Visualizing COVID-19 in the U.S.

An interactive choropleth map & dashboard tracking the coronavirus outbreak across U.S. counties

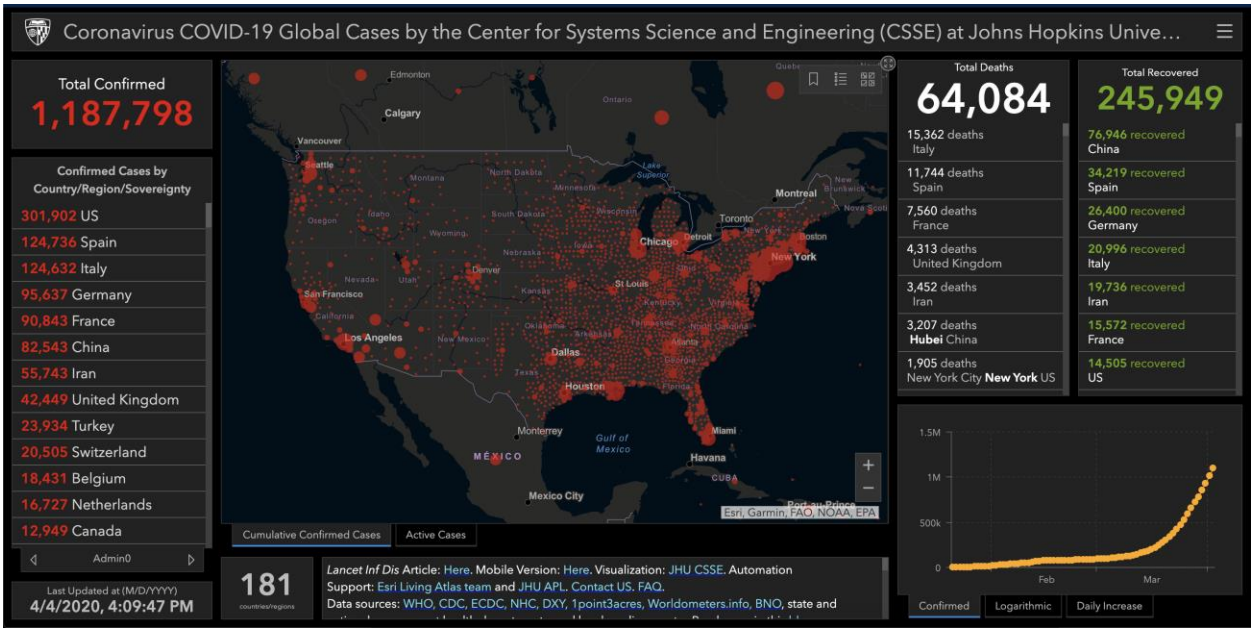
With the coronavirus (COVID-19) outbreak now a pandemic, many tools have emerged to track new confirmed cases of the virus from online digital maps to detailed dashboards. These tools are instrumental in the fight against this pandemic. They help public health officials coordinate response efforts and allow citizens to better understand the reach of the virus so that they can prepare accordingly.

While these maps are undoubtedly important, many lack the granular scale necessary to contextualize new confirmed cases of the virus' across large swaths of area. In large states such as California, seeing cases on a state-wide scale may be valuable to a national health official, but is not as helpful for state officials, local officials, or regular citizens. In addition, cases often skew towards larger urban areas due to their high population density at the expense of rural and suburban areas.

