

RESEARCH BRIEF

MUNICIPAL VARIATION IN COVID-19 CASE RATES IN NEW JERSEY

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- In 2020, New Jersey experienced two distinct waves of the novel coronavirus. There were broad regional differences in the number of COVID-19 cases during these waves.
- The first wave of the pandemic, during spring 2020, largely affected northeastern New Jersey. The second wave, during late fall 2020, spread more broadly throughout the state.
- During the first wave, the peak case rate in New Jersey's southern region was relatively small and occurred weeks after the peak in other parts of the state. In contrast, during the second wave, New Jersey's southern region had case rates as high as northeastern New Jersey.
- Municipality-level data reveal patterns that are masked by the county-level data: nearby municipalities can have COVID-19 case rates that are very different from each other and from the average rates within their county. Although the number of COVID-19 cases is only a single indicator of the pandemic's effects on communities, the large variation across municipalities on this indicator supports the importance of examining variation in other indicators measuring COVID-19 impact.

I. BACKGROUND

In early 2020, as COVID-19 began spreading through New Jersey, Governor Phil Murphy issued Executive Order No. 103. This order closed many schools and businesses and implemented social distancing measures to protect the public health of the State. In the past year, New Jerseyans across all regions have experienced health and economic impacts of the global pandemic. This coming year will see efforts to mitigate the continued detrimental effects of COVID-19 through vaccination and other measures, such as economic recovery tools.

Safeguarding health, improving the economy, and promoting wellness will require decisions about how to mobilize and allocate assets across the state. Organizations are advocating for resources in their local service areas, and government and philanthropic leaders are creating programs that aim to allocate resources equitably. With the goal of providing information to aid these decisions, this brief describes the timeline of COVID-19 progression at the municipality-level across New Jersey.

II. DATA SOURCES

The figures in this brief used data from two sources. County-level data are from the [Johns Hopkins Coronavirus Github](#), which provides daily updates on the number of positive COVID-19 tests reported in each county in the United States. Municipality-level data were more difficult to obtain. In 2020, no official source released municipality data aggregated and recorded over time. However, many county health departments and other public sources report the number of confirmed COVID-19 cases in municipalities each day. On April 22, 2020, the Senator Walter Rand Institute for Public Affairs (WRI) began tracking these sources. The methods used to collect and analyze the data are described in a technical document in the publications section on [WRI's website](#). Data can be [downloaded here](#).

III. FINDINGS

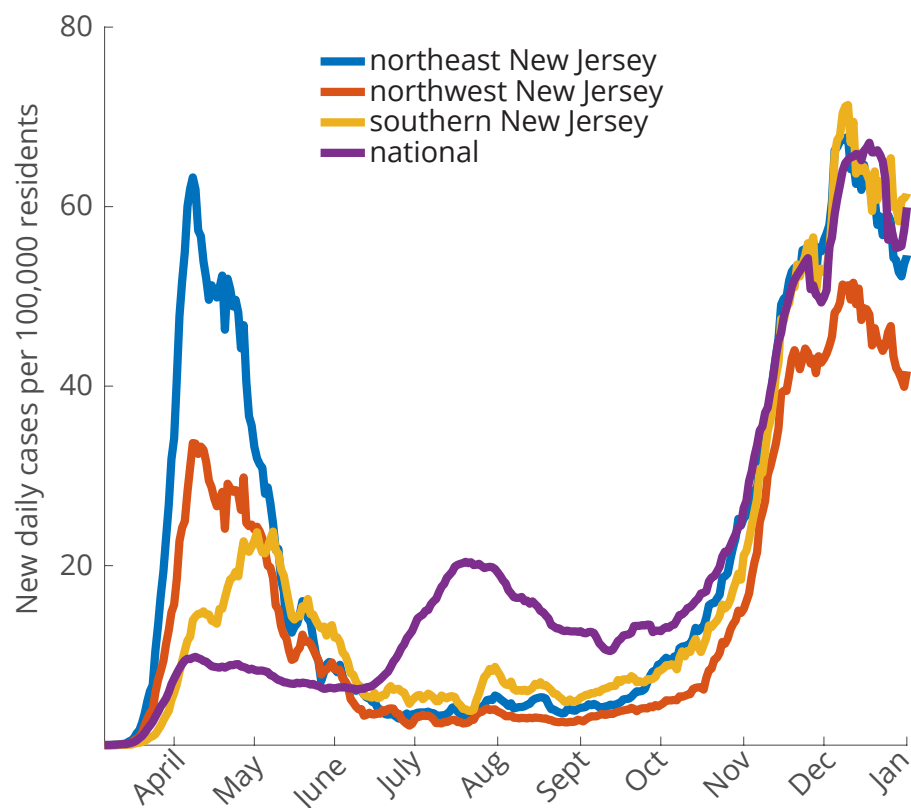
The main conclusion is that the COVID-19 case rates (number of cases, adjusted for population) vary throughout New Jersey—both across geographic areas and over time. The two waves of the pandemic, in spring of 2020 and late fall 2020, show clear regional patterns. Municipality-level data during the first wave demonstrate that COVID-19 case rates were largely predicted by proximity to New York City and Philadelphia. In contrast, municipality-level data during the second wave show that cases spread more broadly across the state. During the first wave, the peak case rate in southern New Jersey was relatively small and occurred weeks after the peak in other parts of the state. In contrast, during the second wave, southern New Jersey as a region had case rates as high as northeastern New Jersey. **Significantly, in both waves, municipality maps reveal important patterns that are masked by county-level maps.** Taken together, these results suggest that municipality-level data at distinct time points, in spring 2020 and fall 2020, rather than total numbers of cumulative cases at the county-level, provide important guidance to those advocating for and making decisions about resource allocation at the local and county levels.

