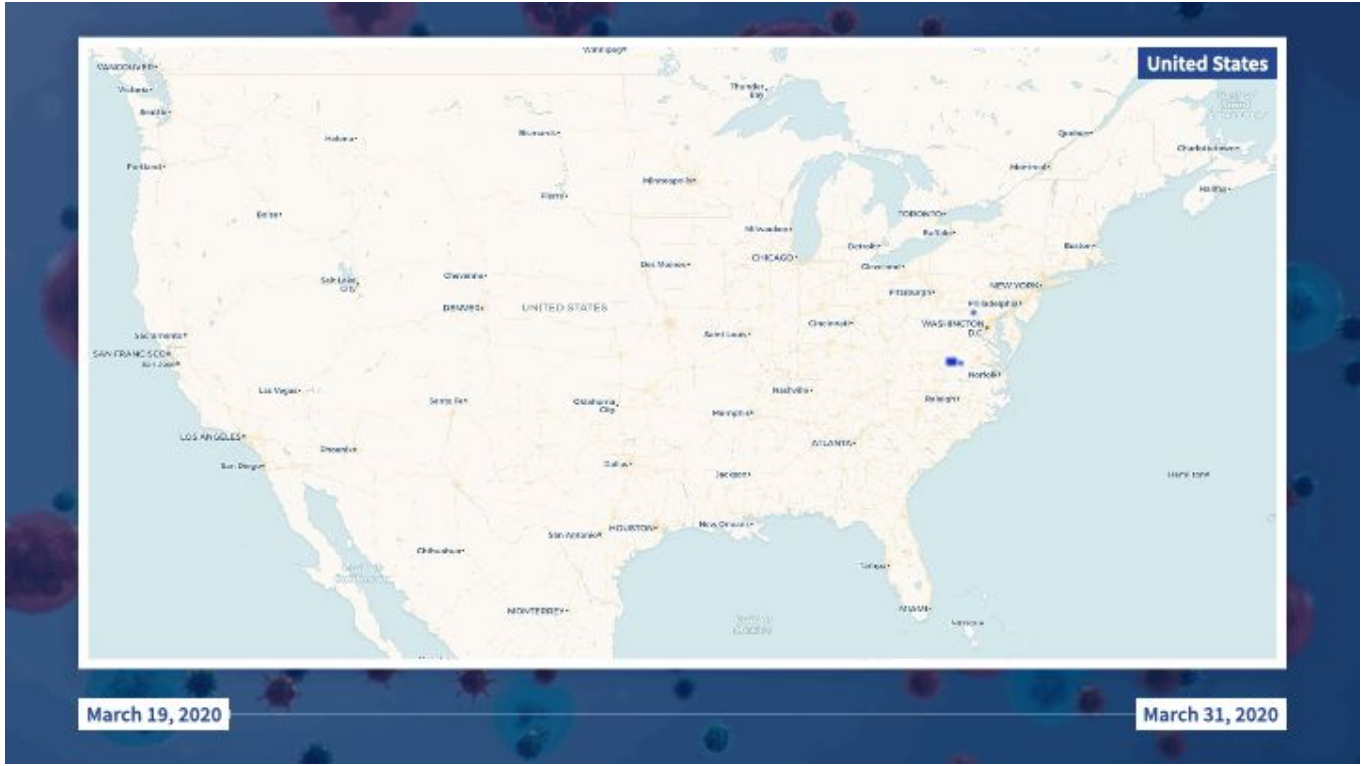


The River at Tampa Bay

People who attend large in-person events at The River have an average cumulative distance traveled of **102.9 miles** from March 15 to present.

Liberty University

Students and faculty at the Liberty University campus in the last two weeks of March have an average cumulative distance traveled of **132.03 miles**.



Utilizing outbreak epicenters to model the community impact of public gatherings

Applying this to other events at a high risk of exposure

- **Identify high risk event**
- **Pull data**
- **Layer in public Covid-19 data**

Better understand the specific risks of an event should it not be cancelled or postponed

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Covid-19 Impact on the Homeless Population in LA

COVID-19 impact on the homeless population in LA

How can we help Federal, State, and Local Governments answer answer critical epidemiological, resource and economic questions during the COVID-19 pandemic?

Nathalie J. Blume, Ph.D.
Data Scientist
UberMedia

An Overview of Homelessness in LA County

On an **average night*** in Los Angeles, **53,000 people are homeless,** with 4 out of 5 unsheltered.

Approximately **50%** of the homeless community own smartphones.

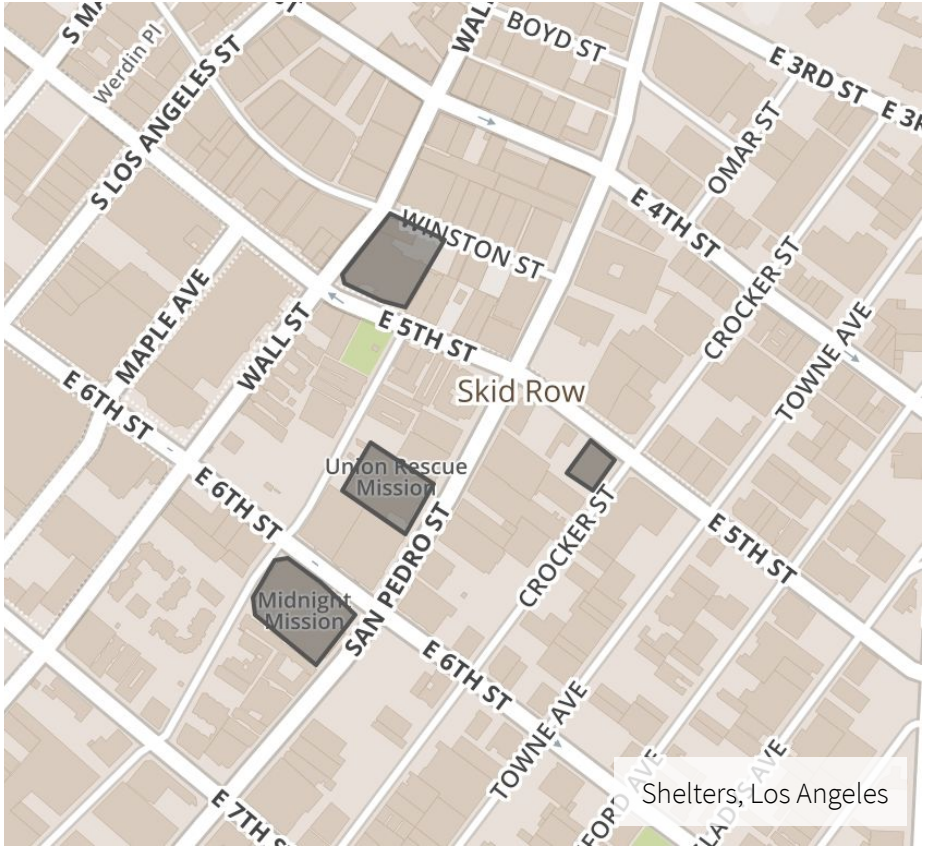
*According to a 2017 study

LA County has moved to address homeless needs during the pandemic

- Expanse of shelter system's footprint:
  - New emergency shelters
  - Expanded footprint of shelters
- Changes among the unsheltered: Move off the street.
- Disruptions of management systems (e.g. daily census) and ancillary services (medical, mental health, clothing, food).

Methodology

- Geofence homeless shelters and encampments in LA County
- Isolate those devices seen between 6 pm and 8 am
- Enables us to understand the movement and behaviors of the devices owned by those seen in shelters and encampments.



Changing Footprint

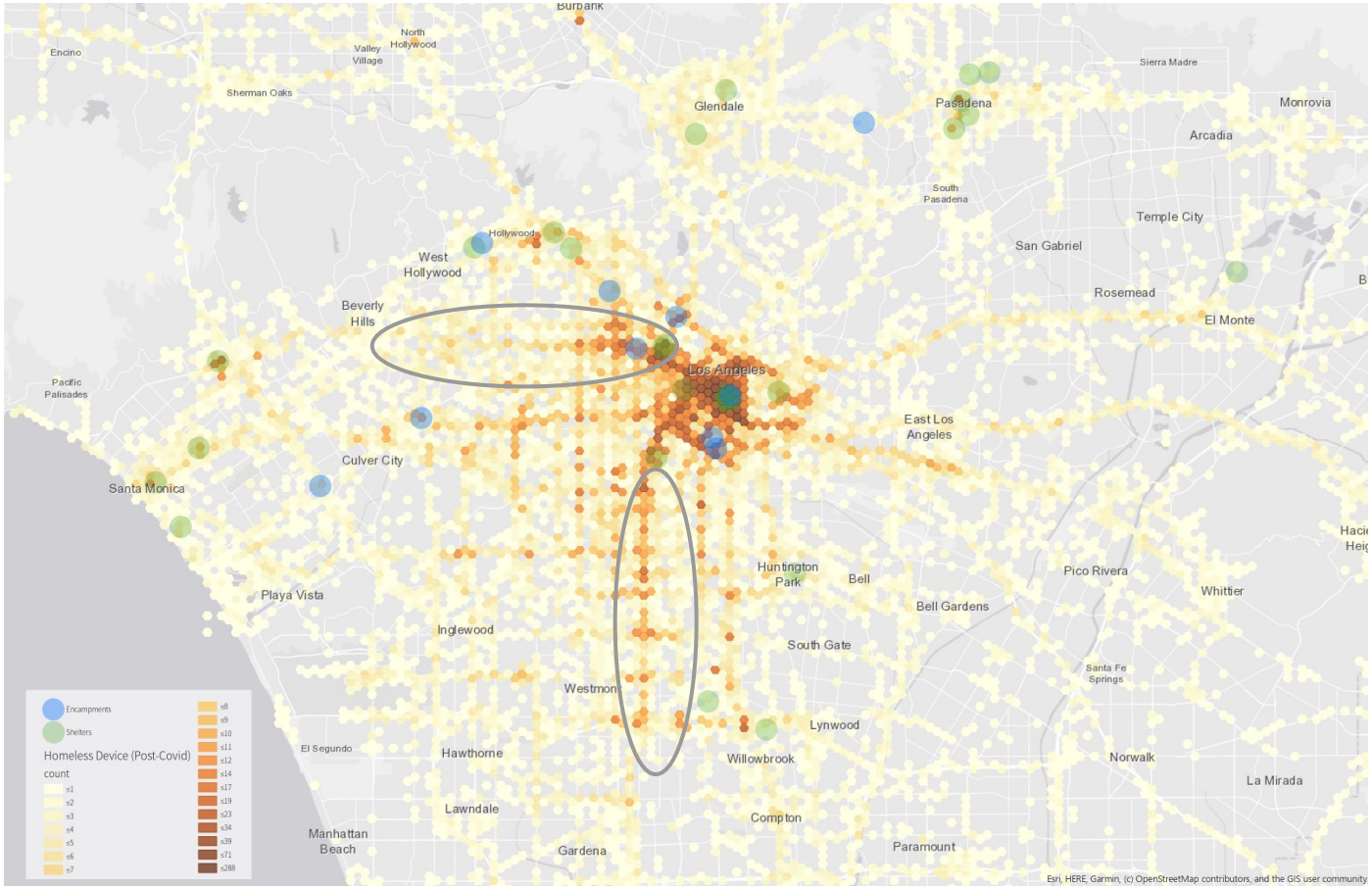
Homeless Devices Movement

Pre Covid 19
(Feb. 19 to March 15)

Changing Footprint

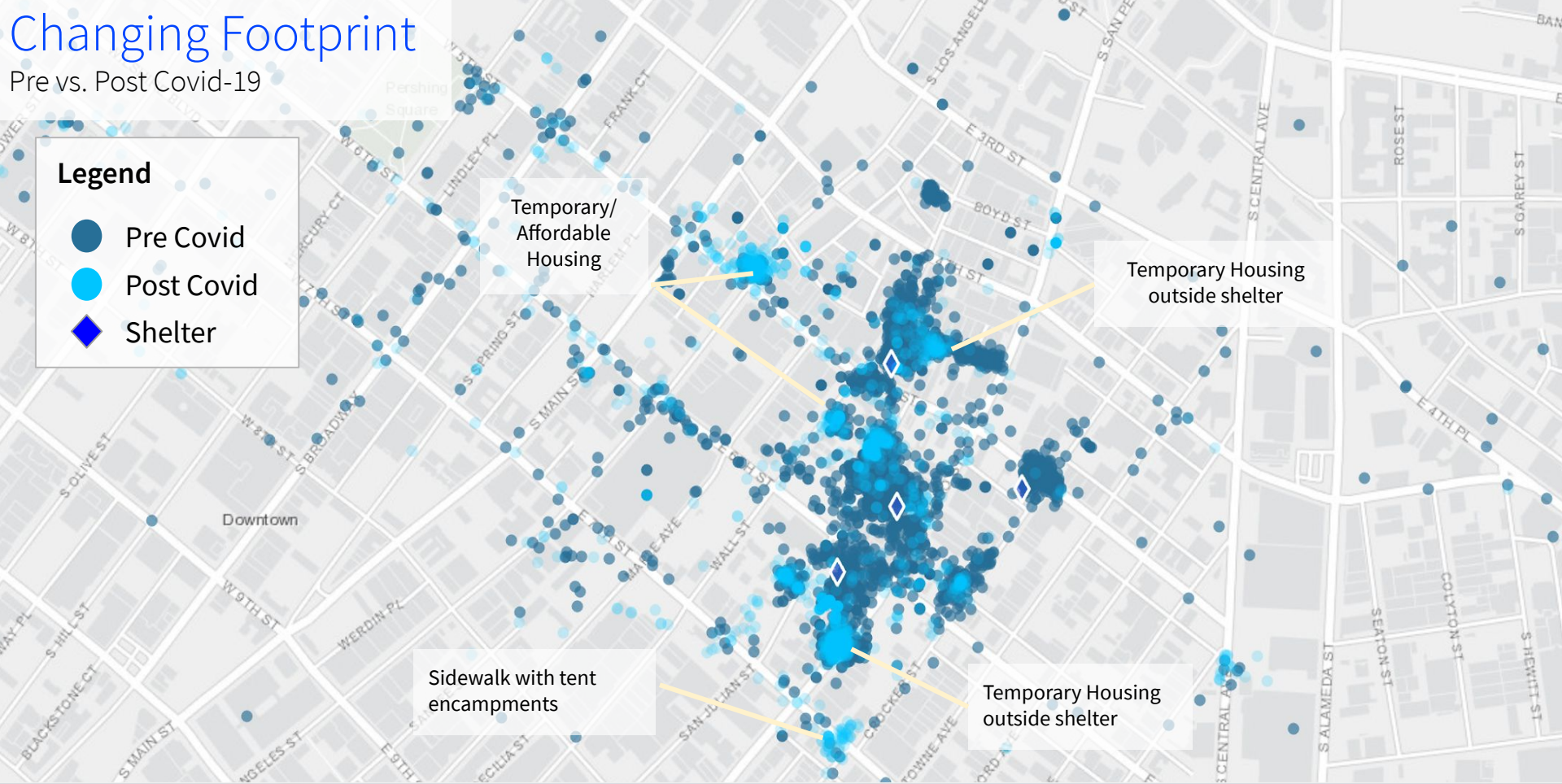
Homeless Devices Movement

Post Covid 19
(March 16 to April 12)



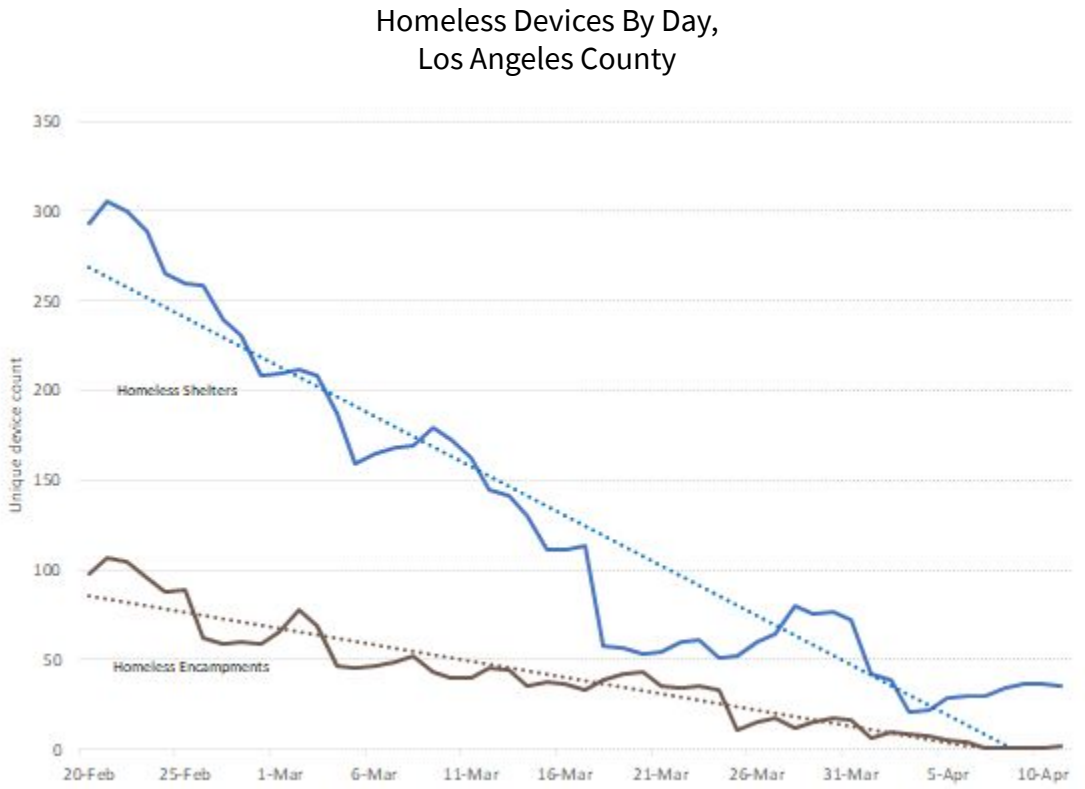
Changing Footprint

Pre vs. Post Covid-19



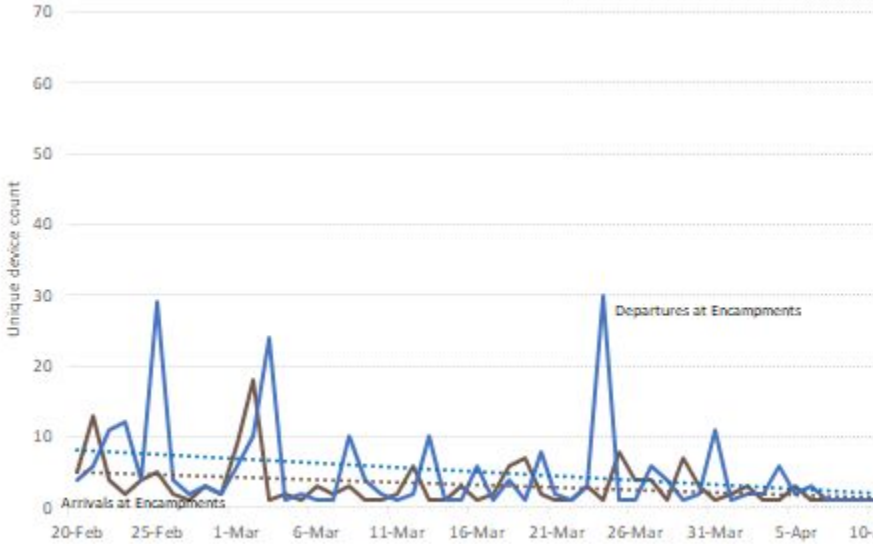
Breaking it Down: Homeless Devices in Shelters & Encampments

- Daily censuses at previously established sites are shrinking

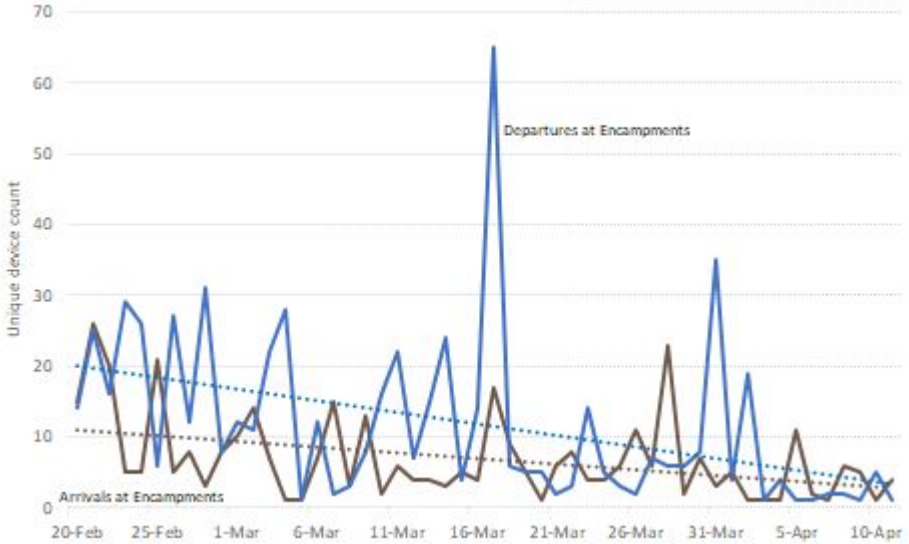


Departures Peaked in Mid-March

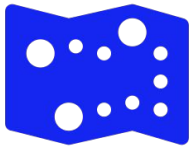
Arrivals and Departures at Encampments



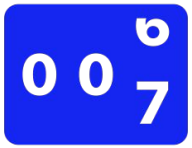
Arrivals and Departures at Shelters



Identifying homeless populations to inform city-wide resource allocation



Document large scale changes distribution of this population



Estimate census counts at shelters

Guide public health messaging to the homeless population

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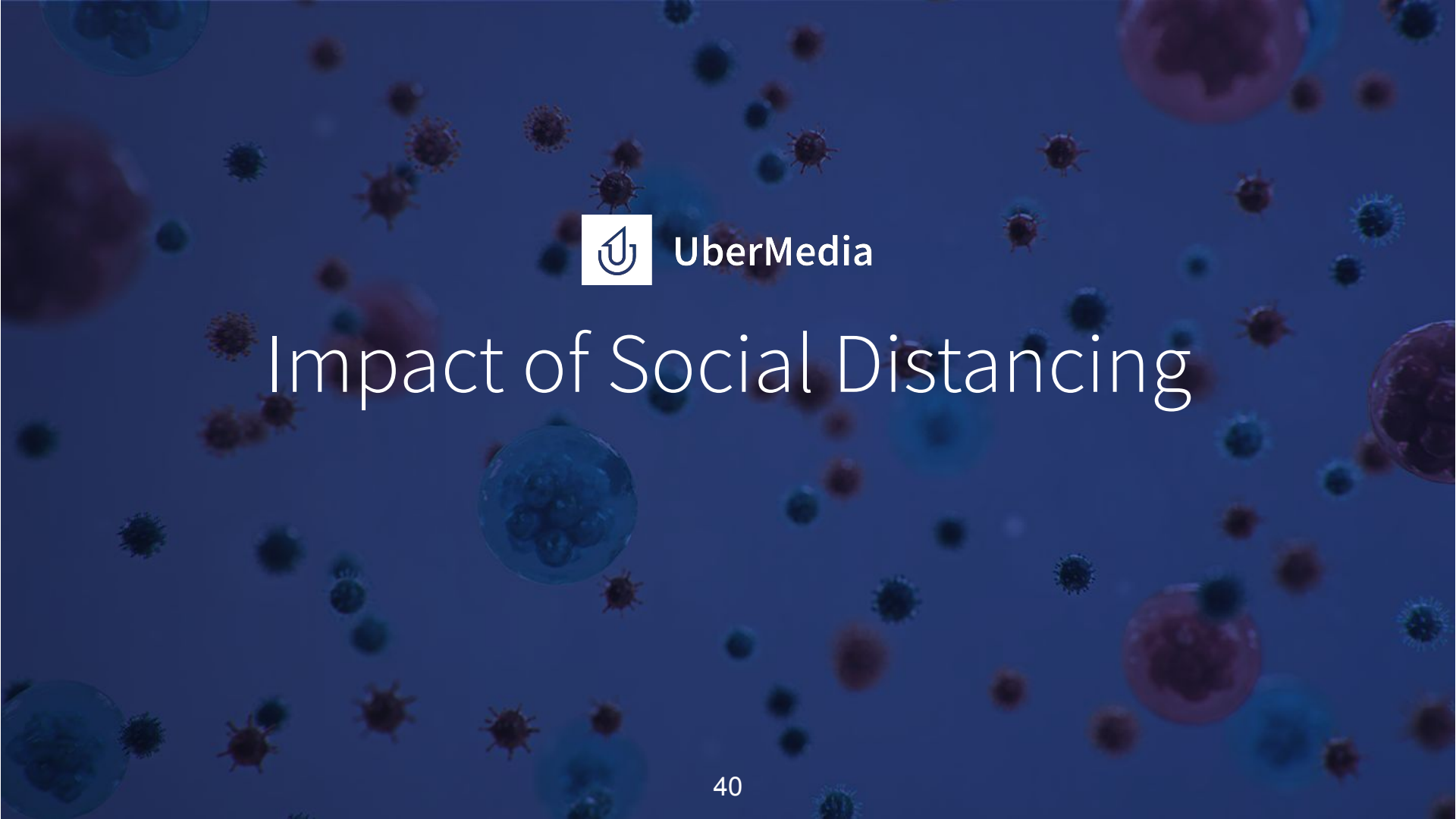
Disease Modeling Research Examples

Disease modelers are able to use mathematical models to project new cases and deaths for COVID-19 and calculate the effects of interventions such as stay at home orders.