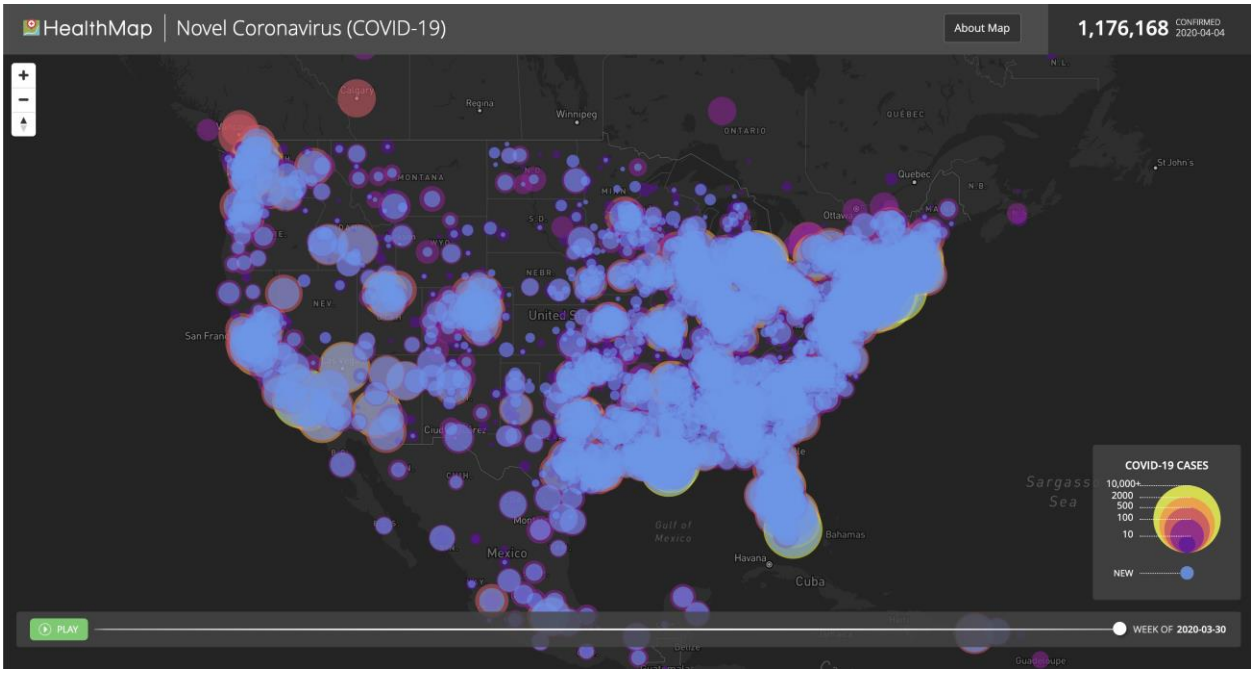
What we've aimed to do is create several interactive visualizations to contextualize all aspects of the pandemic.

1. Cumulative Map — visualizes sum cases per county
2. Per Square Mile Map—visualizes cases per square mile per county
3. Per Capita—visualizes cases per capita per 100,000 people

It should also be noted that the data undoubtedly misses many cases due to selective testing and asymptomatic individuals. These visualizations, while incomplete, are nonetheless still important in our collective effort to understand and fight this pandemic.



[Visualization from Johns Hopkins University] is overly specific and makes the data hard to grasp



