After the holiday season in December 2019, air traffic volume rebounded to average levels throughout the country. Although the news of coronavirus reached Americans in early 2020, air traffic volume was not terribly impacted. In fact, the monthly changes in air passengers throughout domestic routes from January and February varied throughout the country, with travel decreasing from the end of the holiday season in January. However, March and April saw heavy hits in air traffic due to the nation-wide shutdown of businesses, schools, etc. However, May and June saw immediate recovery in most places as restrictions were slightly loosened in certain areas of the country. The opening of the country was attributed to shutdown weariness and anxiousness to spend time outside with summer beginning.

The graphs above show the month-to-month change in passenger traffic along domestic routes throughout the continental United States. Maps are separated by the distances of the routes for the readability of the viewer but also to observe whether routes of different lengths were affected the same by the pandemic. Shorter flights may be viewed as safer since passengers do not spend as much time isolated in a cylindrical contained. In addition, long-distance flights are often taken by business passengers thus the changes in passenger traffic along these of flights may be correlated with the decline in employment seen in the U.S. during the first quarter of 2020.

Overall, January saw a mixture of growth and decline in air traffic throughout the U.S., with the most variation found in shorter distance flights. February saw neutral growth for low-distance flights while longer-distance experienced huge declines. In March, almost all routes saw declines in passenger traffic. However, in March, there were huge declines in a large number of routes, with some routes seeing huge growth (potentially due to having experienced its losses in the previous month). May saw the recovery in air passenger volume throughout all routes, though long-distance flights seem to lag compared to the other type of routes. Finally, in June, there is heterogeneity in changes in air passengers with some routes seeing recovery and others still on a downward trajectory.

We also considered potential patterns in monthly changes in air passenger traffic across the top U.S. airport cities. To do this, networks were constructed from a correlation matrix of airport cities and their monthly change in passengers traveling through the city’s airports. Throughout all configurations of the networks, monthly changes for the majority of airports are highly correlated, regardless of geographic region. In fact, there is often a central cluster in the network which highlights how airline traffic is felt almost uniformly across all airports.

In the month of March, the nation was launched into a shutdown, effectively neutralizing all air travel. Thus, networks composed of shorter time periods involving March see a large cluster in the network reflecting the impact of the shutdown. Throughout all configurations of the networks, we also notice that high traffic airport cities are often in close proximity to one another while lower-level airport cities are often outliers with no high correlations with other cities. In fact, these lower-level airport cities are often scattered throughout the network, due to potentially being affected not only from nation-wide trends but also local effects.

In states with a large number of airport cities (e.g. California, Florida, etc.), these cities experience similar patterns to their interstate neighbors. In fact, California airport cities are often connected to each other, regardless of traffic volume level. At times, there are instances of regional patterns where assumingly short-distance air routes between airport cities may be particularly influenced by regional economic circumstances (e.g. upper Florida/lower Georgia). Although the pandemic certainly affected the monthly changes in airline passengers for airport cities, these effects are not uniform; instead, these vary across airport city traffic volume and regional patterns.