Model accuracy improves when meaningful and accurate features are added (e.g. a metric that describes how well populations are socially distancing).



Impact of Social Distancing

Activity in Public Spaces as a Metric for Social Distancing

Experts agree that social distancing is critical to delay and reduce the spread of Covid-19. Models predict various outcomes based on scenarios with varying levels of social distancing assumed. Researchers want to regularly run models in order to make informed decisions about social distancing policy.

In running these models, a number of assumptions must be made in regard to social distancing. Notably, it is unclear how much any given policy actually influences real-world behavior. When a government strongly urges social distancing, does the population comply and to what extent?

This study used mobile data to quantify actual behavior by measuring the GPS positioning of devices before and after a social distancing policy is enacted in South Korea and Italy. This quantification can be correlated to the increase in new cases in order to improve models, evaluate the effectiveness of policy and inform future policy.

Geofence and Select Time Frame

Manhattan Village, Manhattan Beach, CA

Time Frame:
February 15 to
March 17, 2020

Measuring Social Distancing

It starts by defining “Public Spaces”


Restaurants


Markets


Churches


Bars and clubs


Offices


Transit

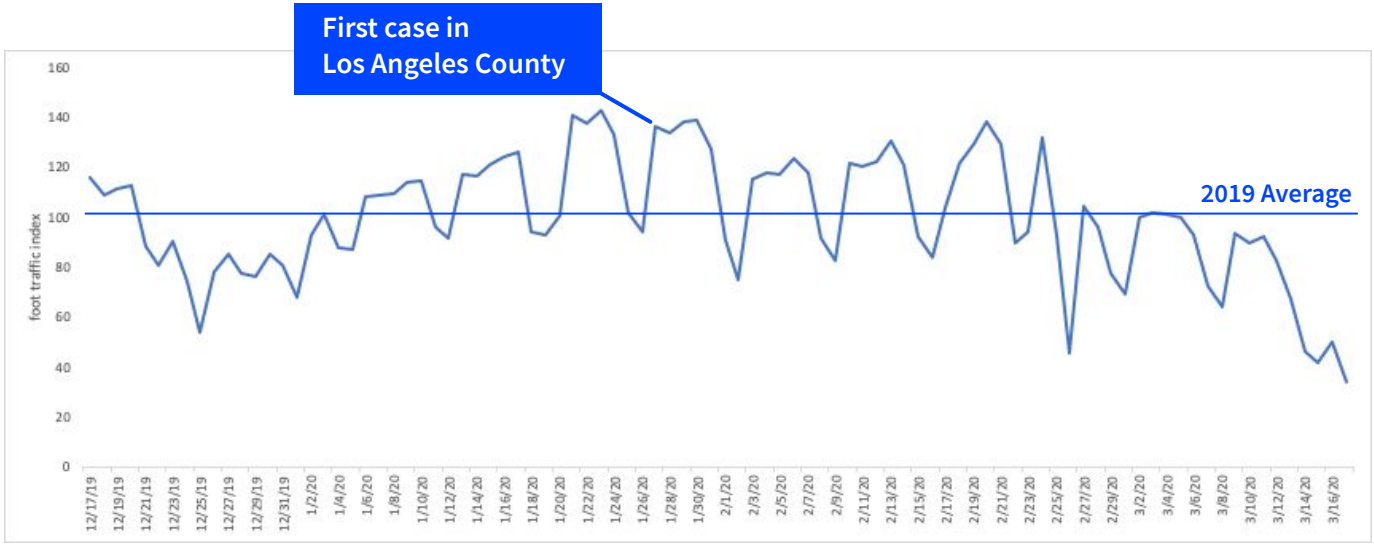

Museums


Universities


Airports

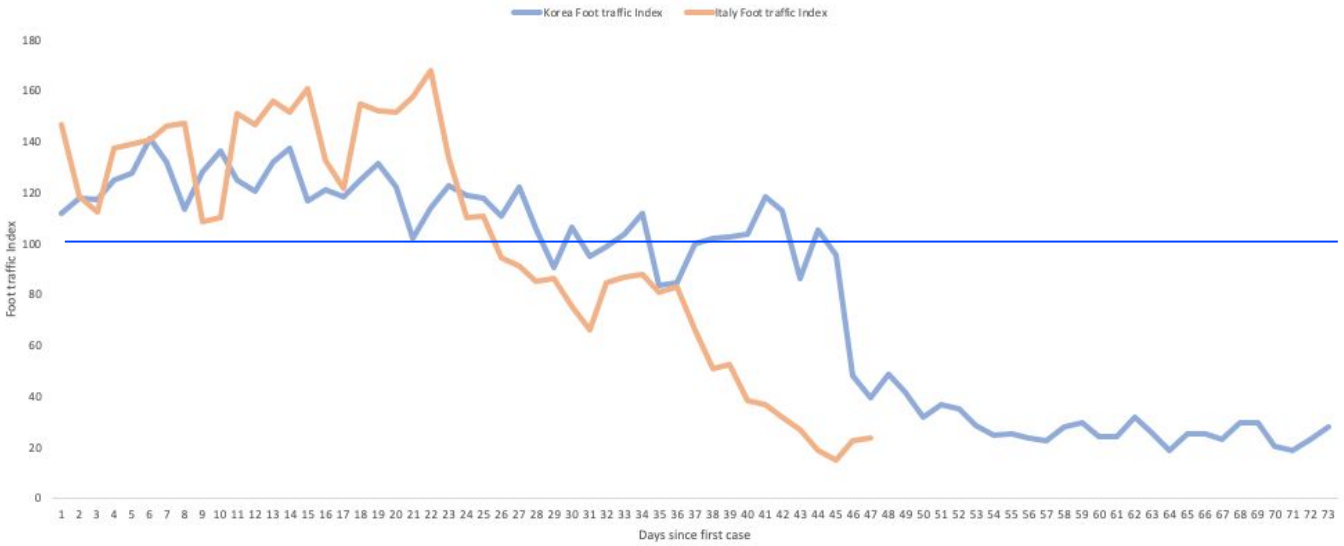
Measuring Social Distancing

Then, count # of devices in public spaces day-over-day and compare to an avg creating a foot traffic index



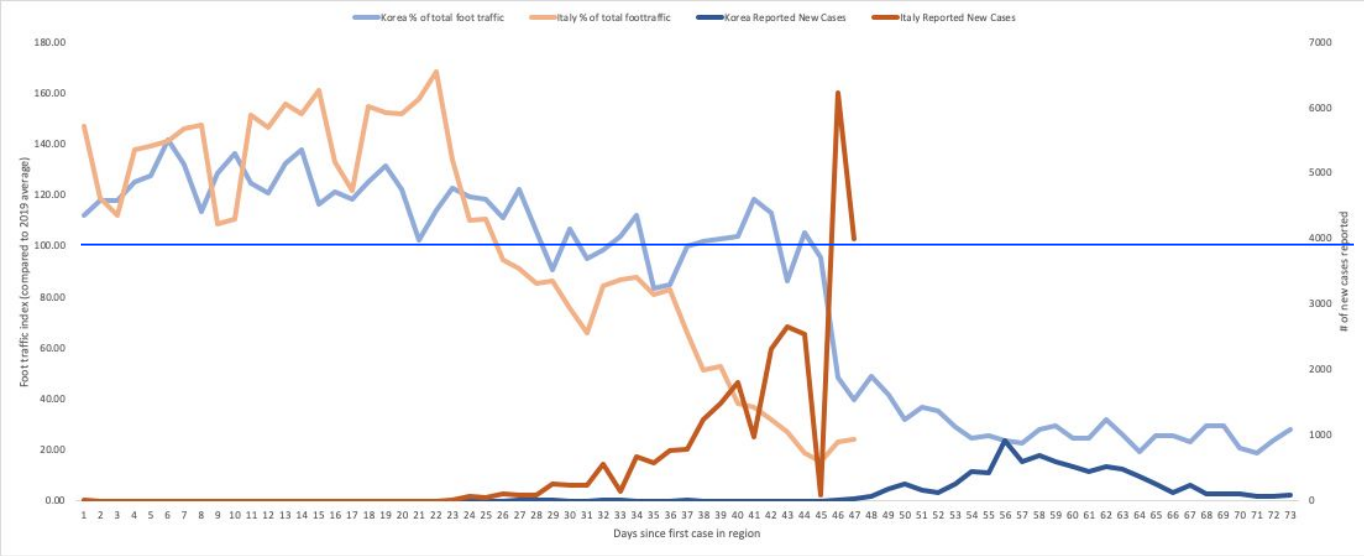
Measuring Social Distancing

Plot foot traffic index for two high-profile Covid-19 Pandemic locations (S. Korea and Italy)



Measuring Social Distancing

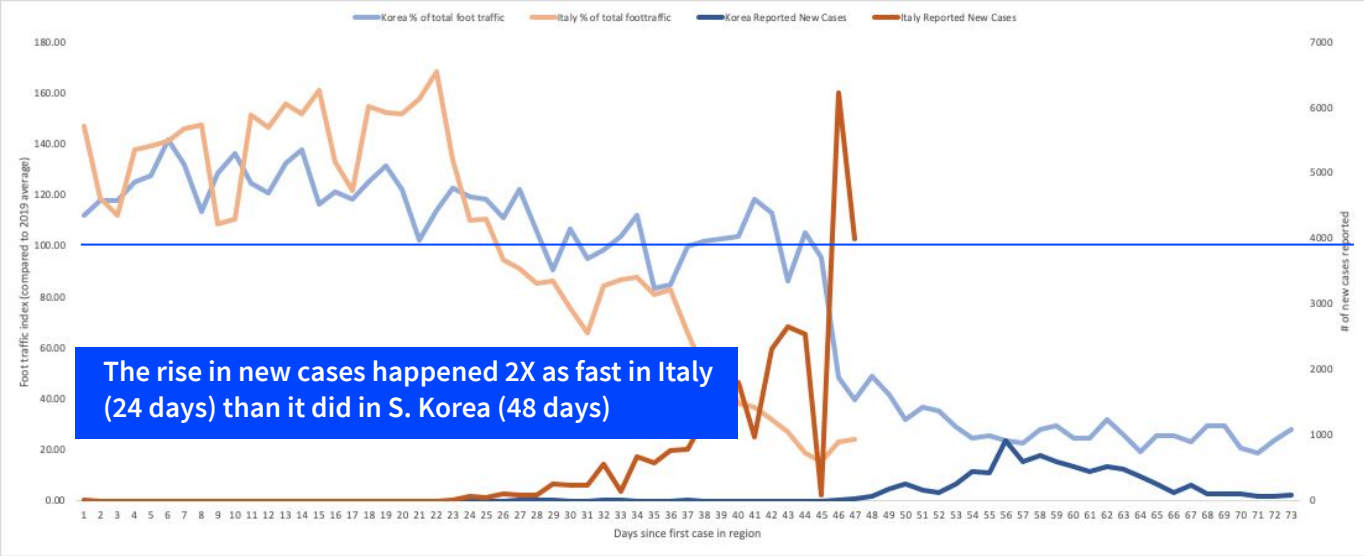
Compare public space foot traffic index vs. # of reported cases (S. Korea and Italy)



Measuring Social Distancing

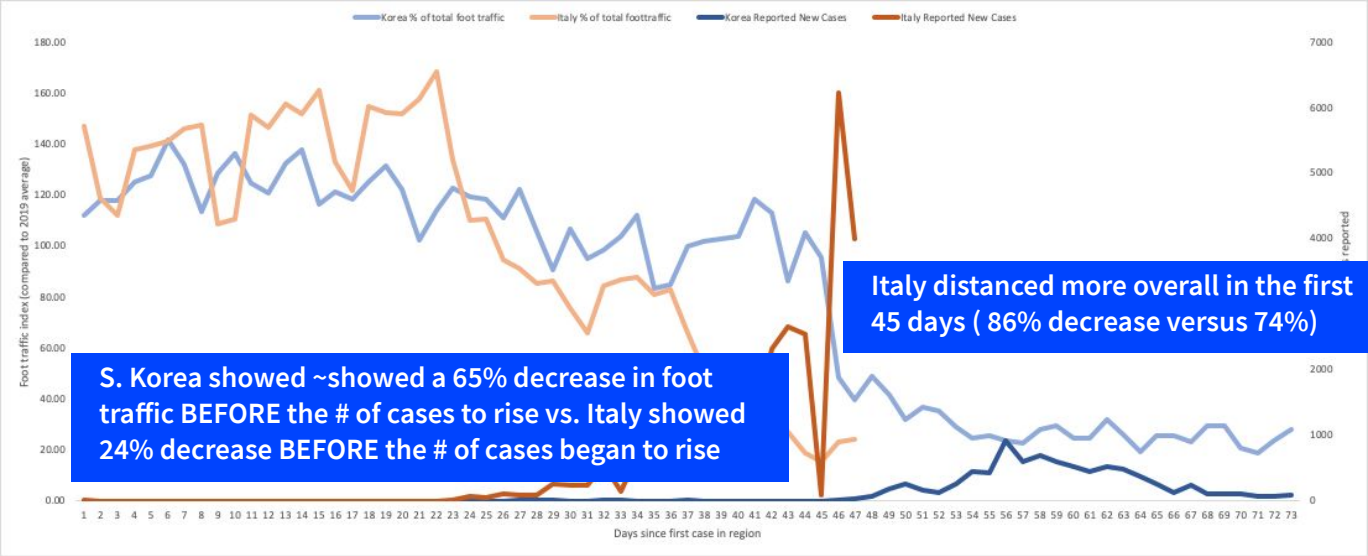
S. Korea showed ~10% more social distancing than Italy in the first 30 days

Insight #1:
Gradual, but immediate, distancing might slow spread



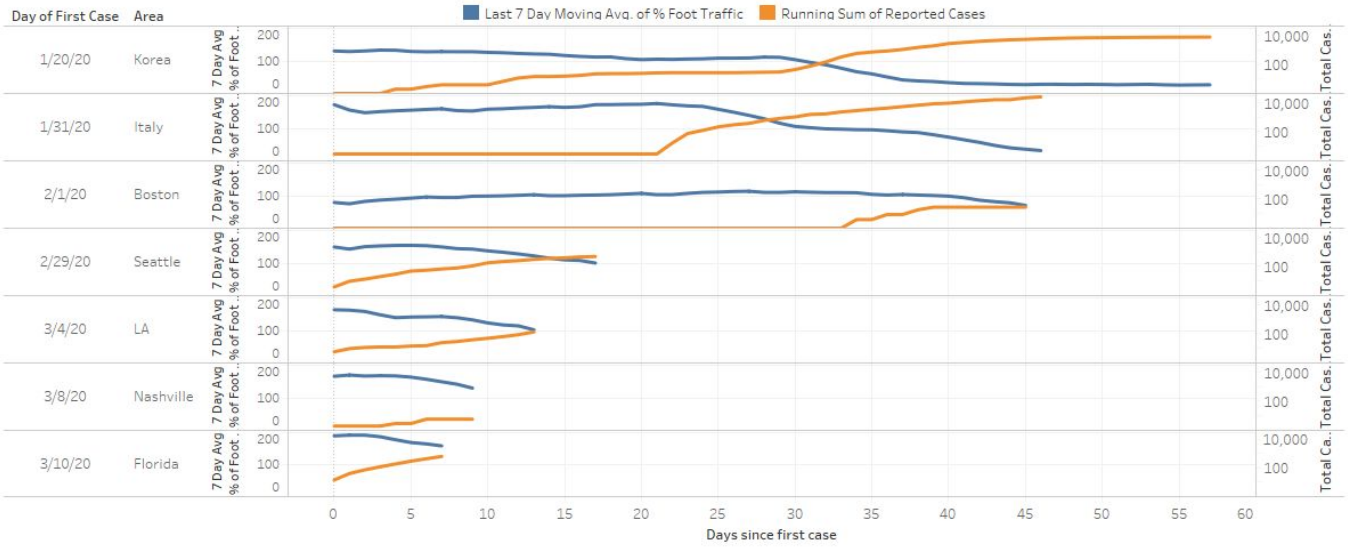
Measuring Social Distancing

Insight #2:
Timing of distancing might matter more than intensity of distancing



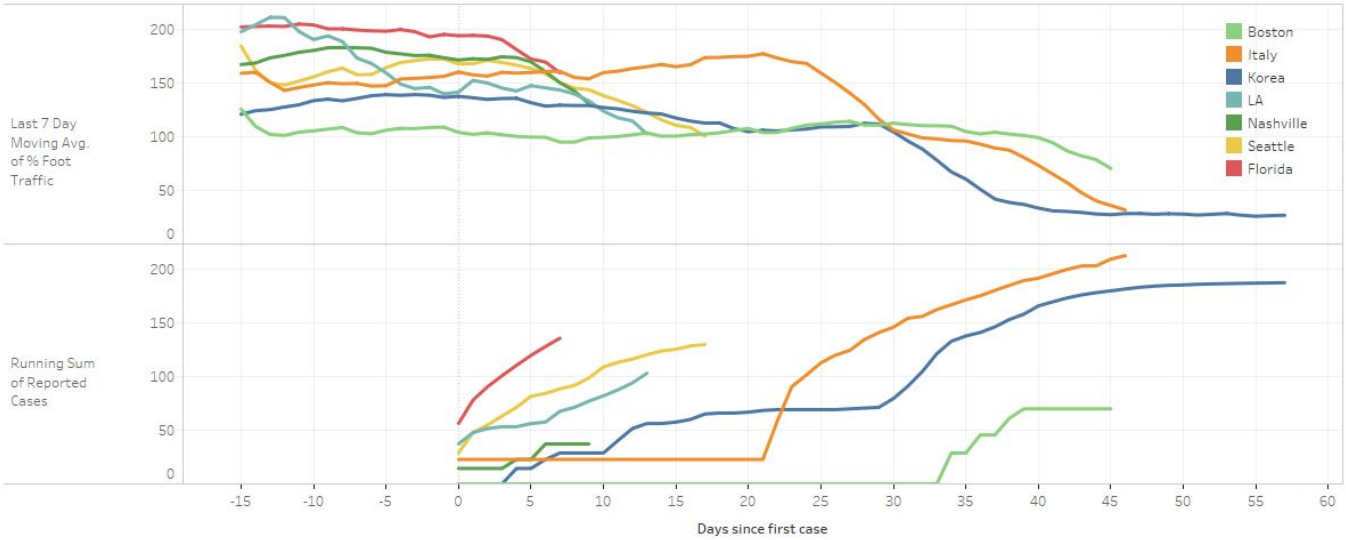
Measuring Social Distancing

Comparing emerging U.S. trends against more advanced outbreaks



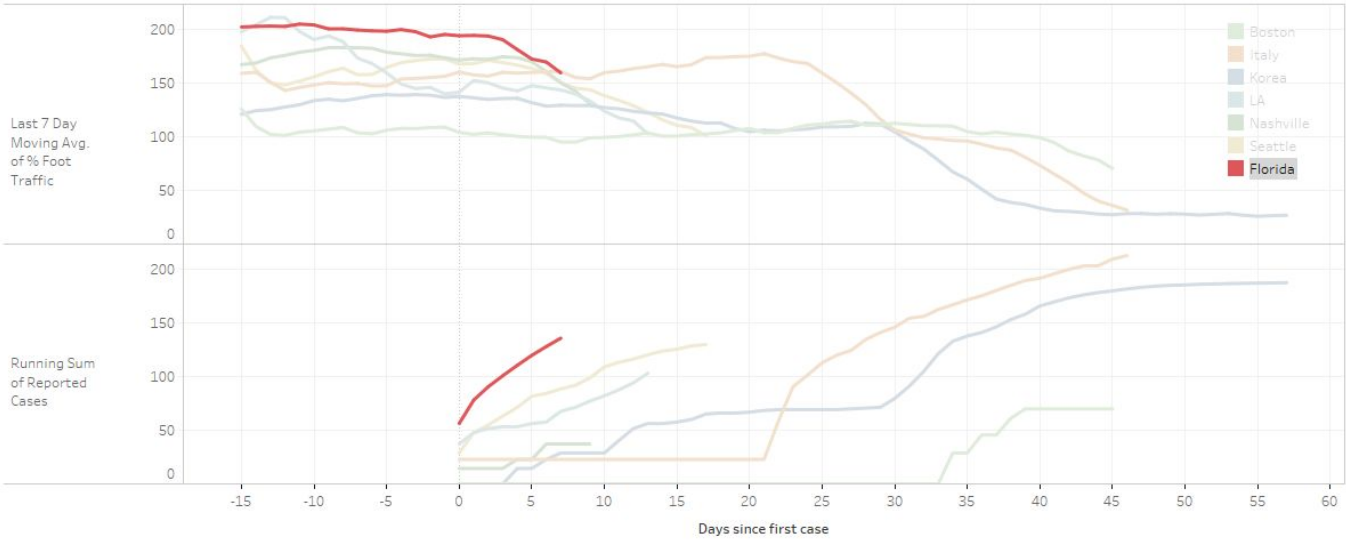
Measuring Social Distancing

Comparing emerging U.S. trends against more advanced outbreaks



Measuring Social Distancing

Comparing emerging U.S. trends against more advanced outbreaks



Measuring Social Distancing

Applying this to other locations

- Define public areas
- Pull data
- Layer in public Covid-19 data

Prepare data on a city, county or state level & compare to publicly available benchmark data.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Traveling Away From Home

Distance Traveled from Home as a Metric for Social Distancing

How can we use the distance of devices traveling away from home in various cities with known outbreak to model developing situations?