Visualization from HealthMap is too broad and makes the data indecipherable

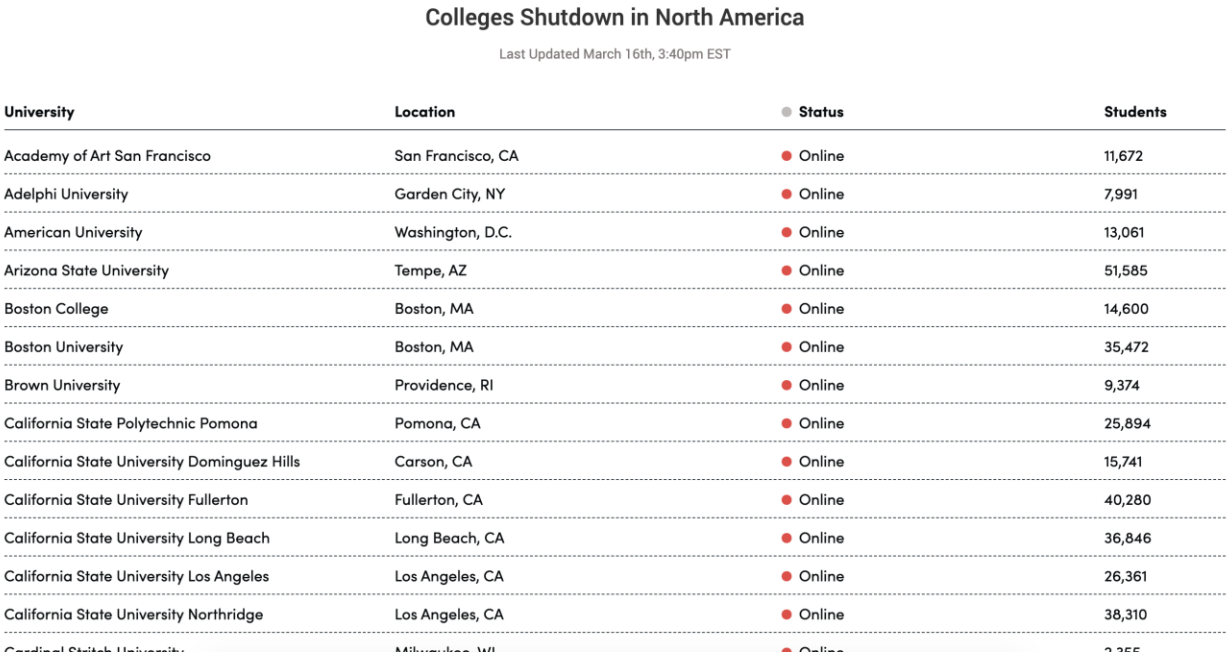
With these considerations in mind, my team and I sought to build upon these existing maps. Our aim was to create a set of visuals that better represents the outbreak at the appropriate scale for everyday citizens, as well as local health officials. **We believe a county-scale choropleth map is the best way to accurately visualize new confirmed cases of COVID-19 across the United States.**

Early Development

The team currently consists of three members from Carnegie Mellon University and New York University. If you think you could help, get in touch!

- Jason Zhu— Project & Design Lead
- Justin Chen —Development Lead
- Miranda Luong —Research & Design

Prior to initial map development, we noticed that many college students were starting to compile their own lists of higher learning institutions and events being shut down. With minimal development, we quickly built a crowd-sourced repository of institutions and events affected by the outbreak. This effort was crowdsourced by the community and became instrumental in generating interest for a more comprehensive map. For example, one Reddit post on an NYU subreddit brought in over 1000+ unique visitors and reshares on Reddit and Twitter.



Colleges Shutdown in North America

Last Updated March 16th, 3:40pm EST

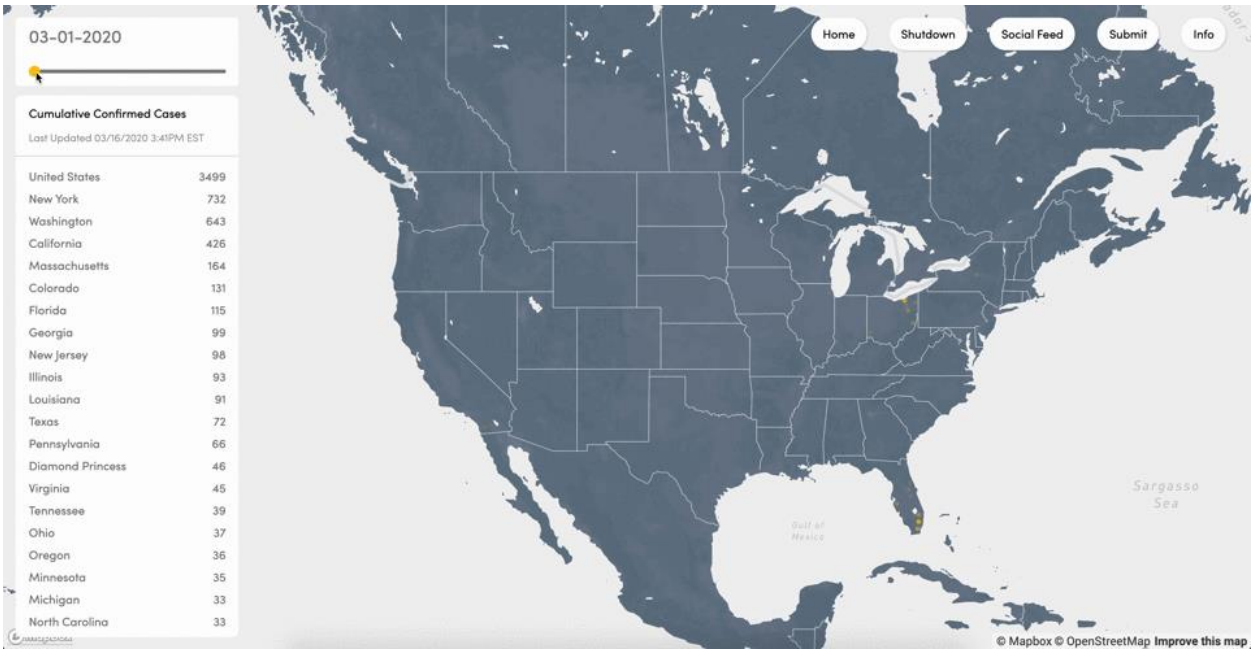
University	Location	Status	Students
Academy of Art San Francisco	San Francisco, CA	Online	11,672
Adelphi University	Garden City, NY	Online	7,991
American University	Washington, D.C.	Online	13,061
Arizona State University	Tempe, AZ	Online	51,585
Boston College	Boston, MA	Online	14,600
Boston University	Boston, MA	Online	35,472
Brown University	Providence, RI	Online	9,374
California State Polytechnic Pomona	Pomona, CA	Online	25,894
California State University Dominguez Hills	Carson, CA	Online	15,741
California State University Fullerton	Fullerton, CA	Online	40,280
California State University Long Beach	Long Beach, CA	Online	36,846
California State University Los Angeles	Los Angeles, CA	Online	26,361
California State University Northridge	Los Angeles, CA	Online	38,310

An initial list of universities that have gone online as of March 16th.

Initial Cumulative Map Visualization

Using Mapbox GL JS and a public data set, we developed a map of the United States that displayed confirmed cases— similar to the HealthMap visualization referenced above. We then moved to chart each coordinate to its relevant counties. We felt this was an appropriate amount of granularity — useful for all levels of government and for the everyday citizen. To not dismiss the importance of seeing state-by-state numbers, we also pulled U.S. state data to display on the left.

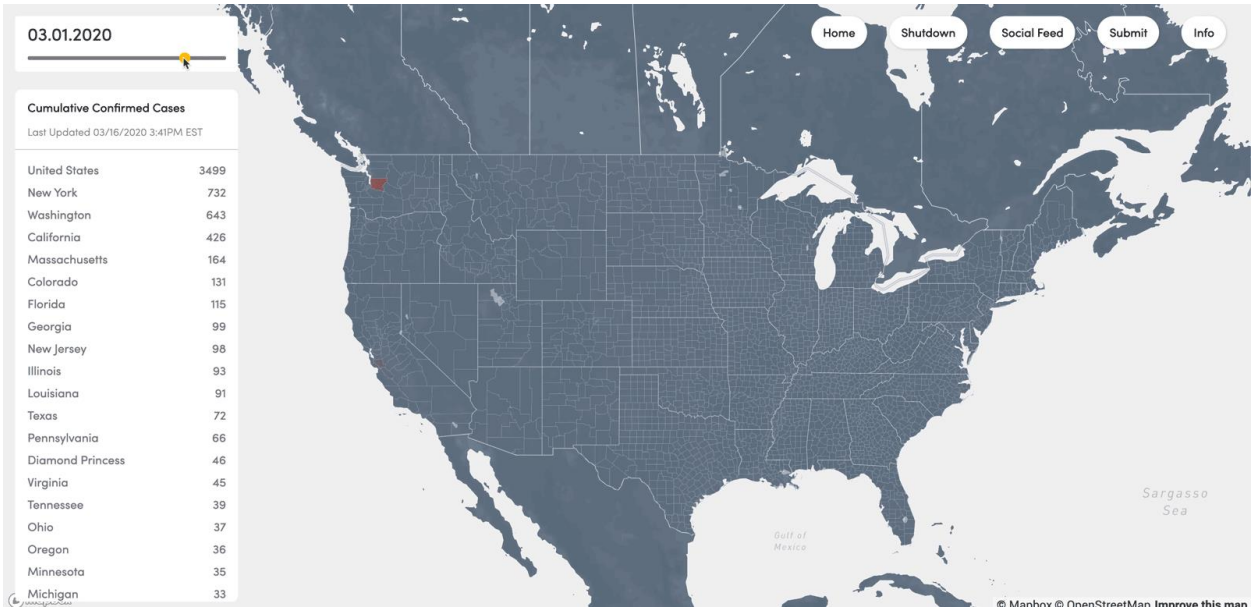
Taking a publicly available GeoJSON boundary file of the U.S. counties, we use Node.js to add properties to each county, noting the number of confirmed cases for each date. This data is sourced from a UW GitHub repository, that outlines each case, date of confirmation and coordinates.