Nathan Jones
Vice President, Data Science
UberMedia

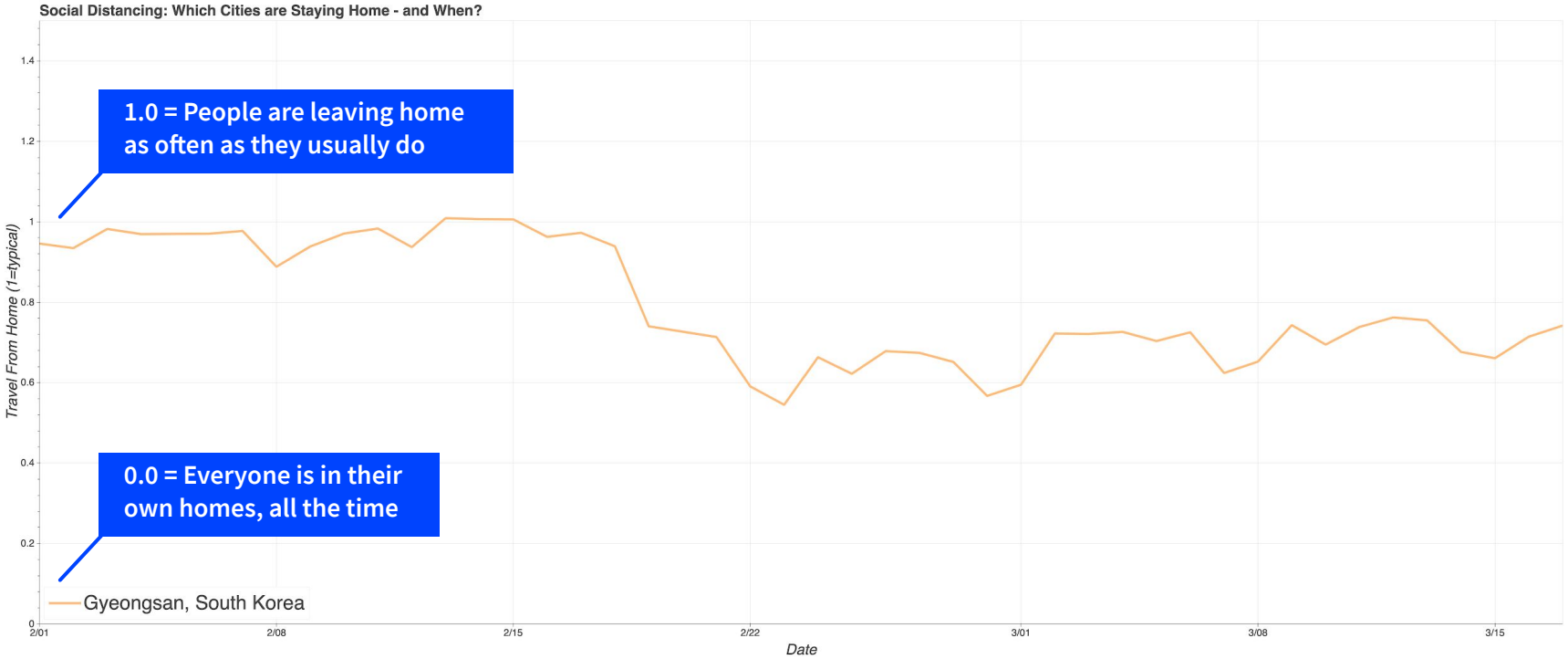
Distance Traveled from Home as a Metric for Social Distancing

The term “Social Distancing” has rocketed to the forefront of American life after becoming the primary means of slowing or stopping the spread of COVID-19. Social distancing is a public health practice that attempts to reduce the number of opportunities for sick people to come into close contact with healthy people and therefore stop the spread of the virus. It can include mandatory closure of large events and gatherings as well as personal measures like maintaining physical distance between individuals.

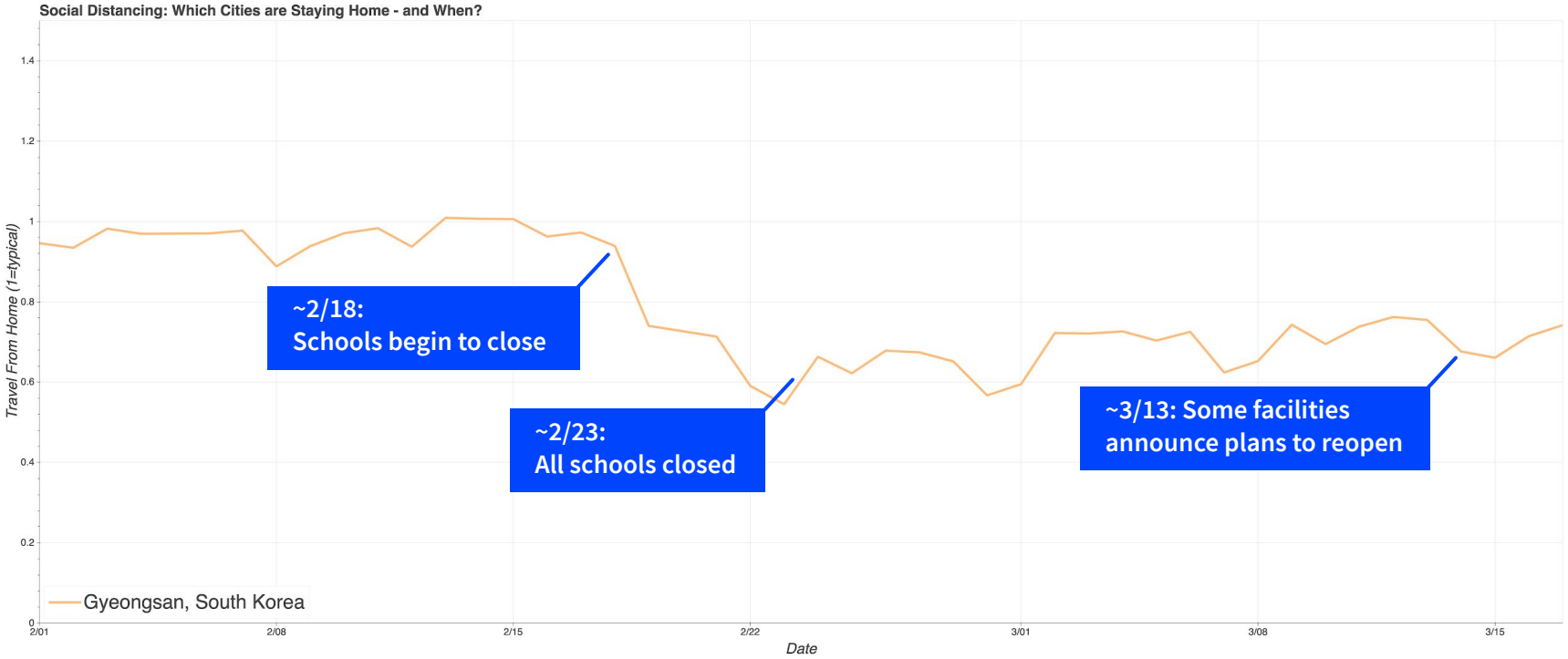
One question on Americans’ minds has been whether or not various states and metro areas have enacted strong enough social distancing policies in time to be on a similar infection trajectory to South Korea, or if they are on a trend that more closely follows Italy.

South Korea took immediate action, enacting harsh social distancing policies quickly after detecting their first cases of COVID-19, while Italy did not take immediate action and slowly rolled out social distancing in a staged manner beginning with the Lombardy region. Infection rates were suppressed in South Korea and continue to rise sharply in Italy, thanks in part to their respective approaches to social distancing.

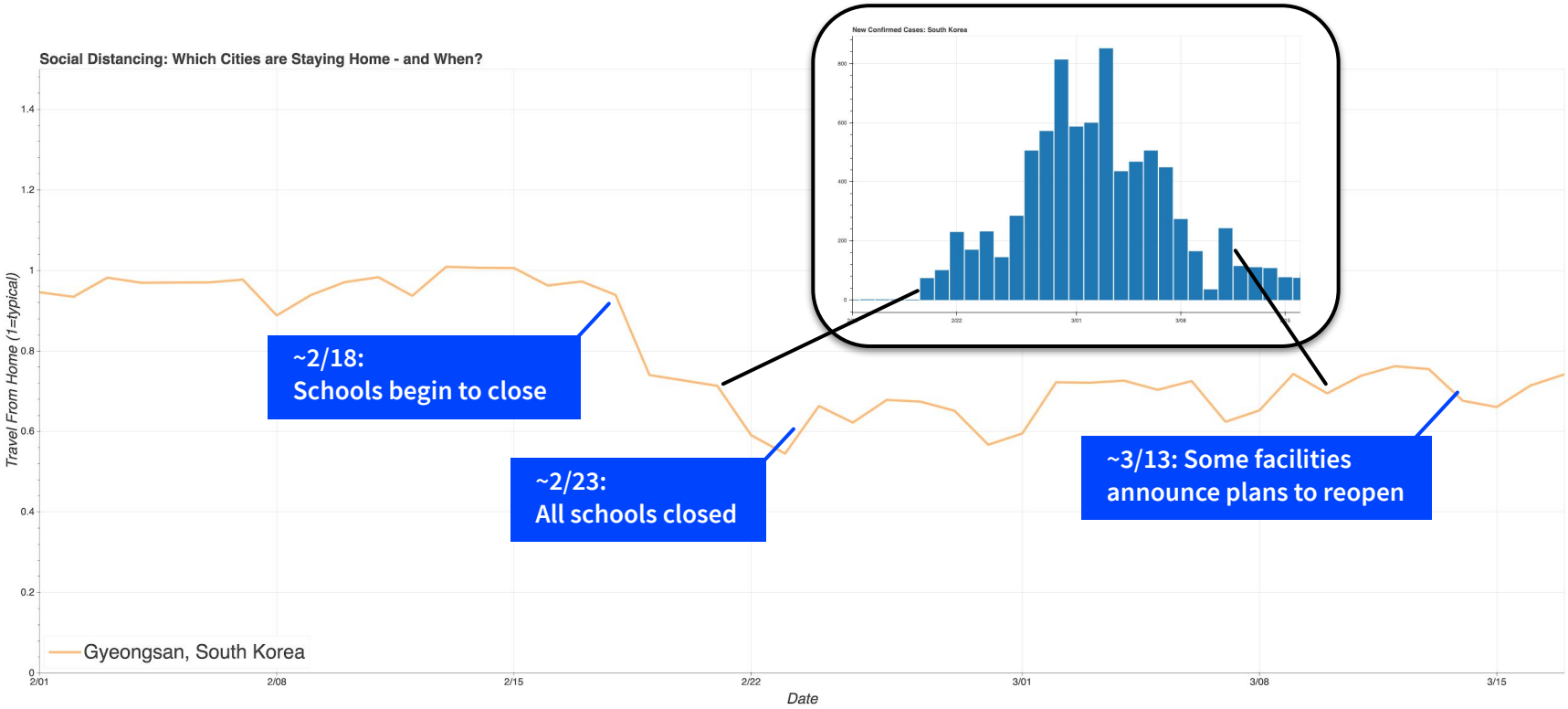
Traveling Away From Home: South Korea



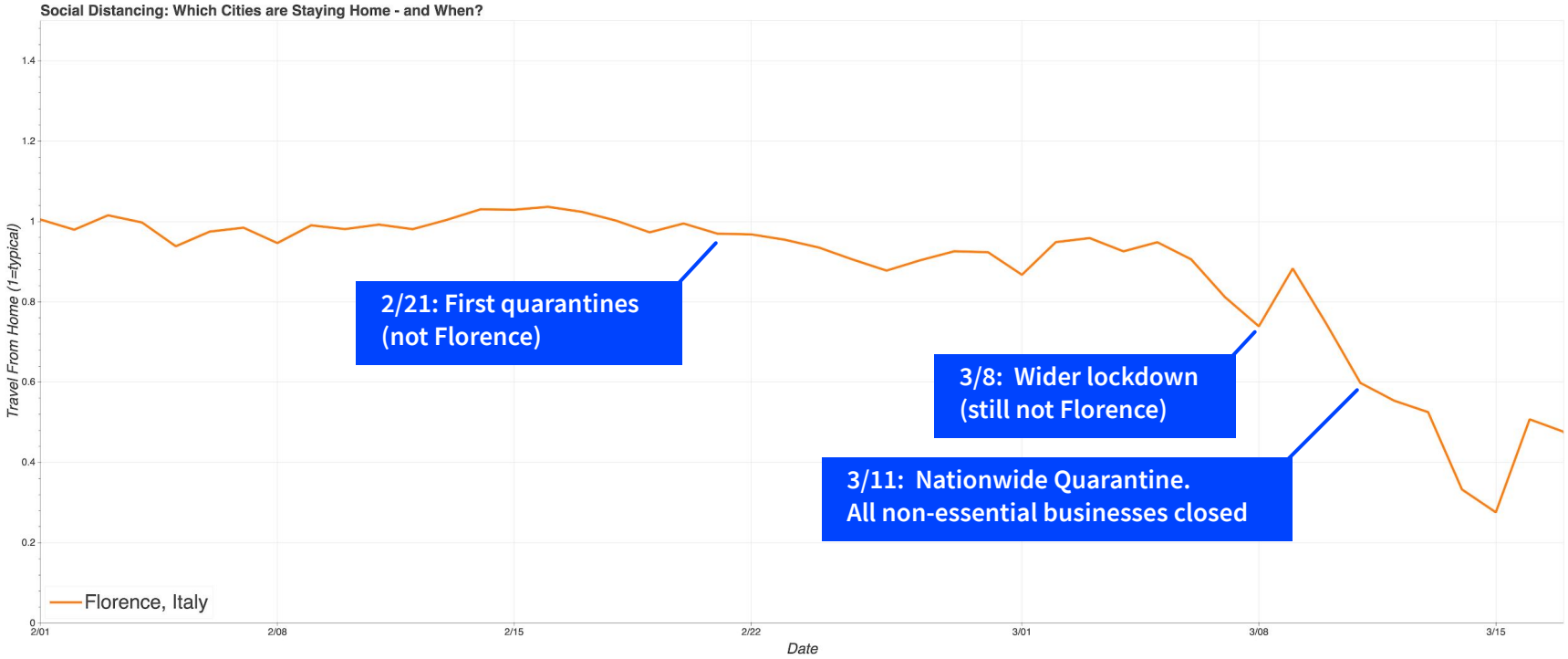
Traveling Away From Home: South Korea



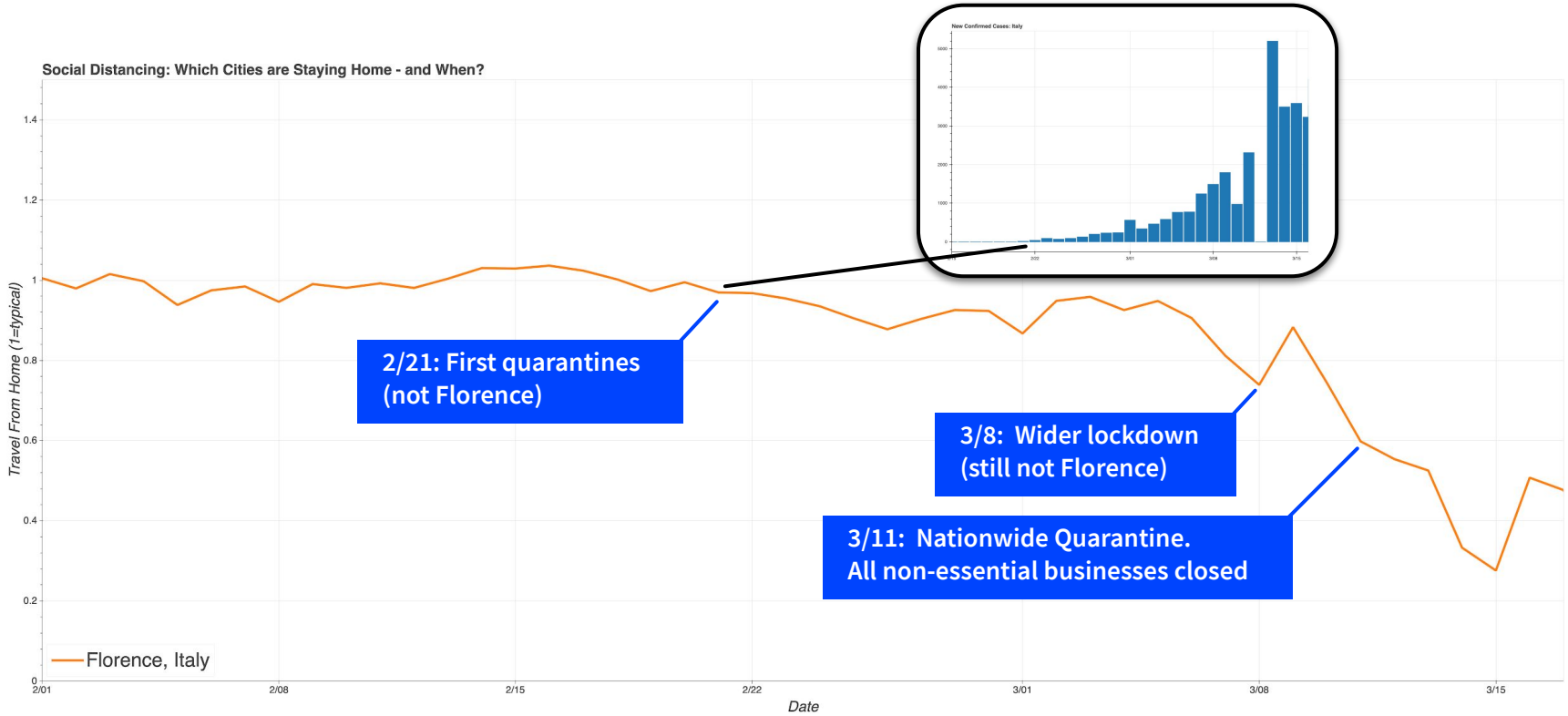
Traveling Away From Home: South Korea



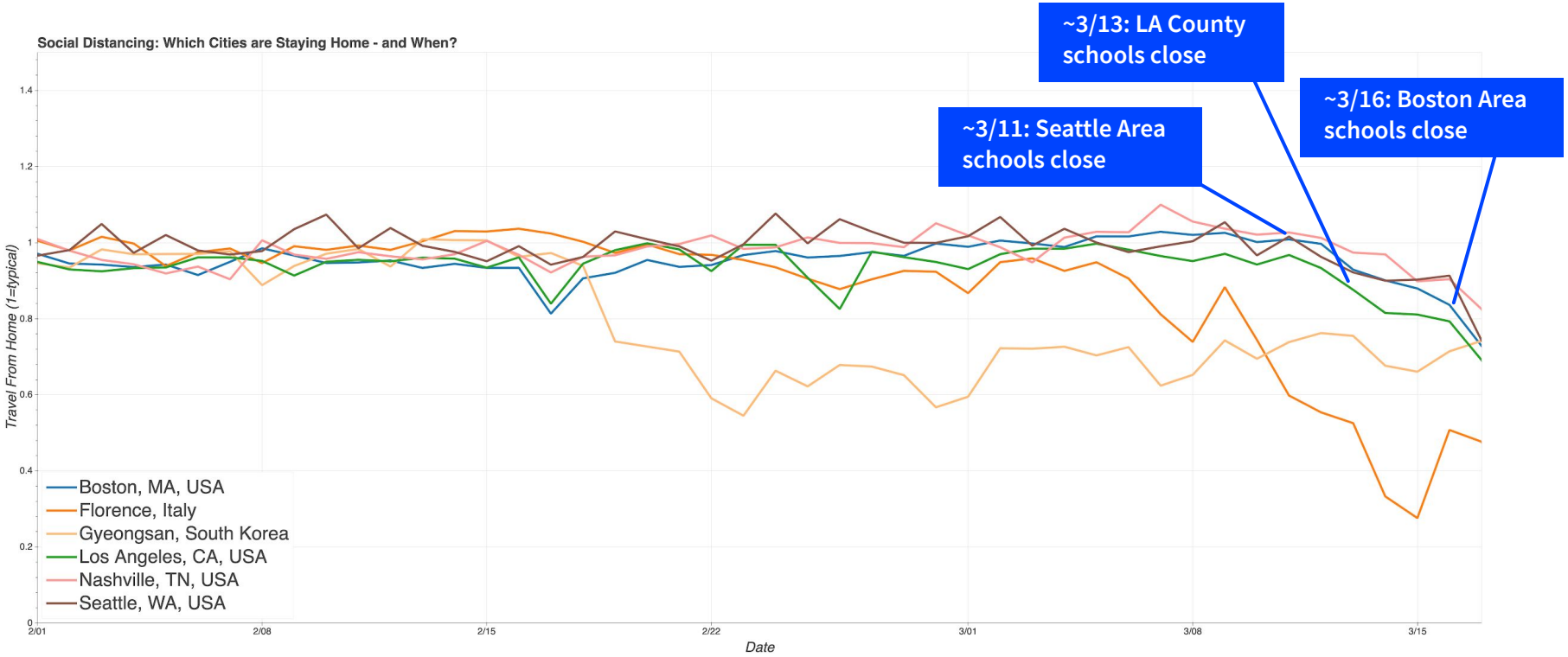
Traveling Away From Home: Florence, Italy



Traveling Away From Home: Florence, Italy



Traveling Away From Home



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Retail Trends Research Examples

As our society changes to adapt to the spread of COVID-19, the shopping patterns of consumers will also likely change. As containment zones, social distancing directives, and shelter in place orders become more prevalent, brands will have to adjust to the changing landscape.

We are committed to providing brands and categories as much information as they need to continue to adapt to the spread of COVID-19 and its effect on businesses. This brand and sector level data is not only useful now to understand the impact of COVID-19 but also help brands prepare as the situation improves in the future.


UberMedia
Covid-19 Brand Impact
Using mobile location data to understand the impact of
Covid-19 on brands and industry categories

Quantifying the Brand/Market Impact of COVID-19

As our society changes to adapt to the spread of COVID-19, the shopping patterns of consumers will also likely change. As containment zones, social distancing directives, and shelter in place orders become more prevalent, brands will have to adjust to the changing landscape.

By utilizing Noodles & Company, a regional fast casual restaurant, as a use case for our Brand/Market Impact Study, we analyzed the foot traffic to brand and sector locations over the current day, the previous 7 days, and traffic against the previous month to better understand the impact COVID-19 has had on those locations.

CASE STUDY:

Noodles and Company, Washington D.C. Metro Area

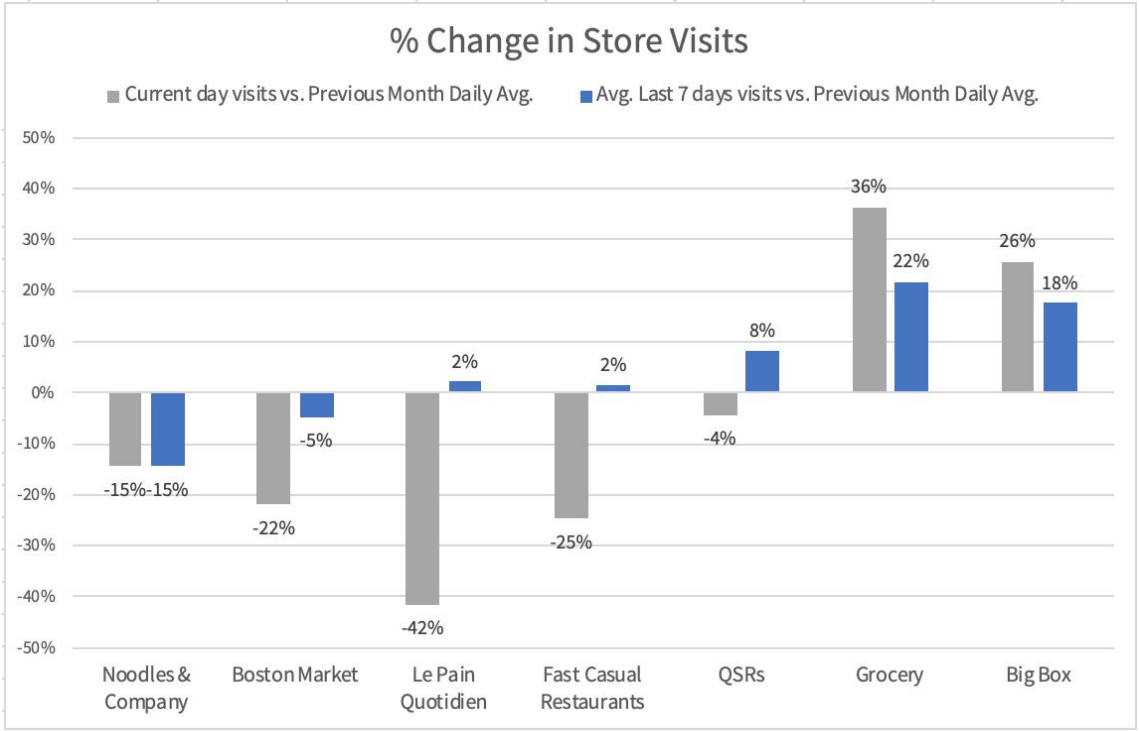
Methodology

- **Geofenced all brand and sector locations**
- **Pulled Visits Counts**

TIMEFRAME	DATES
Current Day	March 14
Previous 7 Days	March 7-13
Previous Month	February

Covid-19 Brand Impact – Noodles & Co

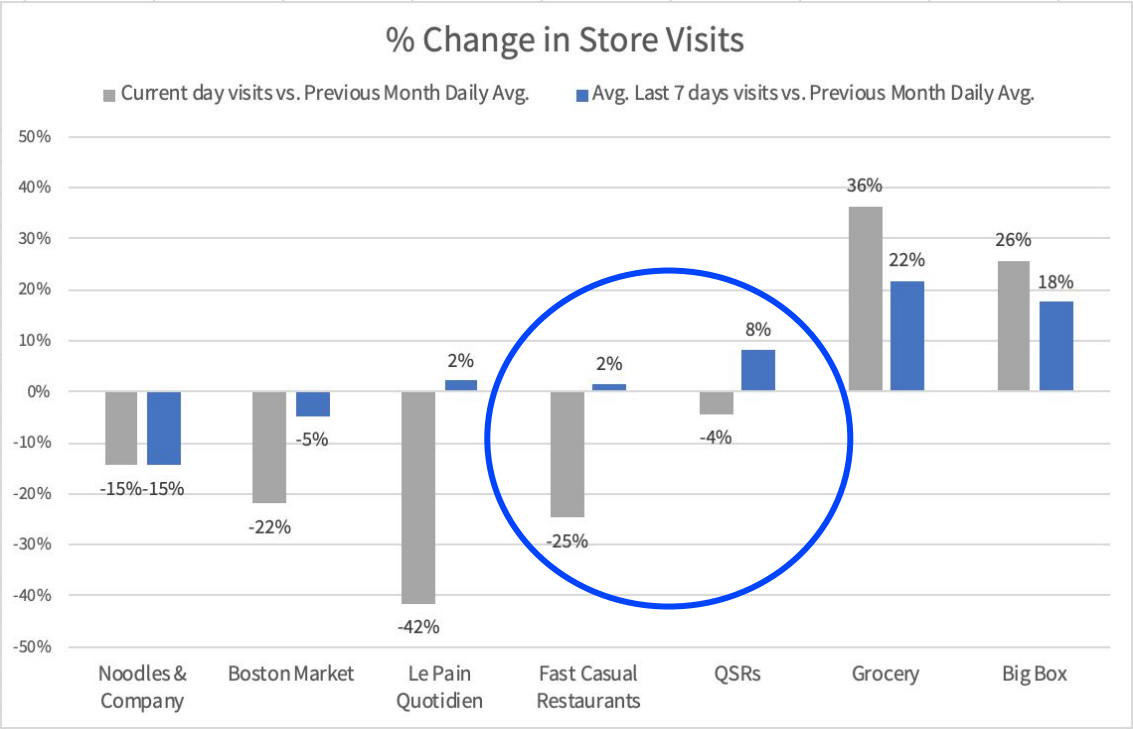
Larger drop seen in visits to **Le Pain Quotidien**, where individuals tend to dine in and most of the dining includes communal tables.



Noodles & Co Category Impact

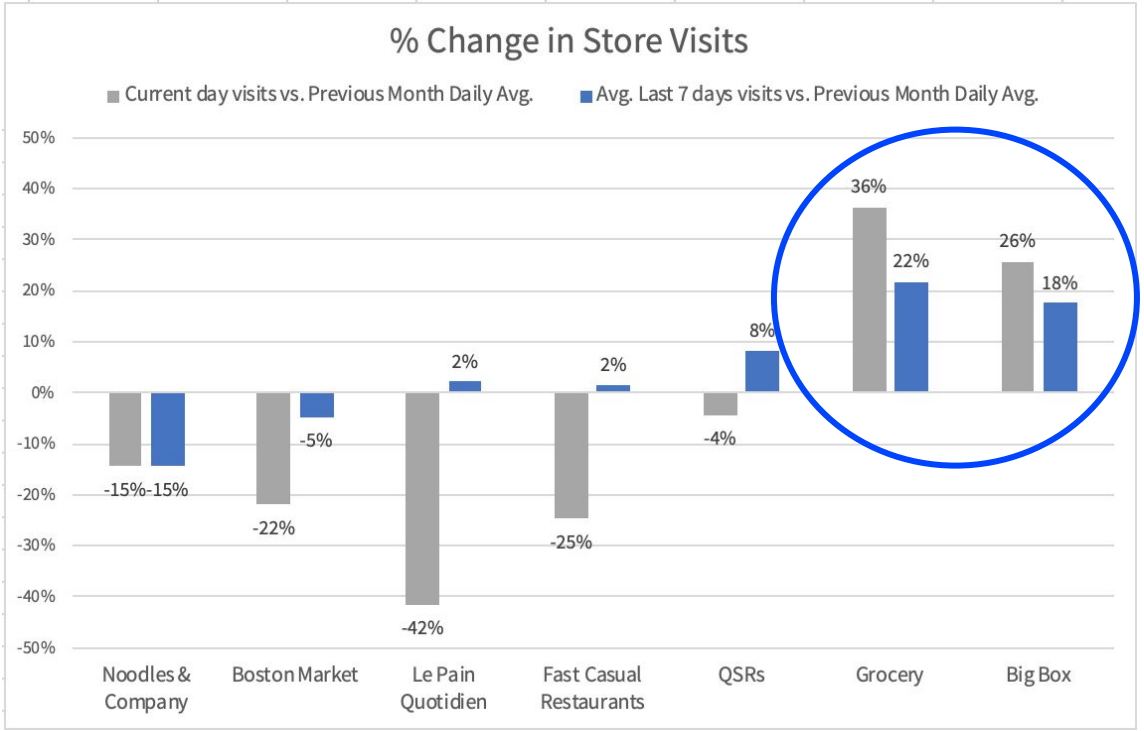
We see a larger drop in **fast casual** where people might tend to eat in the restaurant.

QSRs also typically have drive through which facilitates social distancing.

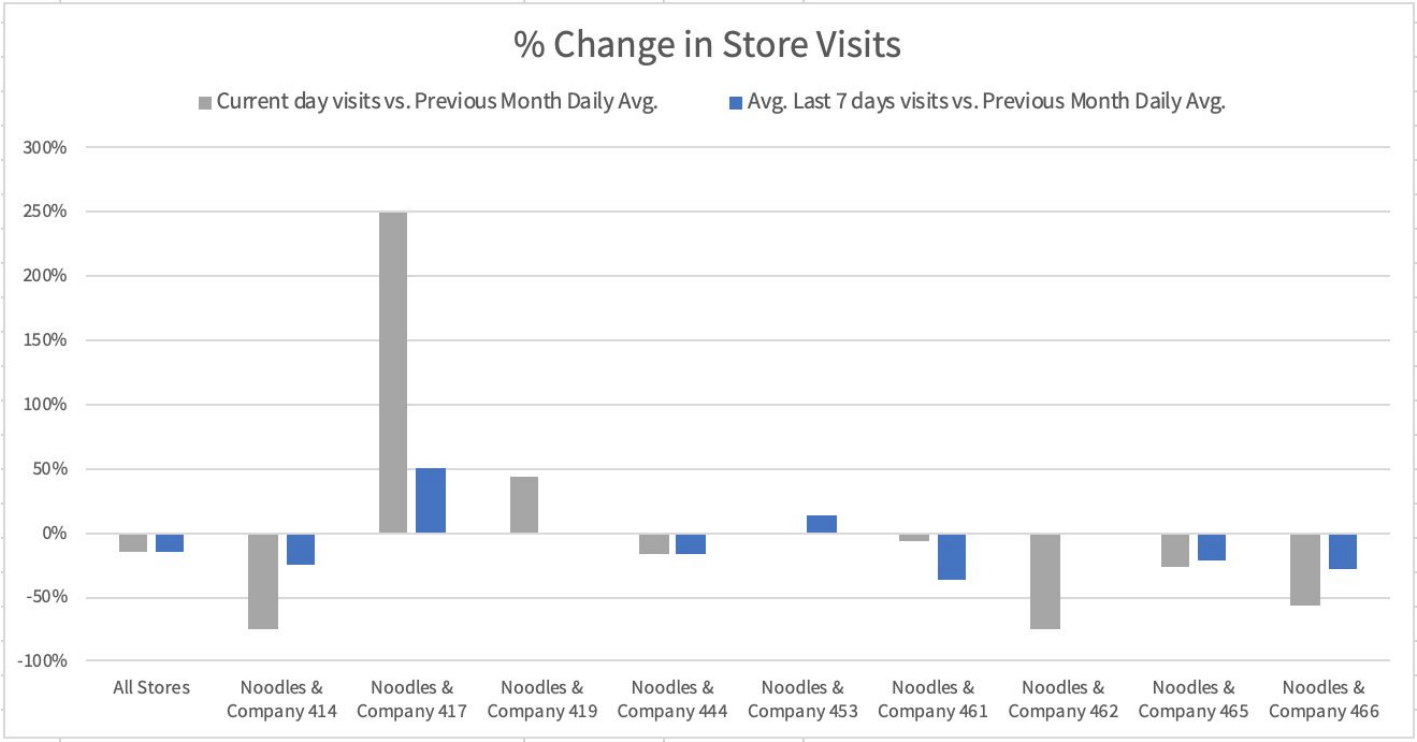


Noodles & Co Category Impact

Jump in visits to grocery and big box stores as people stock up on supplies.

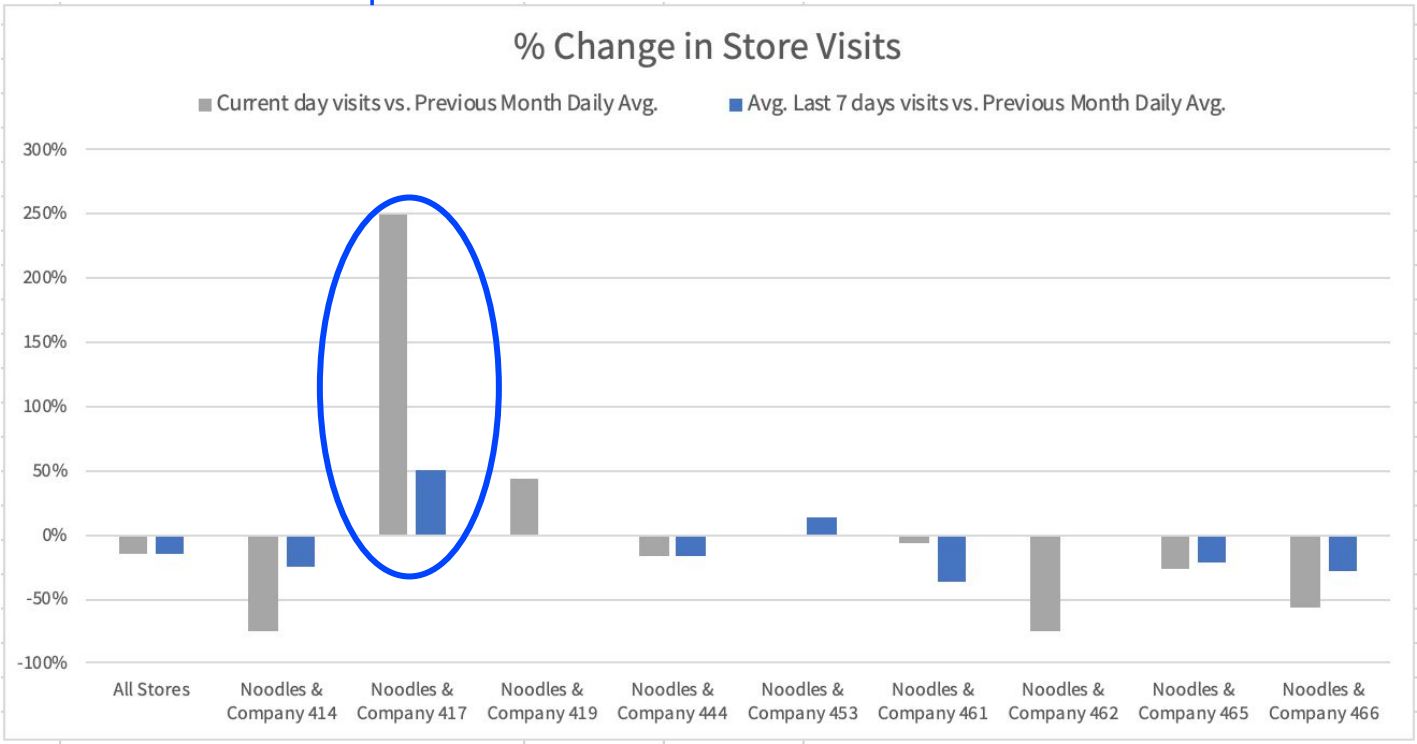


Noodles & Co Store Impact



Noodles & Co Store Impact

Store 417 saw a huge increase. It is located in a big shopping strip mall in a more residential area next to a grocery store.



Mobile Data & Covid19

Brand Impact Metrics

Brand Location Visitation Trends

% change in visitation over time for individual brand store locations

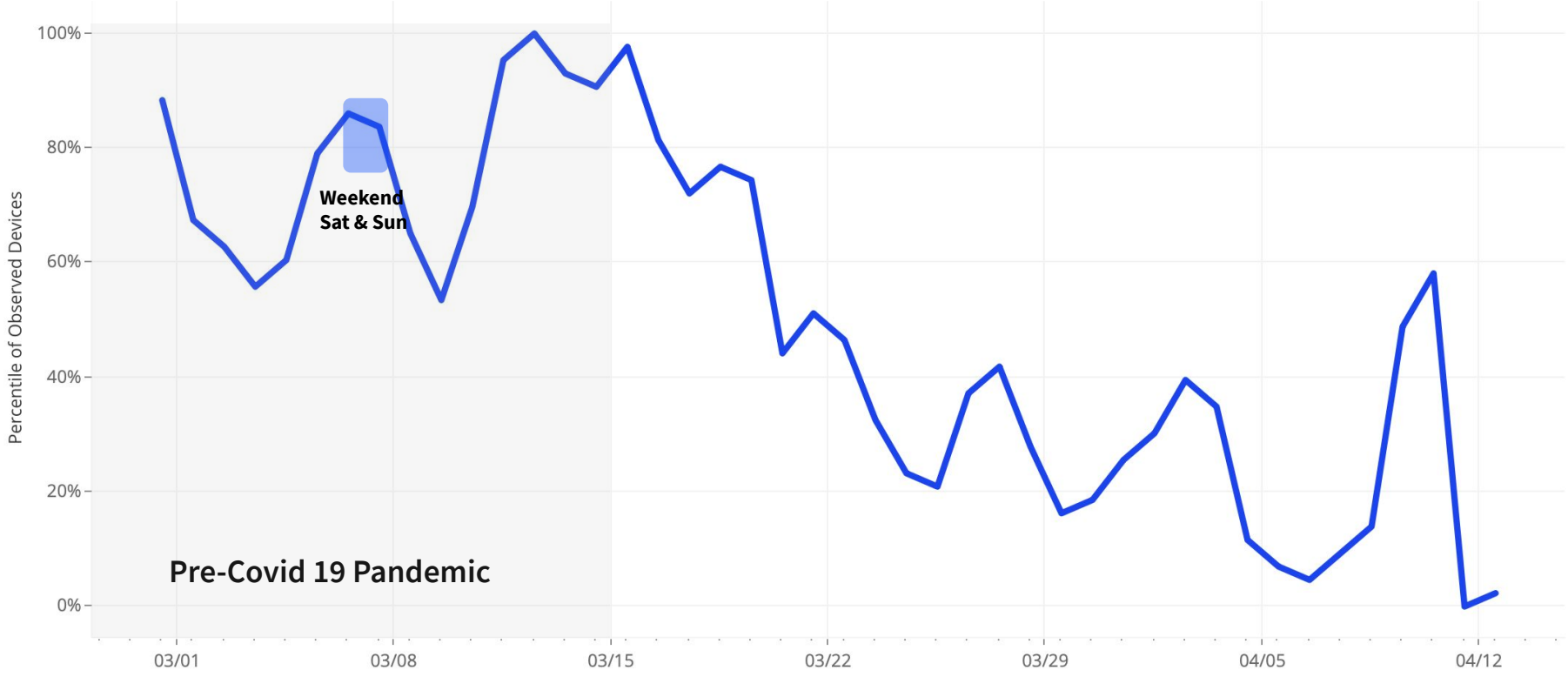
Competitor Locations Visitation Trends

% change in visitation over time for competitor brands and other categories/sectors