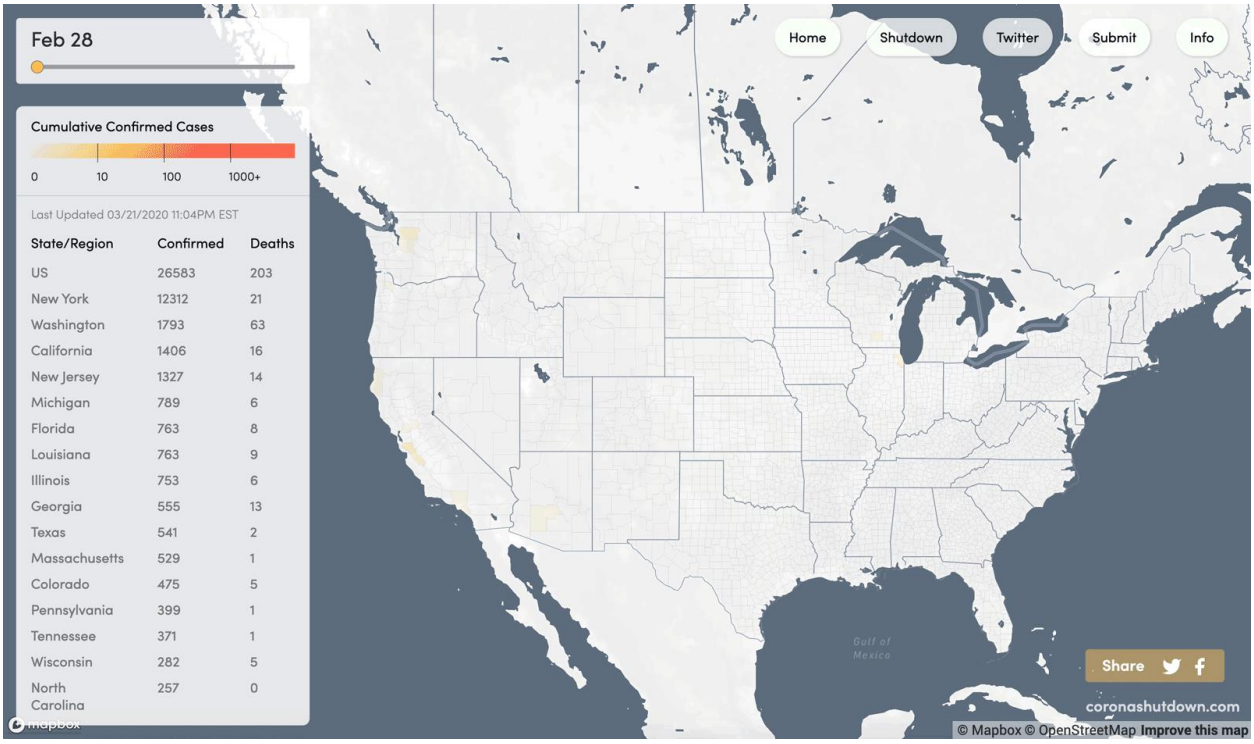


An initial version of our data visualization

In one more day, we were able to create a choropleth map that mapped each confirmed case coordinate with its relevant county. While rudimentary, this was the first effort that we know of that has successfully mapped U.S. coronavirus cases on a county level. We believe this has not been previously done due to difficulty in finding the necessary data.