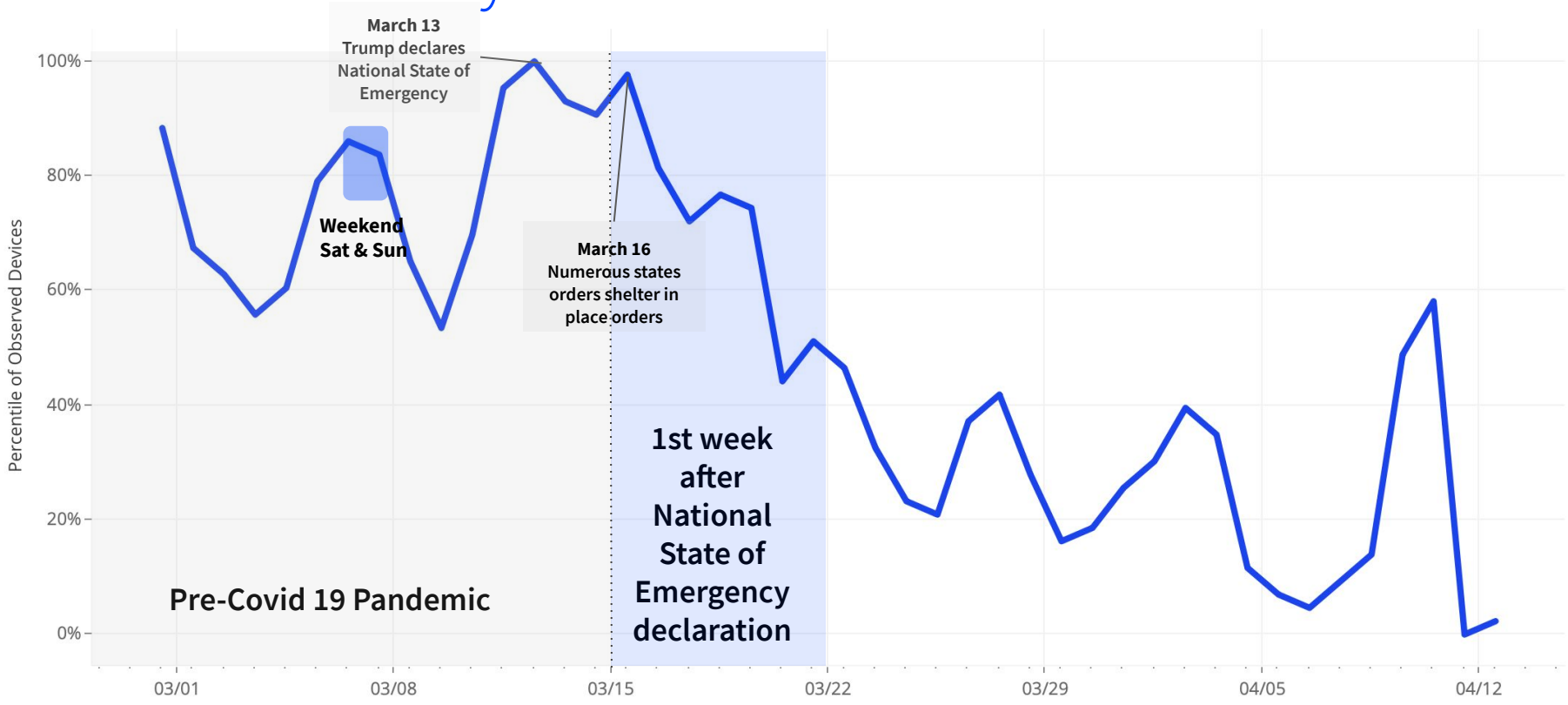
UberMedia

Quantifying the impact of COVID-19 on grocery store visitation

National Grocery Store Foot Traffic



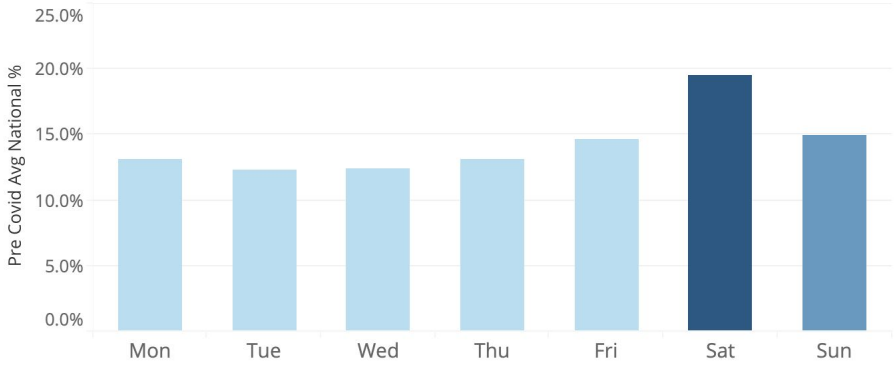
National Grocery Store Foot Traffic



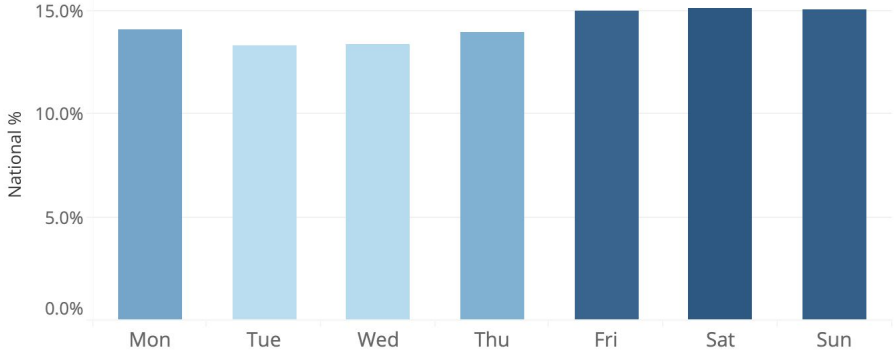
National Grocery Store Foot Traffic

Change in Shopping Times and Days

Pre Covid-19

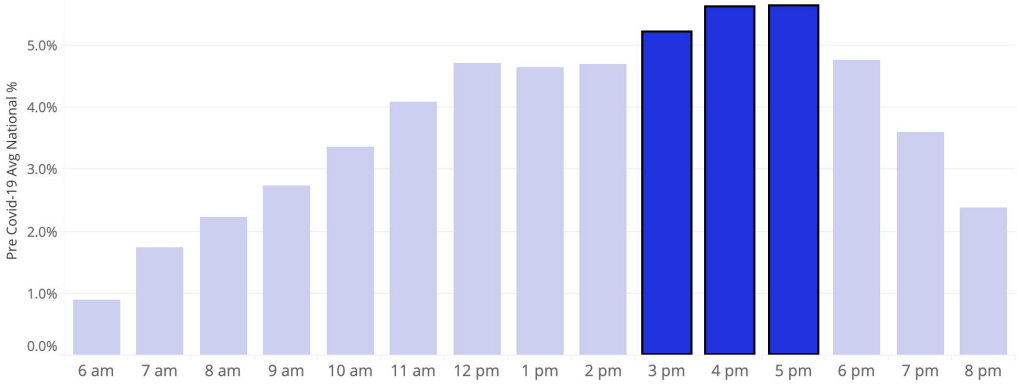


Post Covid-19

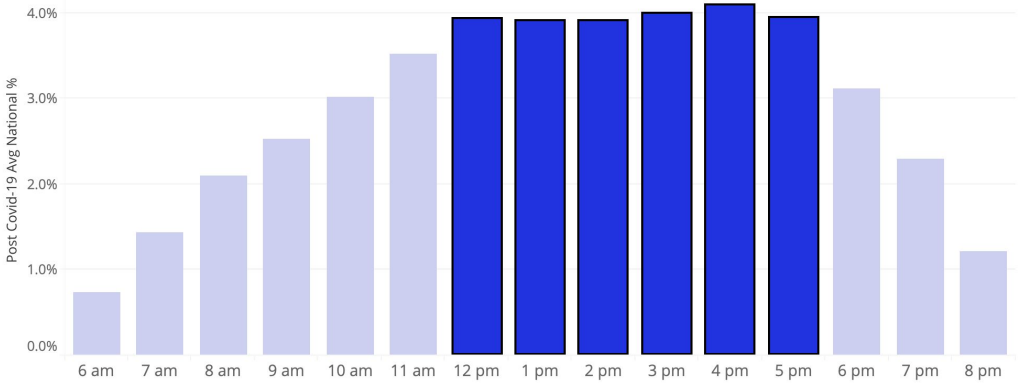


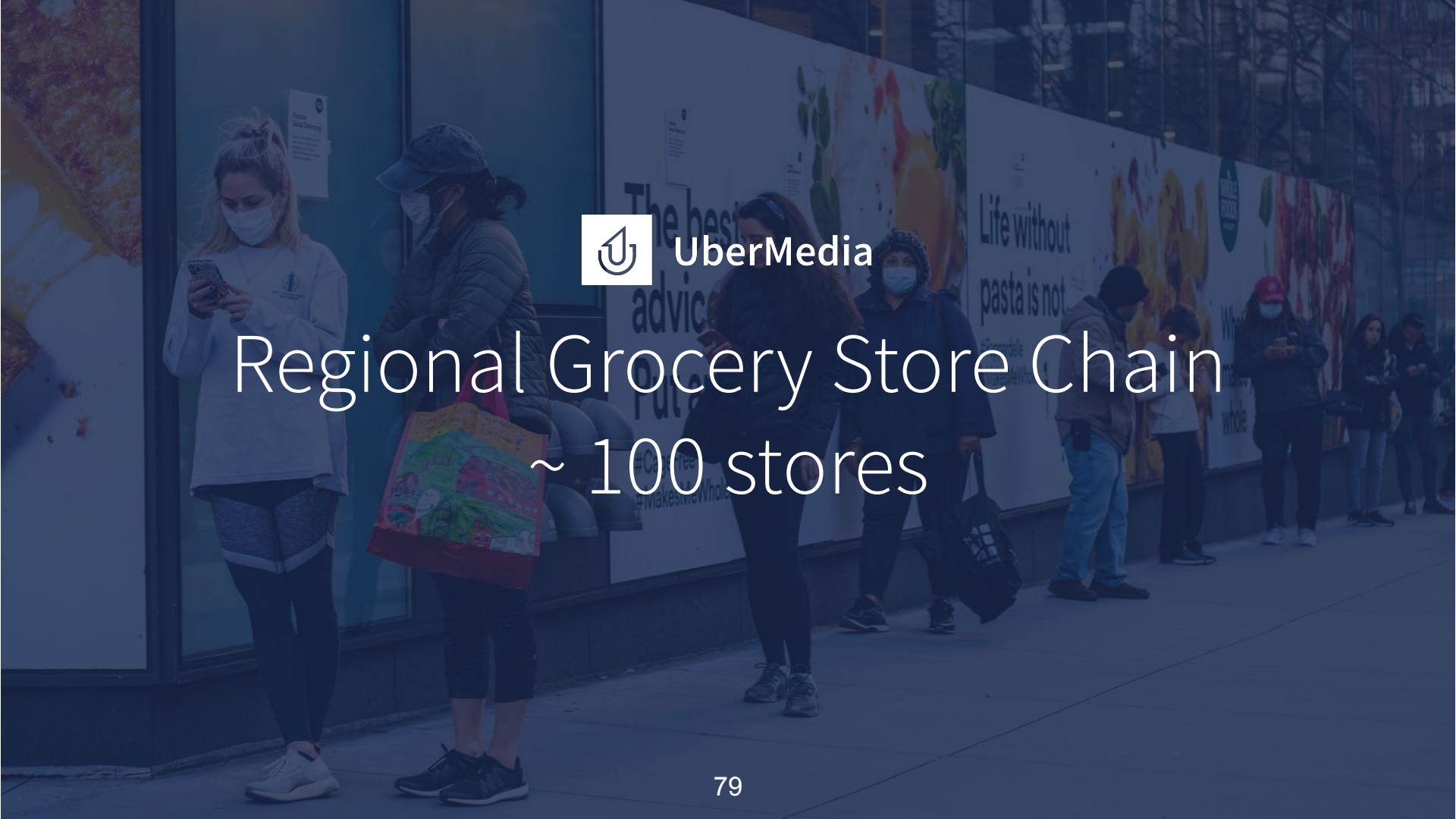
Change in Shopping Times and Days

Pre Covid-19



Post Covid-19



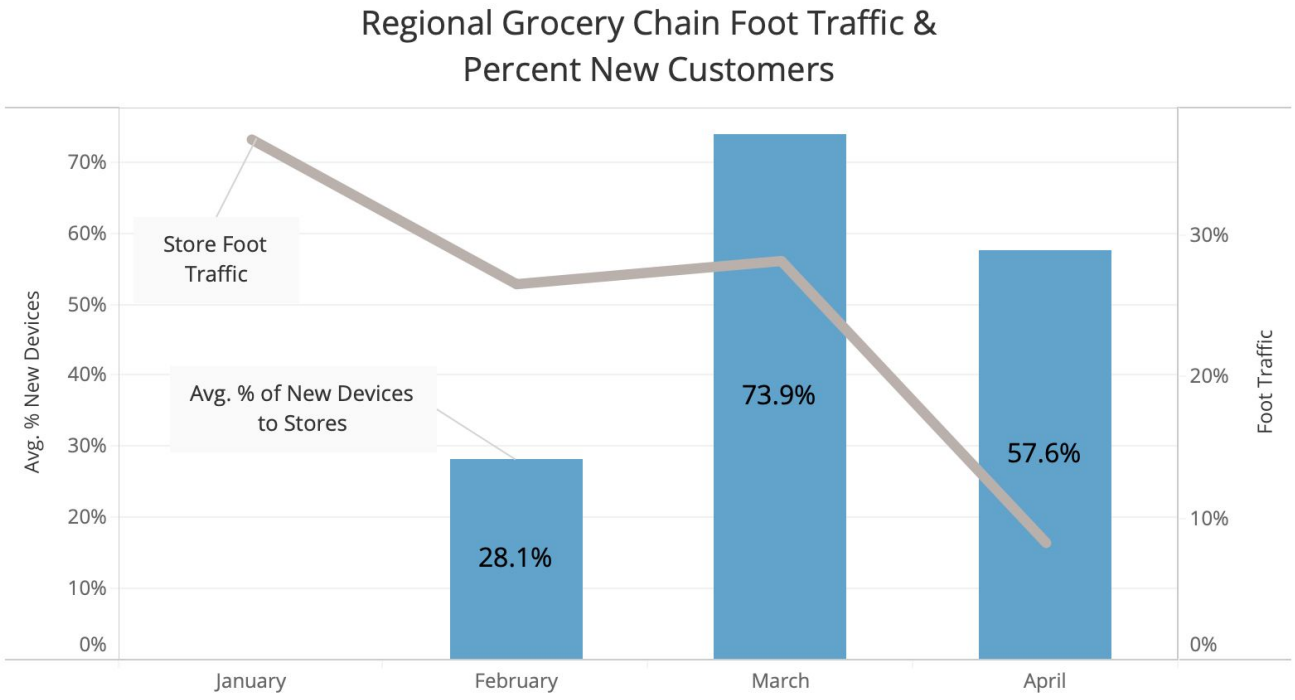


Regional Grocery Store Chain
~ 100 stores

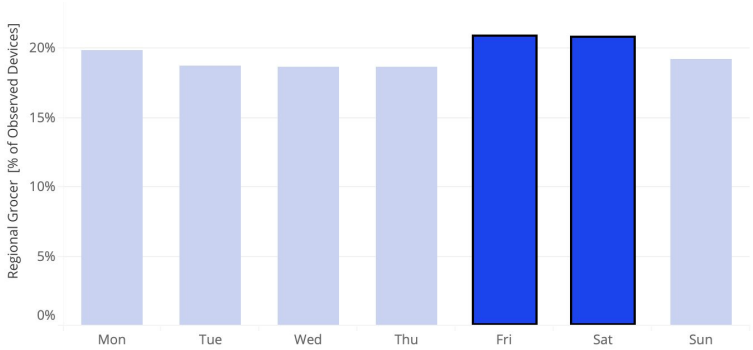
New Customers During Covid-19 Pandemic

Like others, this Grocery Chain saw an overall decline to foot traffic in the Covid-19 Pandemic.

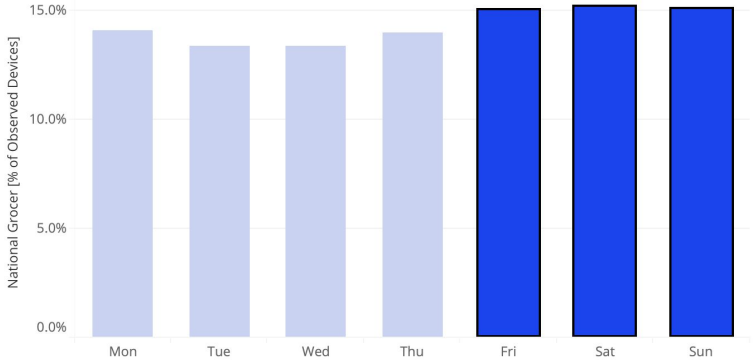
An analysis of “new devices” to the location showed an estimated 70% of “new customers”