One drawback of the map is that it can misrepresent how COVID-19 is spreading and growing across the United States. With testing capabilities in the United States just beginning to ramp up, this is an inevitable consequence of visualizing data over time.

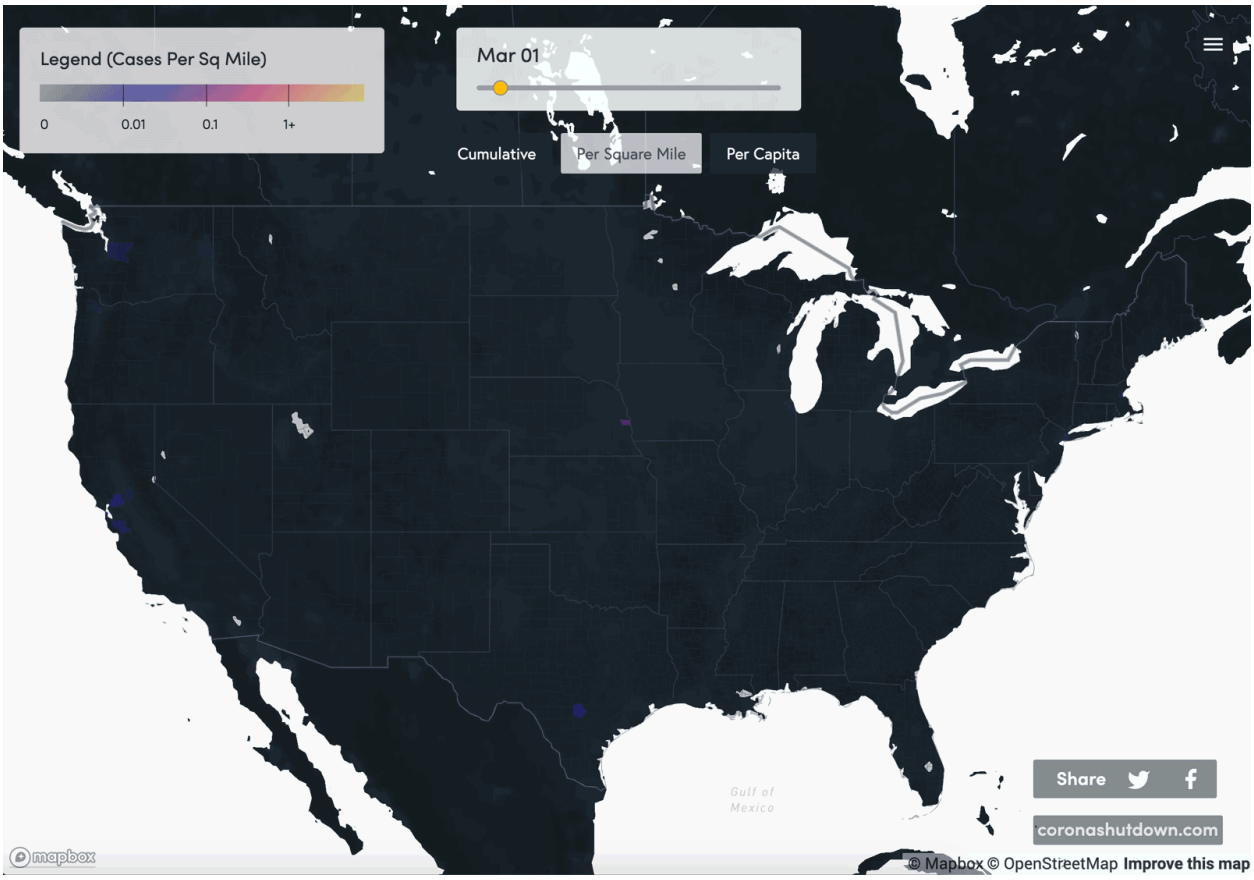




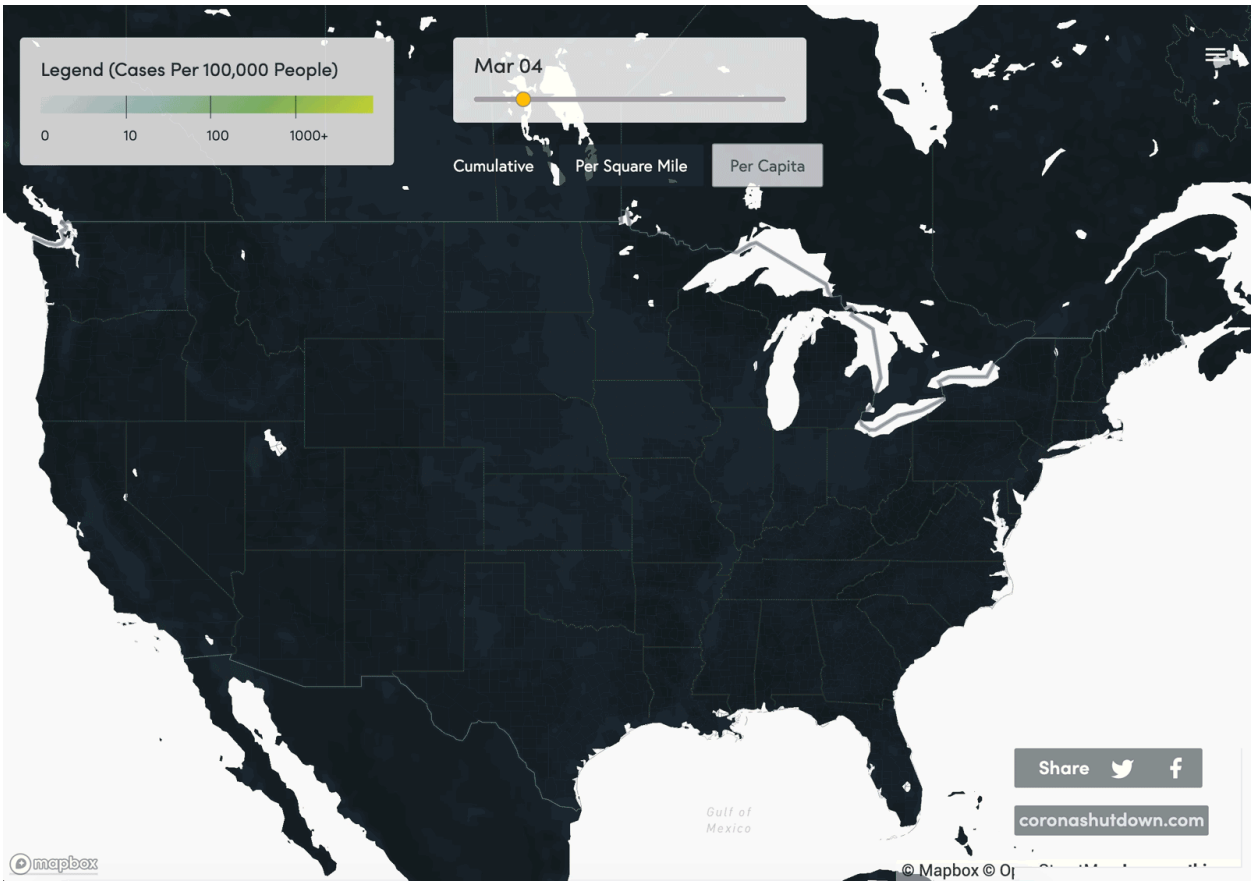
From right to left: three iterations of our cumulative choropleth map.

Per Square Mile & Per Capita Map Visualizations

With the initial map launched, we then set out to address some of the issues that a cumulative chloropleth map presents. A cumulative map, for one, can be miss how COVID-19 is impacting rural areas because it favors places with easy access to testing and high populations.



Per Square Mile Map



Per 100,000 People Map

While the work is still ongoing, we'd invite you to see our visualization at coronashutdown.com.