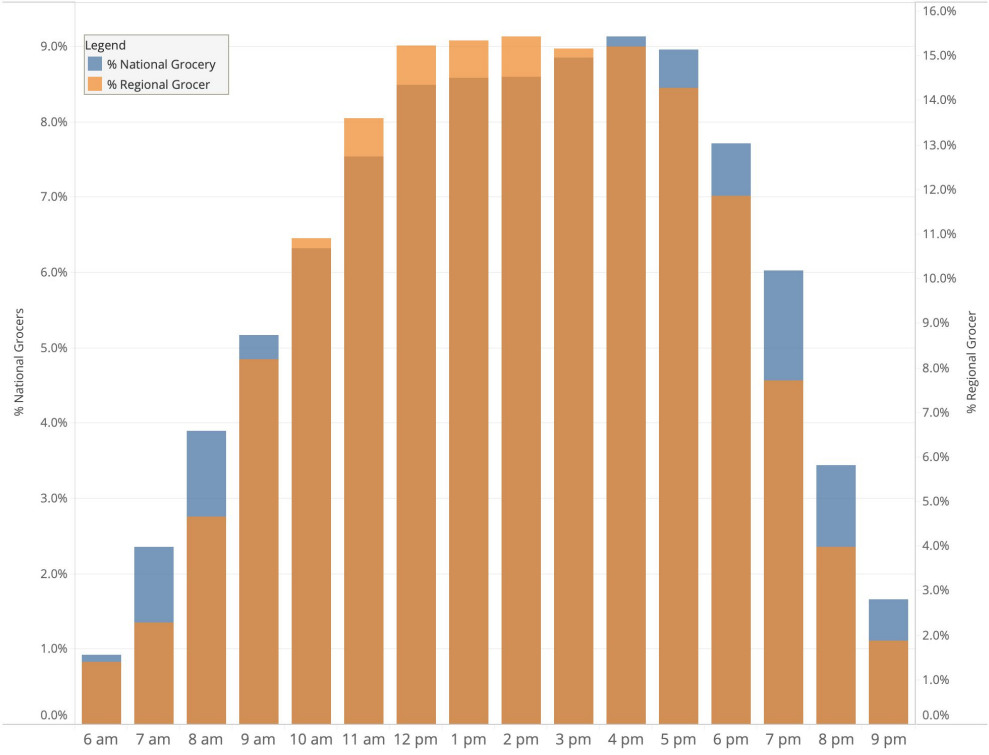


Regional Grocer

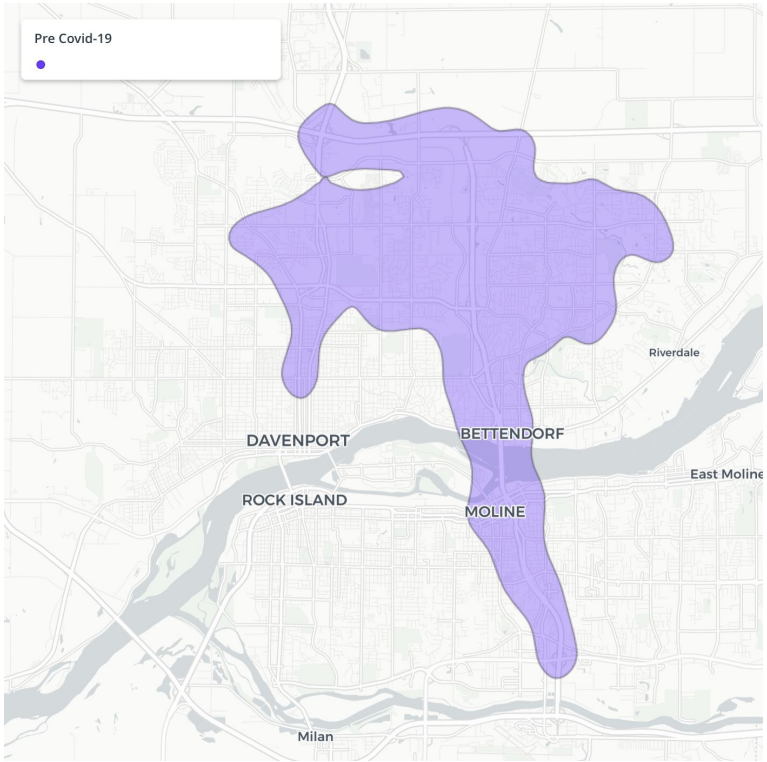


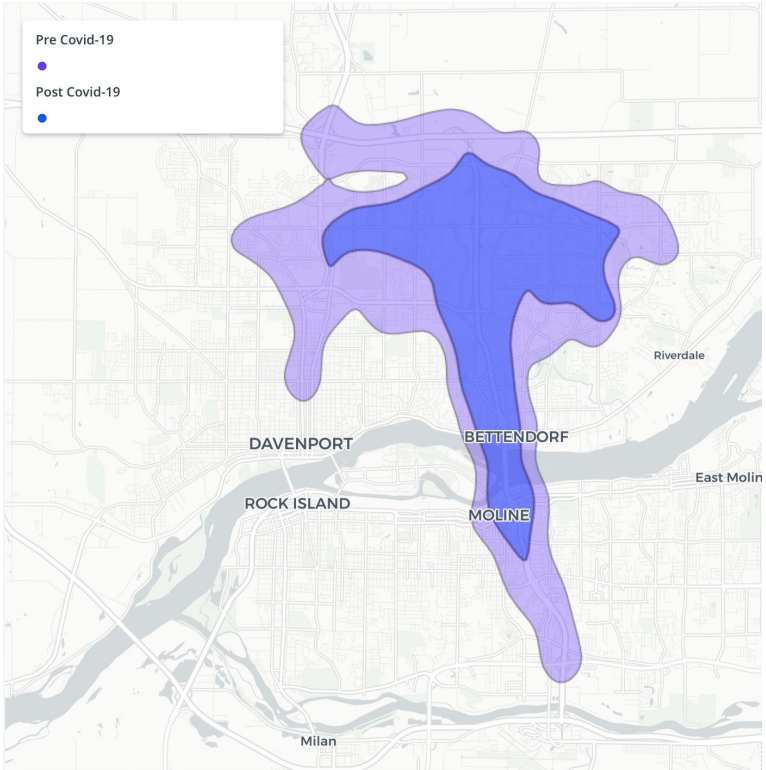
National Grocers





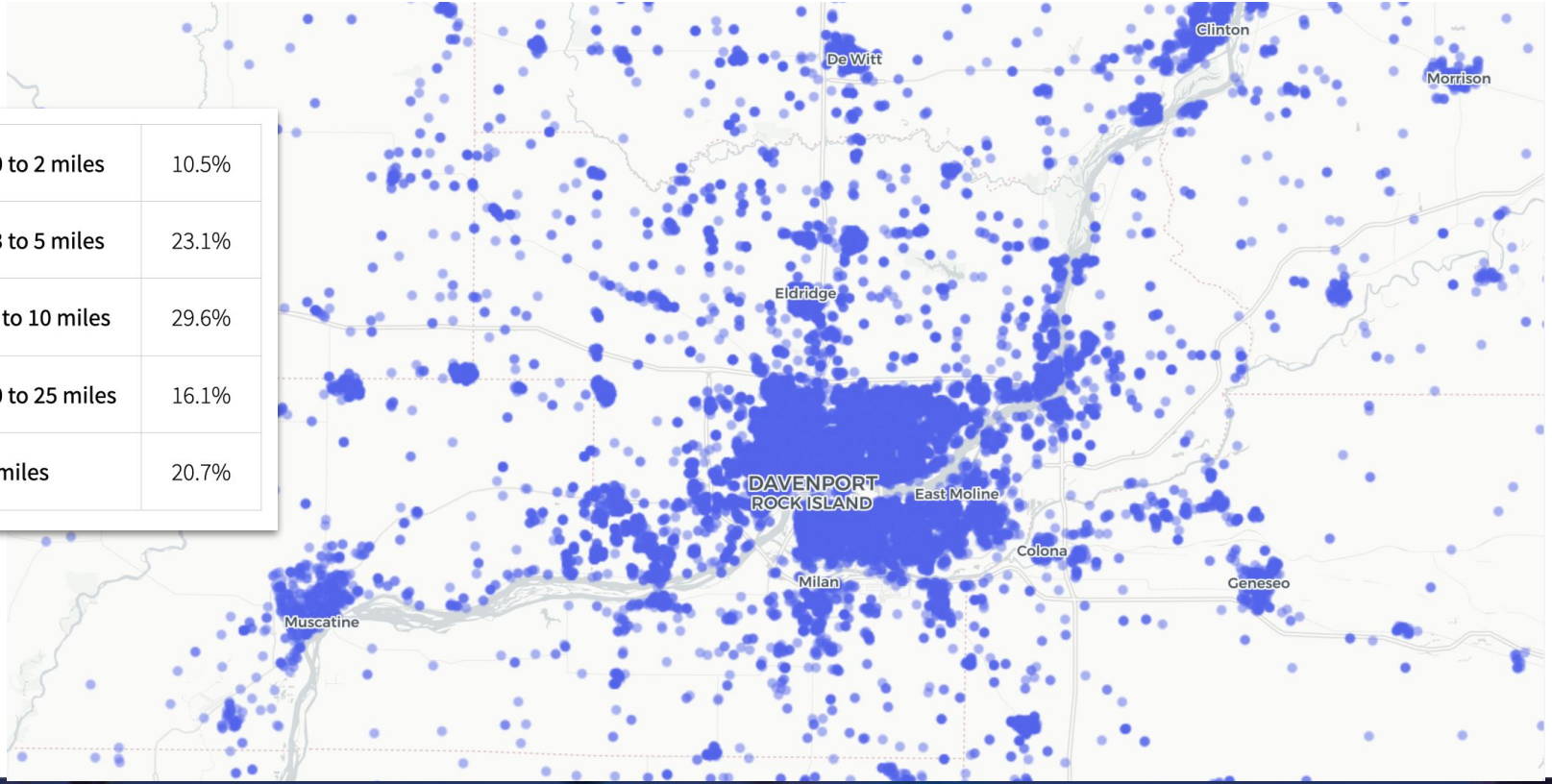
Covid-19 Changes: Mobile Trade Area





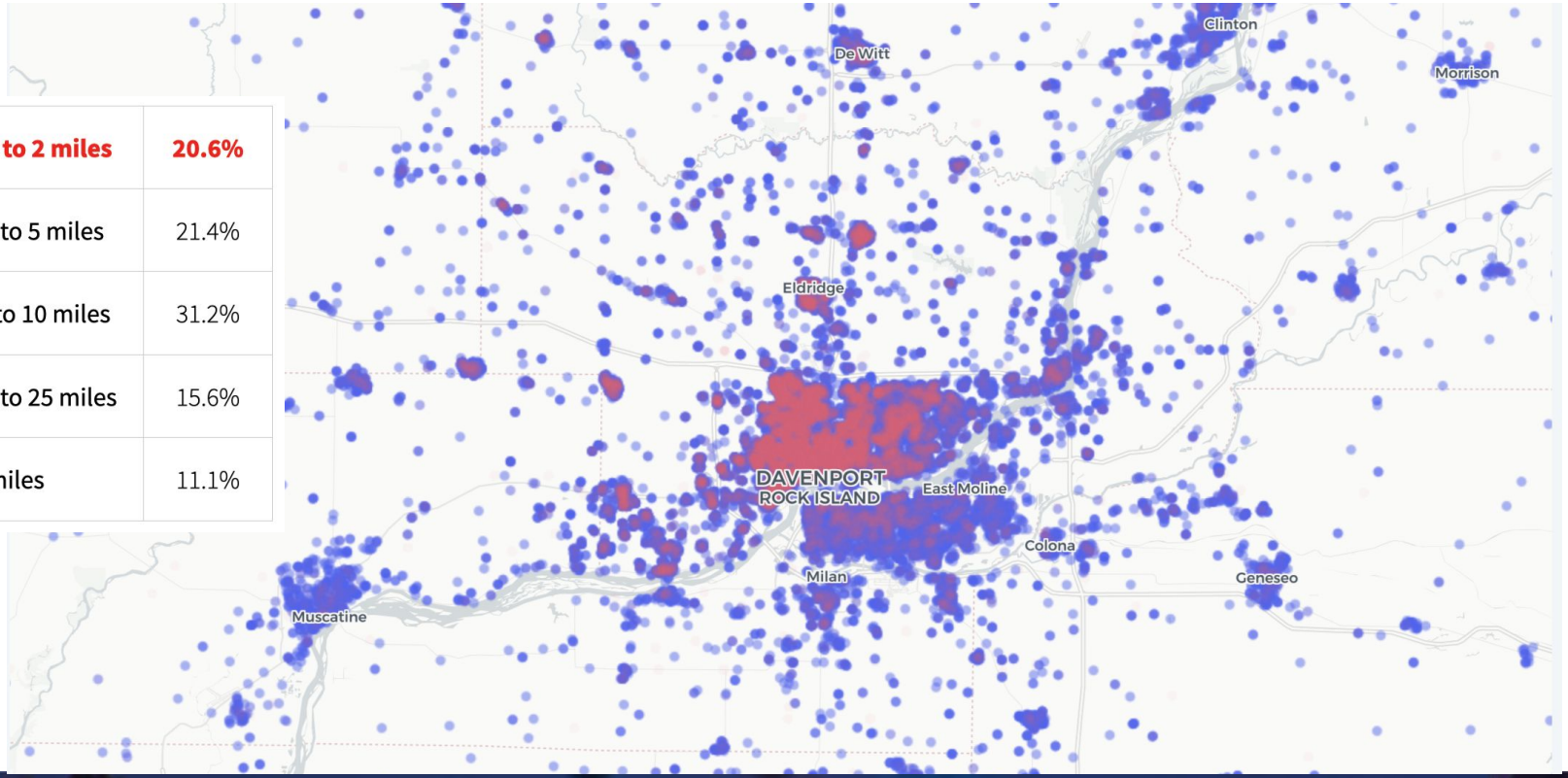
Pre Covid-19: Consumer Origin Points

Lives between 0 to 2 miles	10.5%
Lives between 3 to 5 miles	23.1%
Lives between 5 to 10 miles	29.6%
Lives between 10 to 25 miles	16.1%
Lives 25+ miles	20.7%



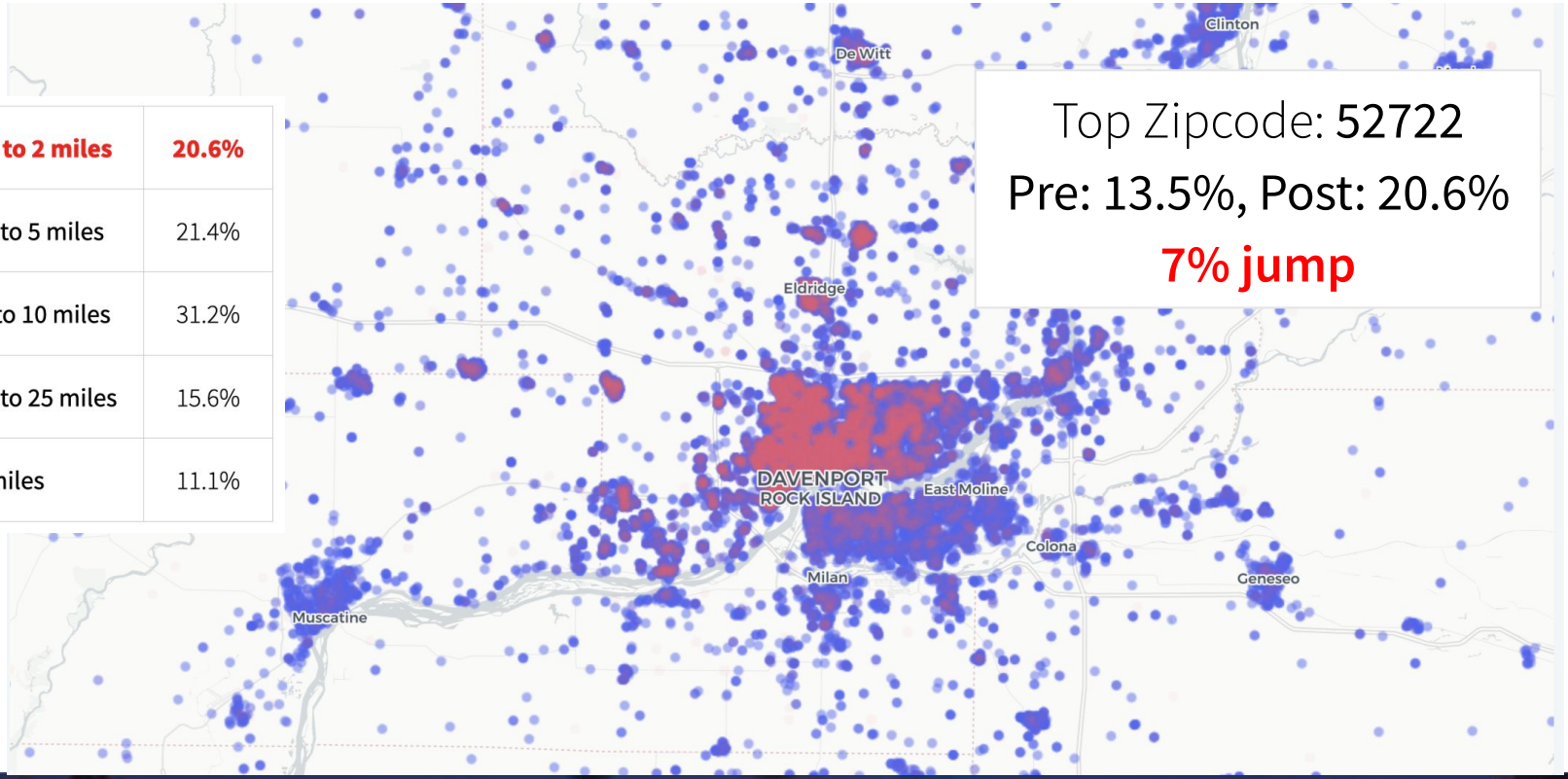
Post Covid-19: Consumer Origin Points

Lives between 0 to 2 miles	**20.6%**
Lives between 3 to 5 miles	21.4%
Lives between 5 to 10 miles	31.2%
Lives between 10 to 25 miles	15.6%
Lives 25+ miles	11.1%



Post Covid-19: Consumer Origin Points

Lives between 0 to 2 miles	**20.6%**
Lives between 3 to 5 miles	21.4%
Lives between 5 to 10 miles	31.2%
Lives between 10 to 25 miles	15.6%
Lives 25+ miles	11.1%

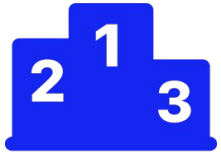


Top Zipcode: **52722**

Pre: 13.5%, Post: 20.6%

7% jump

Recovery Planning:
Near Real Time Info with Mobile Data



Compare foot traffic of your brand's location to competitors

Understand how Covid-19 has changed your consumer base and trade area

Analyze post-Covid 19 consumer behaviors to strategize marketing efforts

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Tourism Research Examples

While tourism destinations are currently on hold due to the Novel Coronavirus in the United States, missions have evolved from focusing on bringing tourists to their destinations to modeling future seasons with actionable insights or understanding how their local populations are responding to the pandemic to help with economic development.

UberMedia

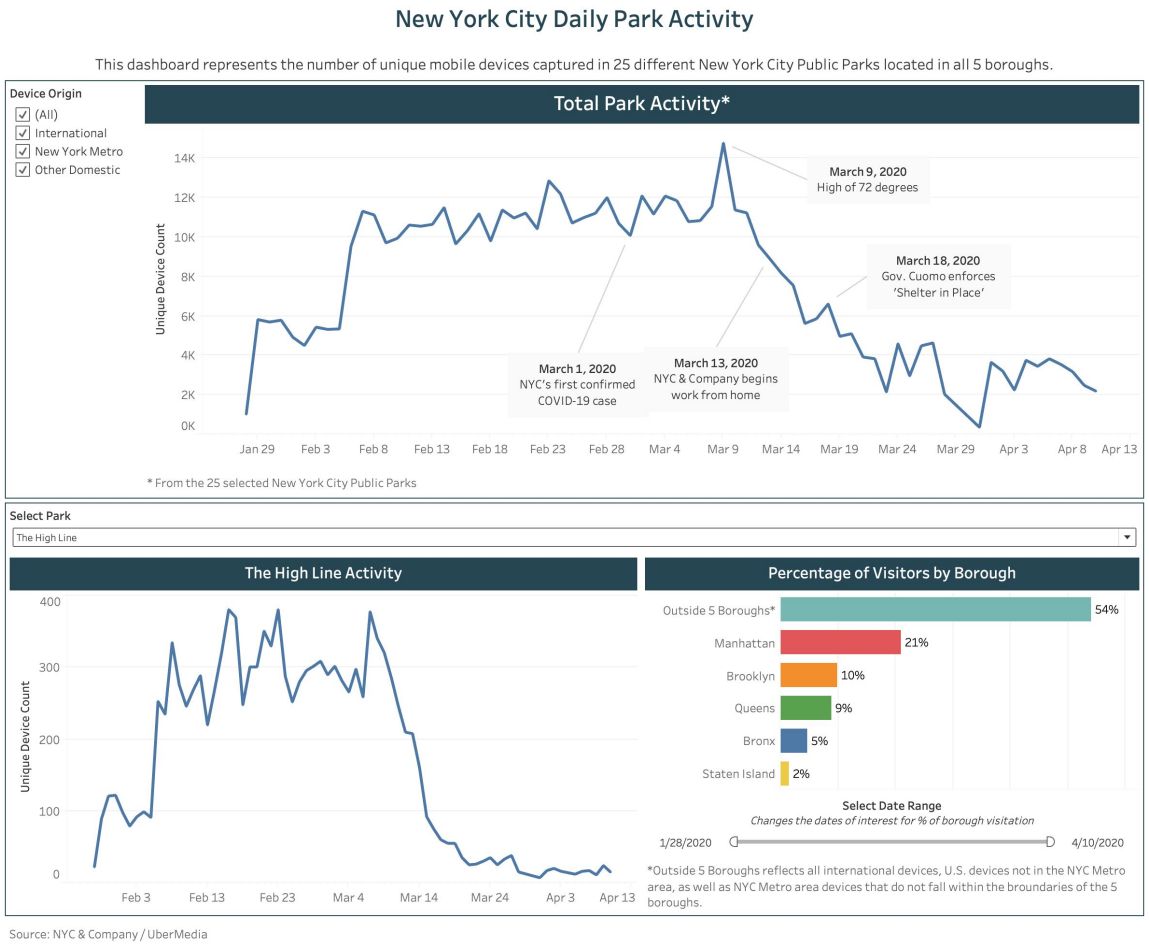
Adapting tourism business analytics into local community resources

Measuring the COVID-19 Impact on New York Community Parks

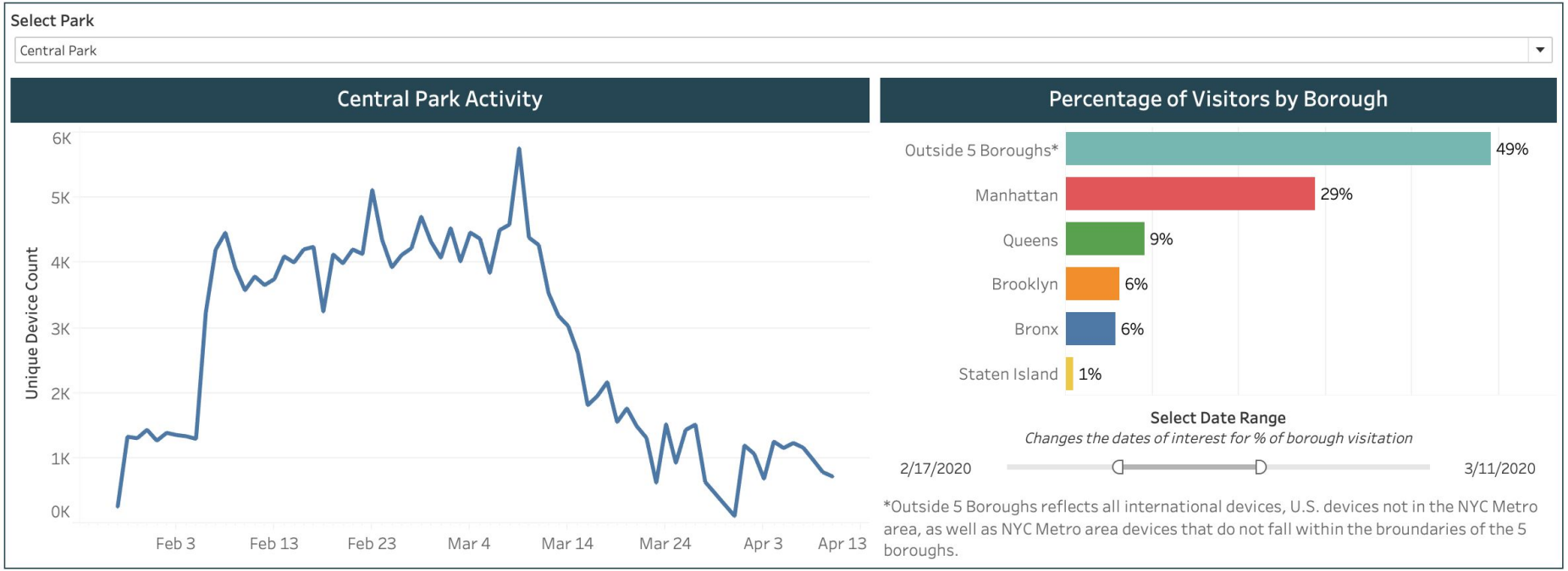
Kaitlyn Drake
Senior Data Analyst
NYC & Company

How are New Yorkers adapting how they interact with and move about New York City during the novel coronavirus pandemic?

NYC Daily Park Activity Dashboard



“Tourist Park” Central Park - Before



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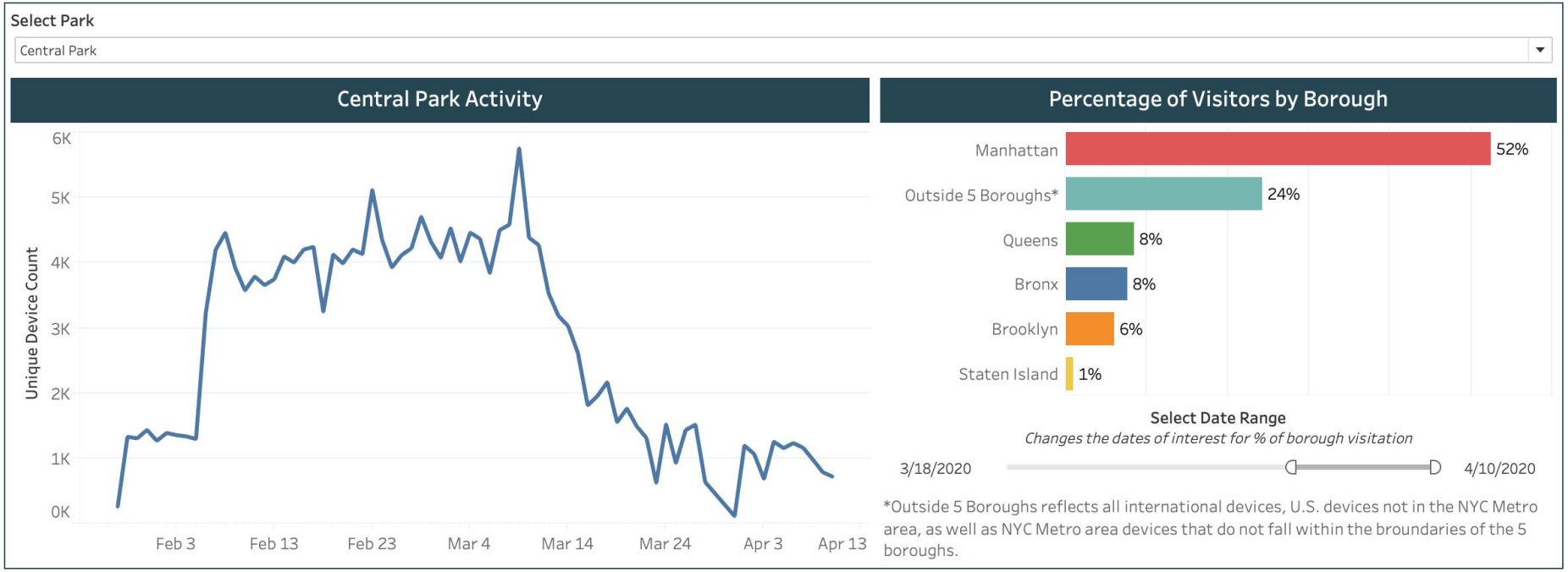
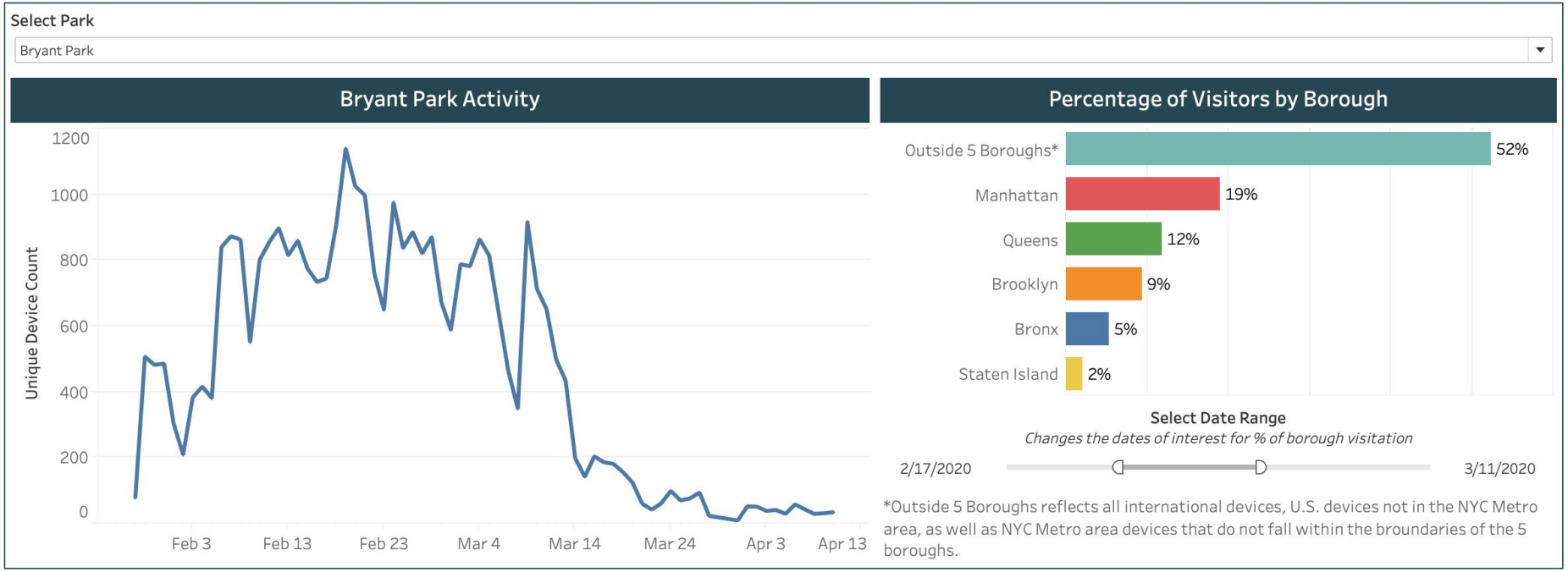
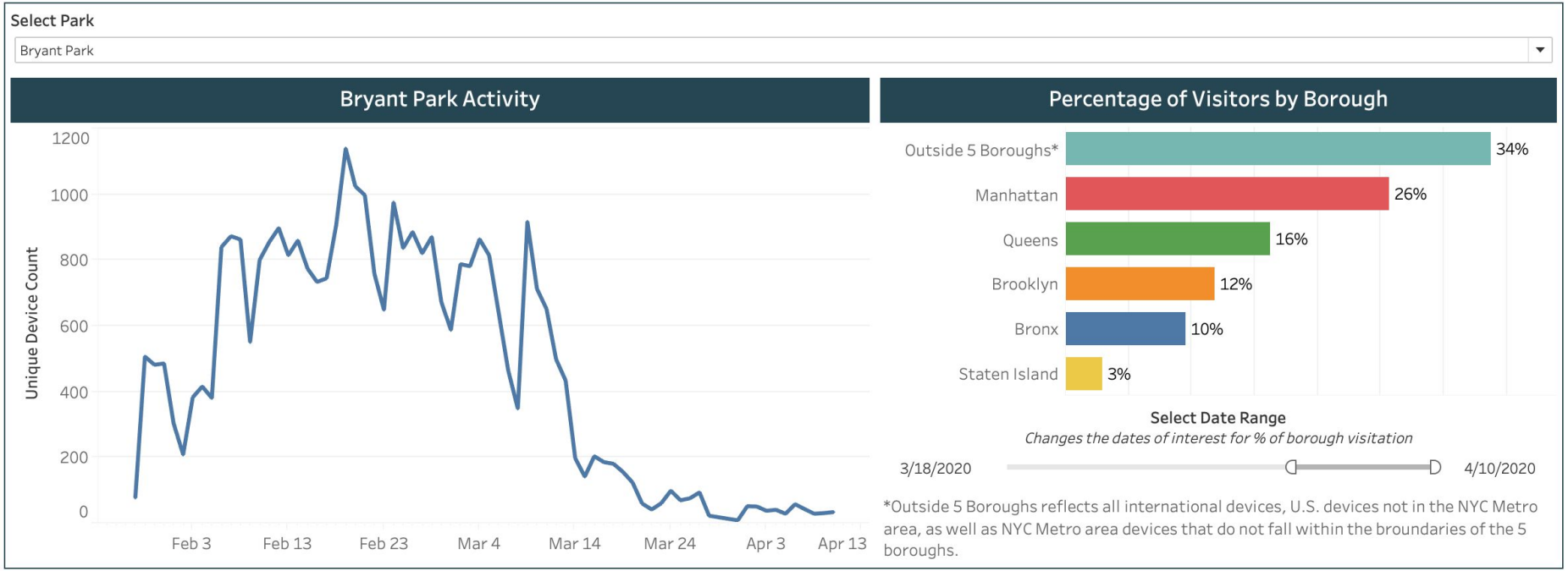


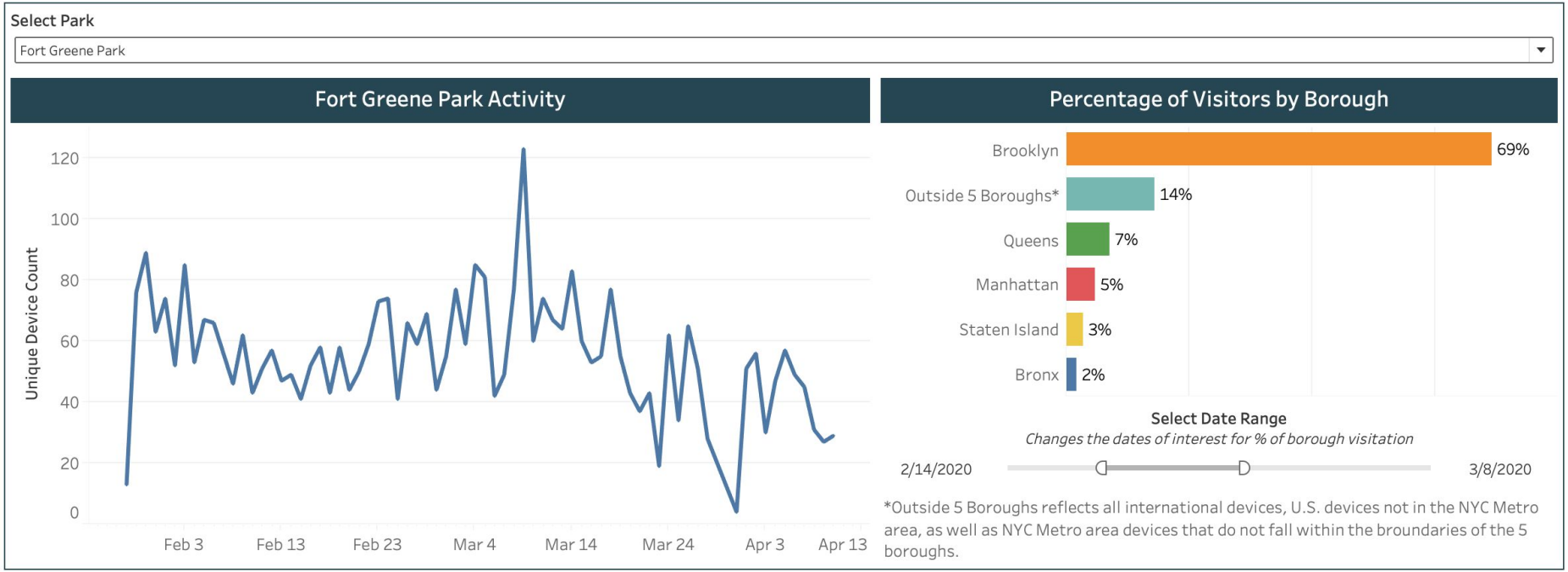
“Business Park” Bryant Park - Before



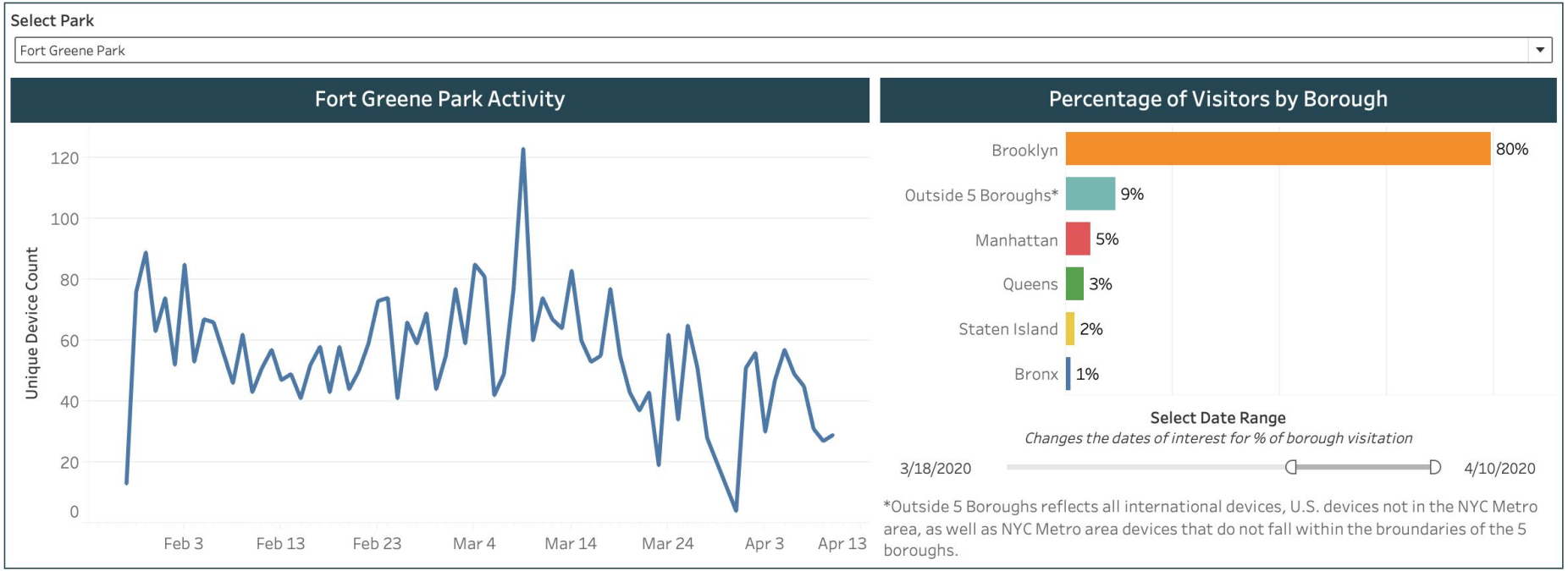
“Business Park” Bryant Park - After



“Neighborhood Park” Fort Greene Park - Before



“Neighborhood Park” Fort Greene Park - After



Identifying origin markets of visitors to hotels still operating during the pandemic

State of Tourism Industry

Most tourist assets are closed in areas around the country.

As a result, visitors to “tourist locations” such as parks and beaches are more local - however, some hotels are still seeing upwards of 25% occupancy rates

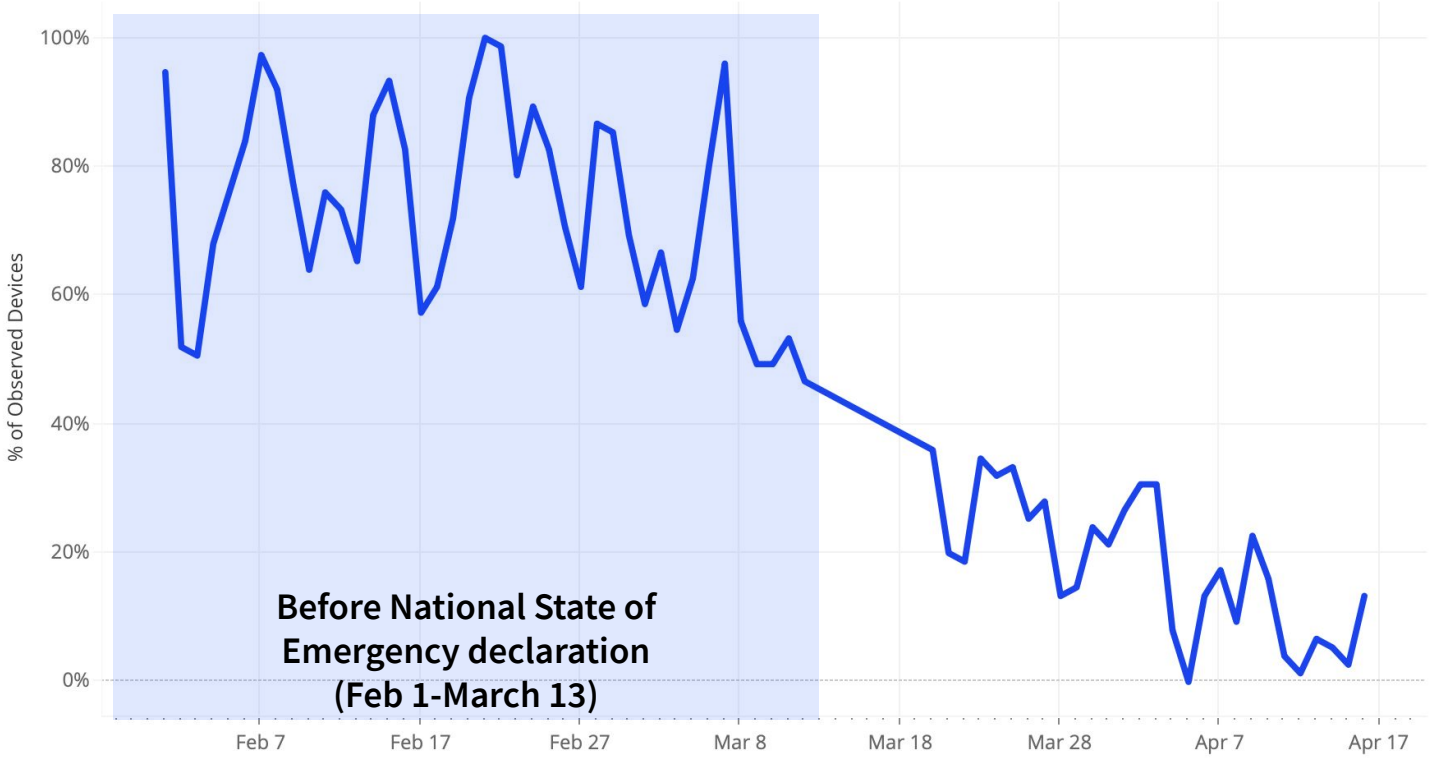
Who are these guests? Where are they coming from?

Five Star Getaways

Sample of Hotels from Across the Nation from these chains

- Four Seasons
- Waldolf Astoria
- Ritz-Carlton

Hotels show available occupancy



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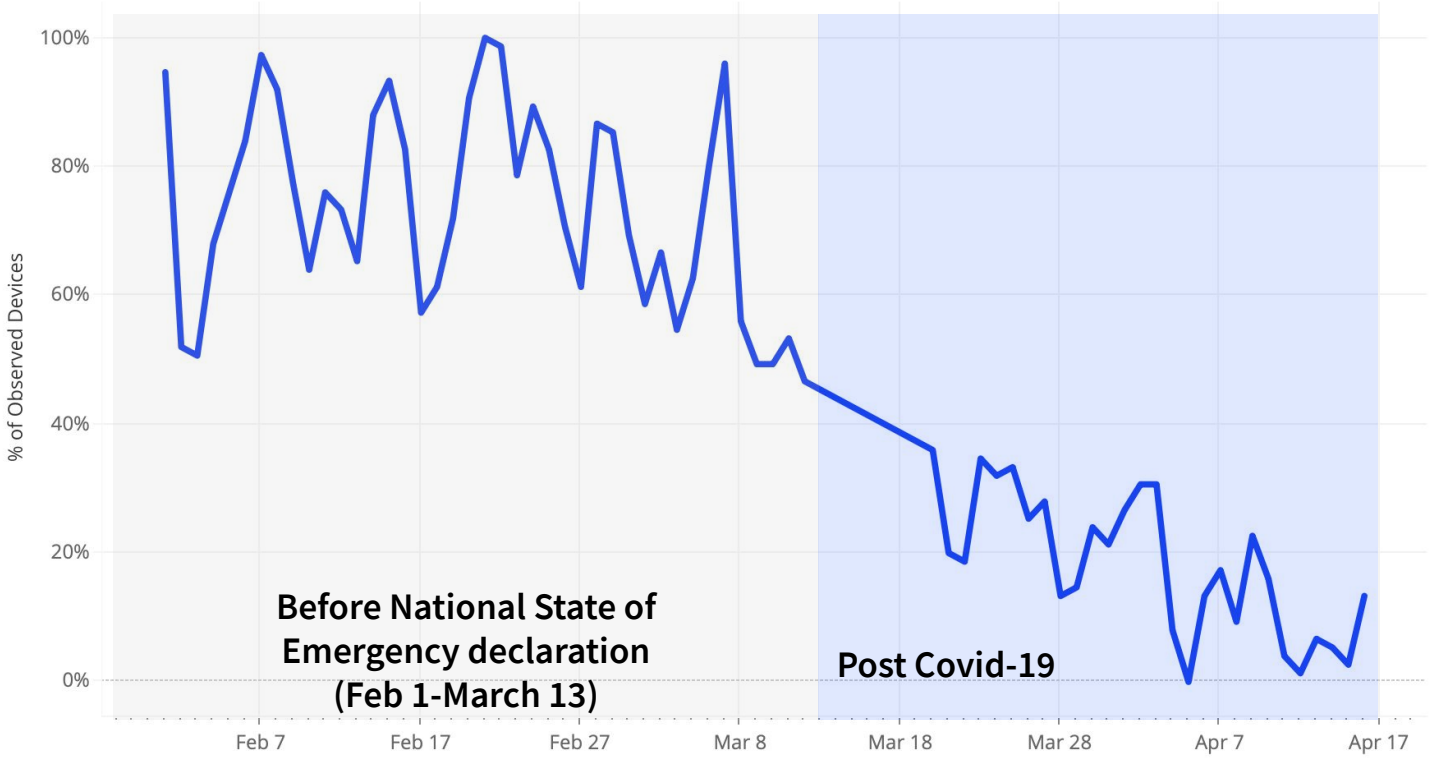
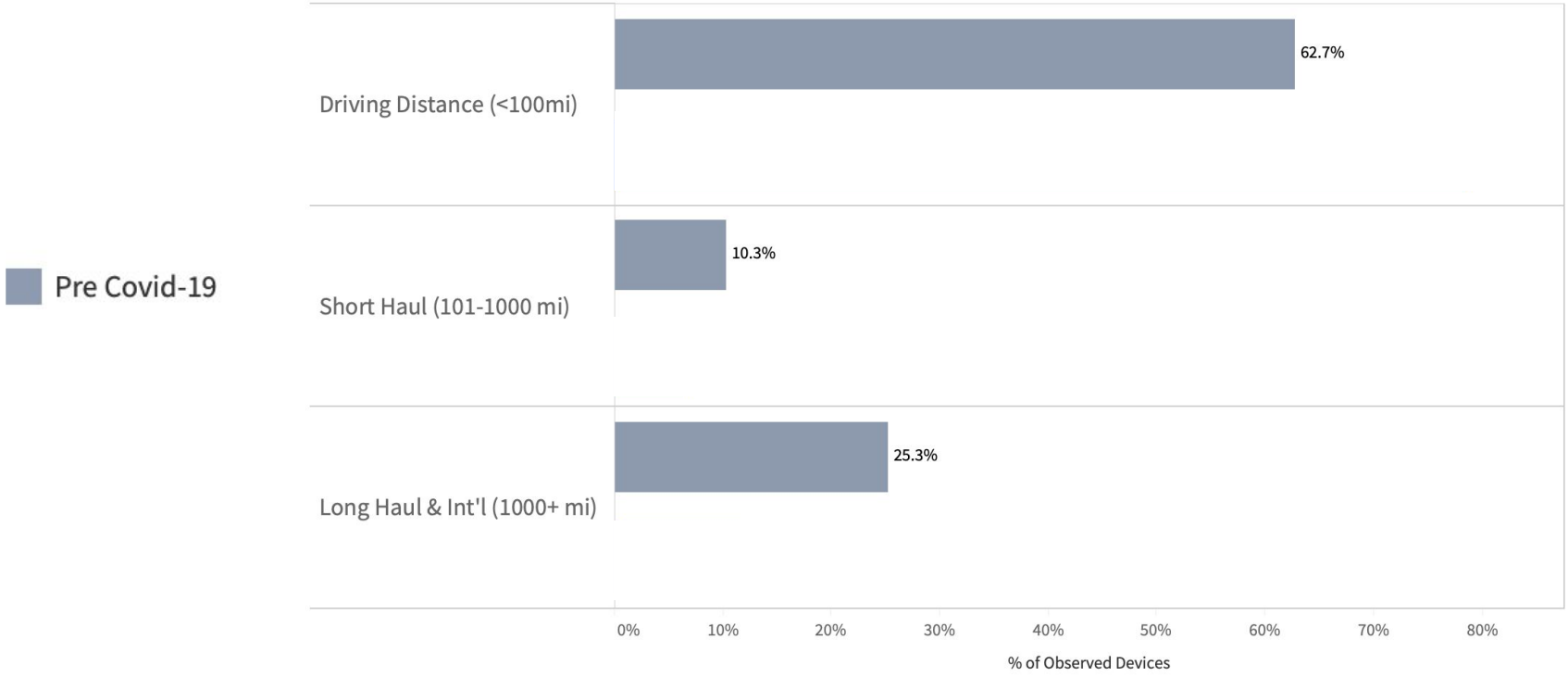
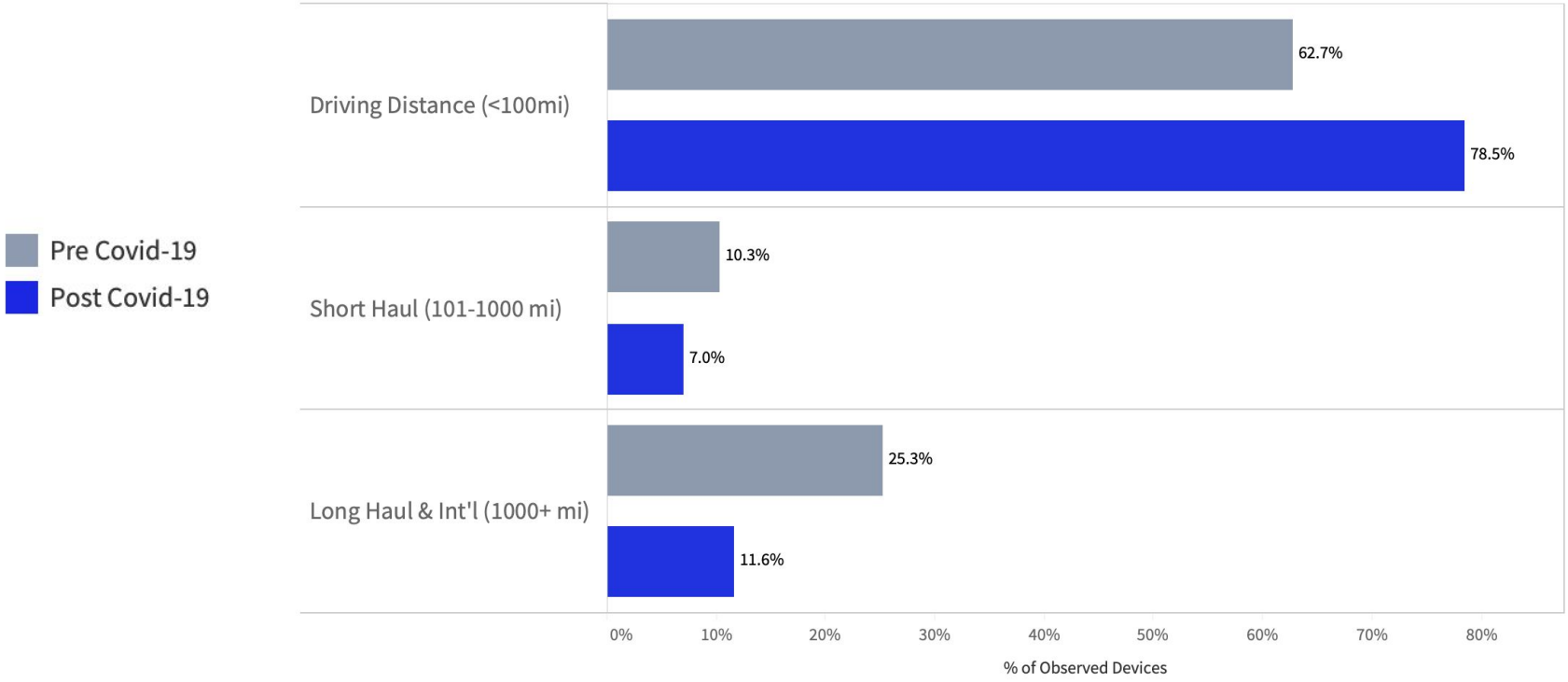


How far are these guests coming from?



Date Range: Feb. 1 - March 13, 2020

How far are these guests coming from?



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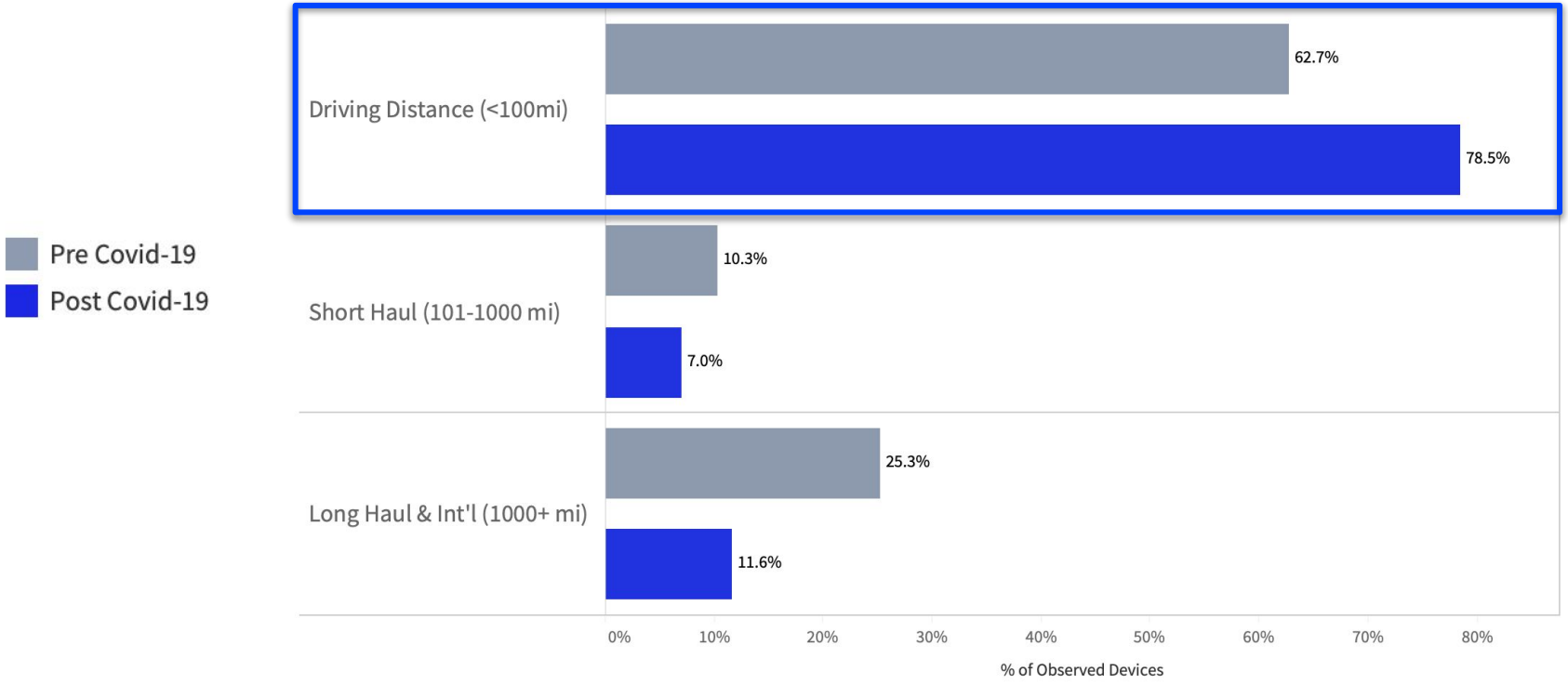

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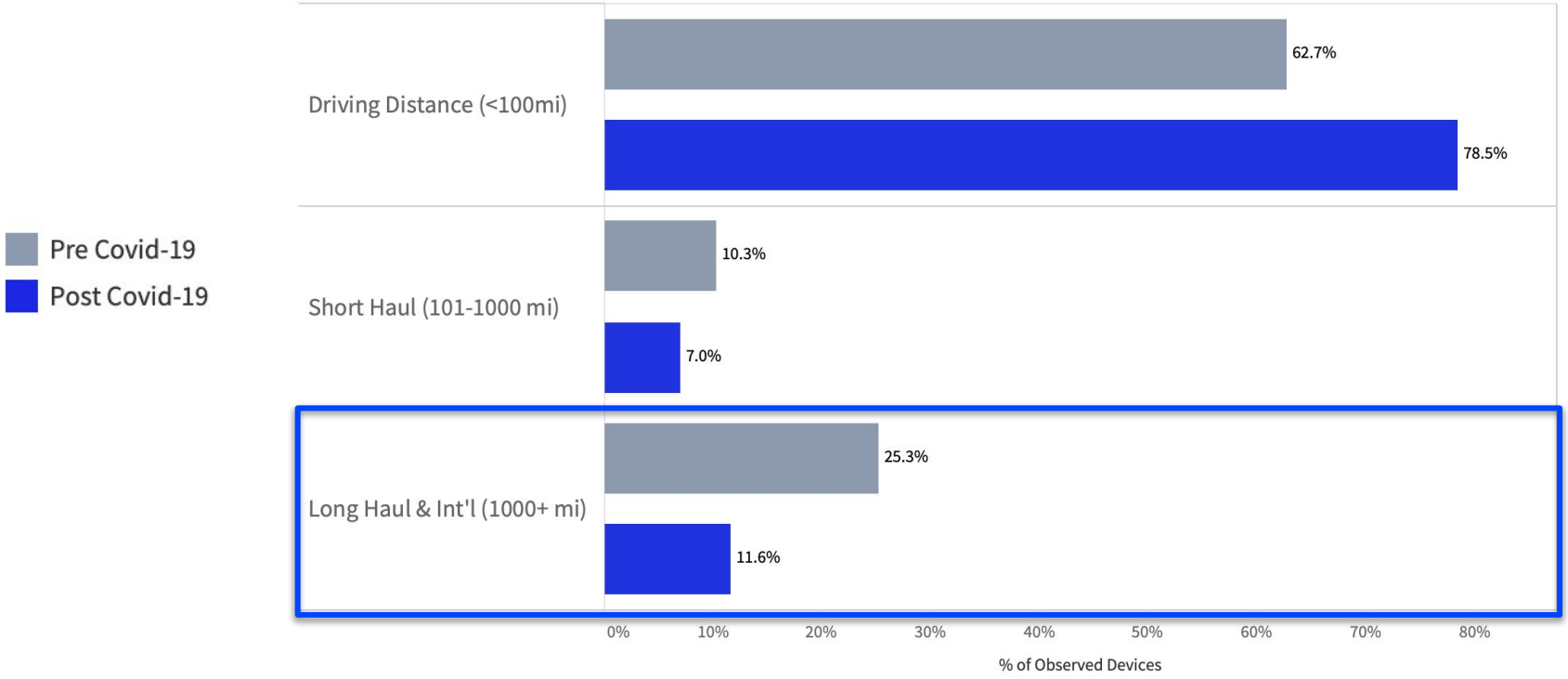

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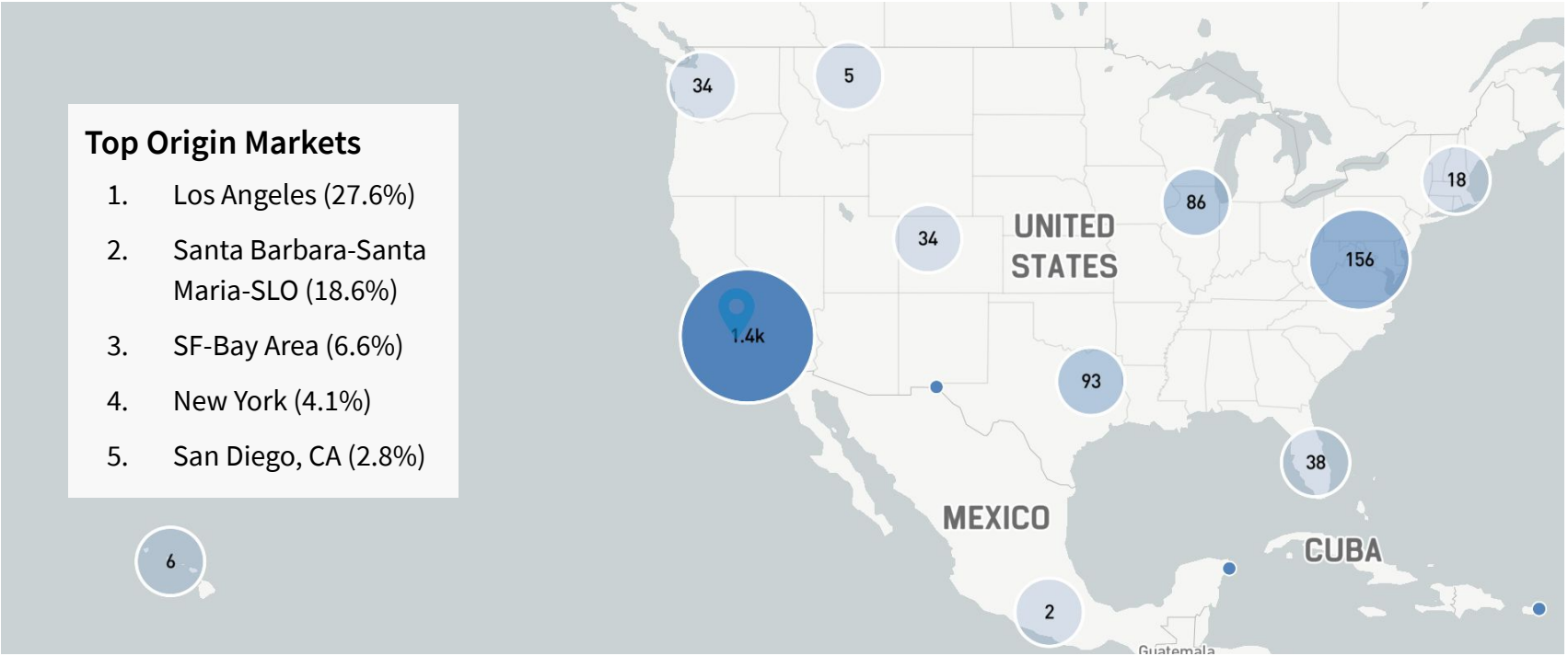
Deep Dive: Luxury Property in Santa Barbara

Pre Covid-19

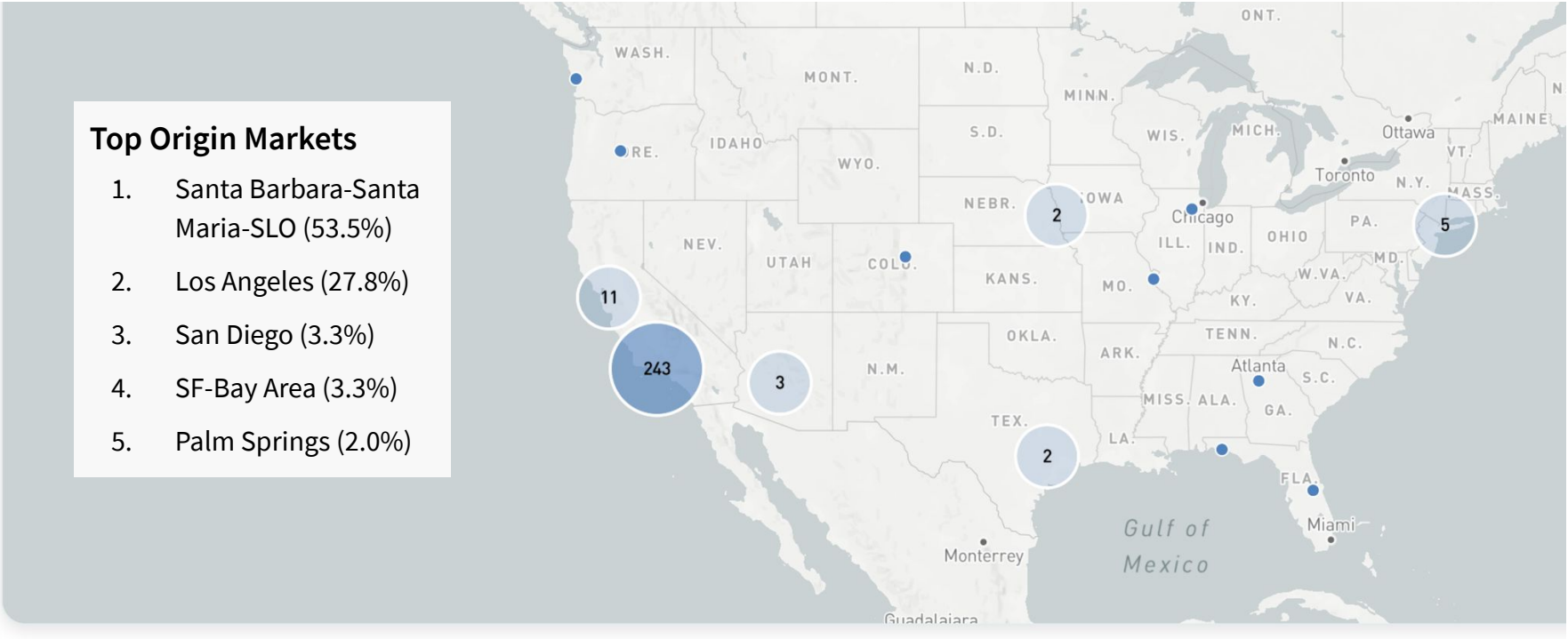


Deep Dive: Luxury Property in Santa Barbara

Post Covid-19

Top Origin Markets

1. Santa Barbara-Santa Maria-SLO (53.5%)
2. Los Angeles (27.8%)
3. San Diego (3.3%)
4. SF-Bay Area (3.3%)
5. Palm Springs (2.0%)



Luxury Hotels: Household Demographics

Pre Covid-19

Median Income

$78,917

Post Covid-19

Median Income

▼ $70,069 (-11.2%)

Tourism Actionable Insights

Matching Occupancy Changes with Origin Markets Enables Targeted Marketing

Staycations + Driving Distance! 2 Potentially Different Markets Focus on Loyalty.

Understand what % of Hotel Demand in Summer 2019 was Driven by Asia and Europe and other Destinations that May not Travel to you

Covid-19 Public Policy Research Kit

Enables researchers to perform custom studies in their community

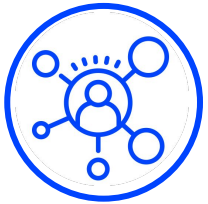
Covid-19 Public Policy Research Kit

UberMedia will be providing a **Public Policy Research Kit** to enable studies for researchers and policy makers who work on the city, county and state level:

- **Social distancing trends**
- **Geographic outbreak prediction**
- **Retail impact by sector (grocery, fast food, etc.), neighborhood and specific location**

Covid-19 Public Policy Research Kit

The Public Policy Research Kit will contain:



Social distancing benchmark data (free)
Social distancing index for 5+ benchmark locals

Special access to Data Explorer Tool
Enables researchers to pull data for specific locations and studies (e.g. Dayton or Wayne County)

PDF Guide to perform local studies using data
Step-by-step guide to analyze data pulls in order to extract actionable insights

Covid-19 Public Policy Research Kit

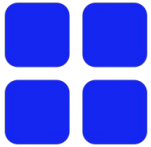
- Public policy decision-makers
- County and state health departments
- Economic development boards
- Researchers and consultants

COMPLIMENTARY TOOLS

Covid-19 Researcher Portal

Enabling and Partnering with Researchers from Multiple Disciplines

Researcher Portal



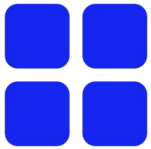
Research Data Directory

Research from a variety of providers gathered in one convenient place

Mobile Data Tutorials

Guides for using mobile location data to study the impact of COVID-19

Researcher Portal



Research Data Directory

Mobile Data Tutorials

Research Blog

Mailing List

Webinars

covid19.ubermedia.com

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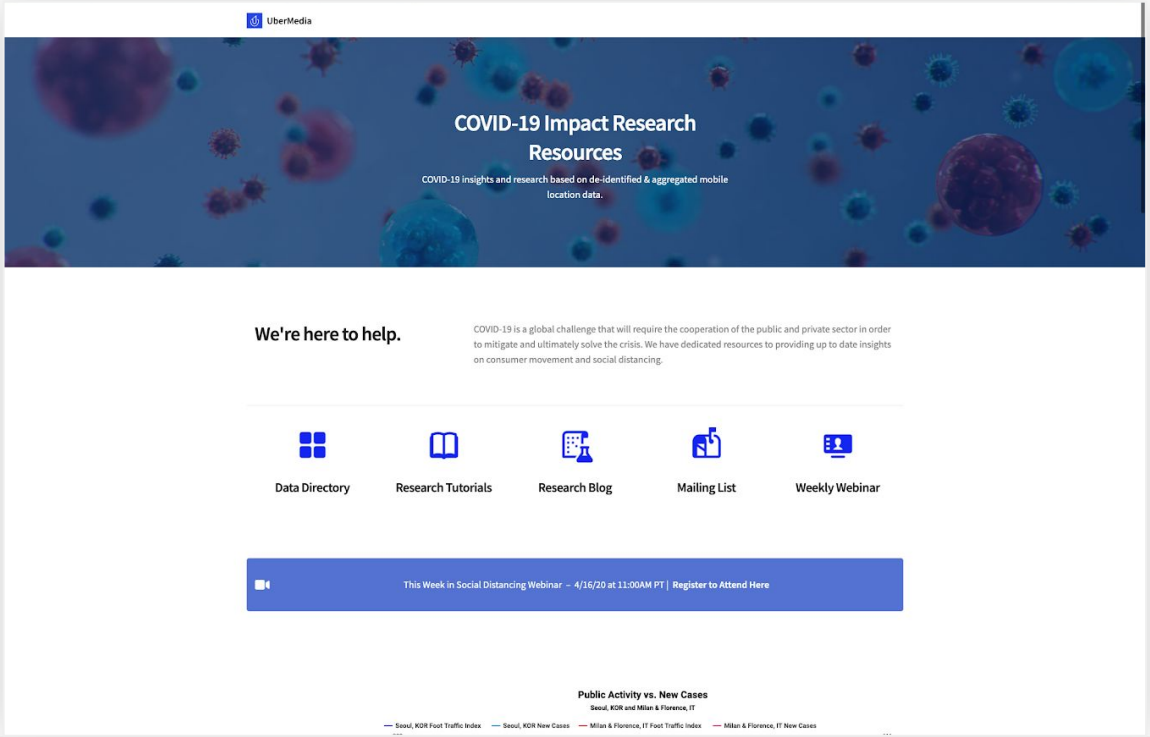
- Mailing List
- Webinars



Our mission

Regarding COVID-19

UberMedia is committed to deliver mobile location data sets that answer critical epidemiological, resource planning and economic questions to power crucial decision making in this challenging time.

We are committed to providing low cost data to research groups focused on containing the spread of the disease as well as to our customers whose business are also severely impacted by Covid-19.

In cases where data can be used immediately for modeling, forecasting and decision-making that can save lives in places that are hardest hit by the pandemic, we will donate our data for free to those causes.

THANK YOU

Questions and Comments?

contact@ubermedia.com

Or contact your UberMedia representative