A. FIRST WAVE VS. SECOND WAVE: REGIONAL EFFECTS

The United States as a whole (purple line, Figure 1) experienced three pandemic waves in 2020. Nationally, the first wave peaked in early April and then slowly declined. The second wave began in June and peaked in mid-July. The third wave began in mid-October and peaked in December. In contrast to the country, New Jersey experienced two pandemic waves, one in the spring of 2020 and one in late fall of 2020. We defined the first wave in New Jersey as the total number of cases per 100,000 population in each municipality until April 27, 2020, and the second wave as the total number of cases per 100,000 population between June 30, 2020 and December 13, 2020. Interestingly, the two waves differed in how they affected regions of New Jersey. During the first wave, northern New Jersey had far higher case rates than counties in southern New Jersey. Counties in the northeast part of New Jersey, nearest to New York (blue line), had the earliest and highest peak. Counties in the northwest part of the state (red line), had a slightly delayed and smaller peak. And counties in southern New Jersey had the latest, smallest peak (yellow line). With the goal of understanding the regional effects more clearly, the next two sections examine case rates in municipalities for each wave.

FIGURE 1. New daily cases

The United States as a whole (purple line) experienced three pandemic waves in 2020. Nationally, the first wave peaked in early April and then slowly declined.



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B. FIRST WAVE: MUNICIPALITY VS. COUNTY

The maps of the first wave at the county (Figure 2) and municipality (Figure 3) levels replicate the broad geographic differences first shown in Figure 1. In these maps, darker shades of red indicate higher case rates. The first wave of the pandemic affected northeastern New Jersey far more than northwest and southern New Jersey. The dark red areas on the map in Figures 2 and 3 are almost exclusively located near New York City. Of the 100 municipalities with the highest first wave COVID-cases, 87 were in the northeast region, 11 were in the northwest region, and two were in the southern region. This is likely because of the geographic proximity of these municipalities to New York City, which was the epicenter of COVID-19 in the U.S.

The municipality map also reveals regional differences in case rates within counties. For example, the eastern parts of Bergen, Passaic, Hudson, Union, Essex, Middlesex and Monmouth counties had higher case rates than the western parts of the counties. The speckled light and dark patterns across the state are another example of the nuance of case rates. In some areas, there is a sprinkling of lighter municipalities embedded within otherwise red counties. In other areas, darker red municipalities are sprinkled within otherwise lighter counties. For example, Hoboken, NJ, in Hudson County, exemplified the lighter sprinkle in a redder county. Case rates in Hoboken on April 27, 2020, were 889/100K, while the adjacent municipality of Weehawken had a case rate nearly double that, at 1857/100K population, and the municipality just north of Weehawken, West New York, had case rates three times higher than Hoboken (at 3179/100K). In southern New Jersey, Willingboro, located in Burlington County, is an example of a red municipality sprinkled into a lighter county in the first wave. Willingboro had case rates of 1230/100K, which is much higher than surrounding municipalities of Delran (385/100K), Moorestown (588/100K), Mount Laurel (308/100K), Westhampton (655/100K), and Hainesport (380/100K).

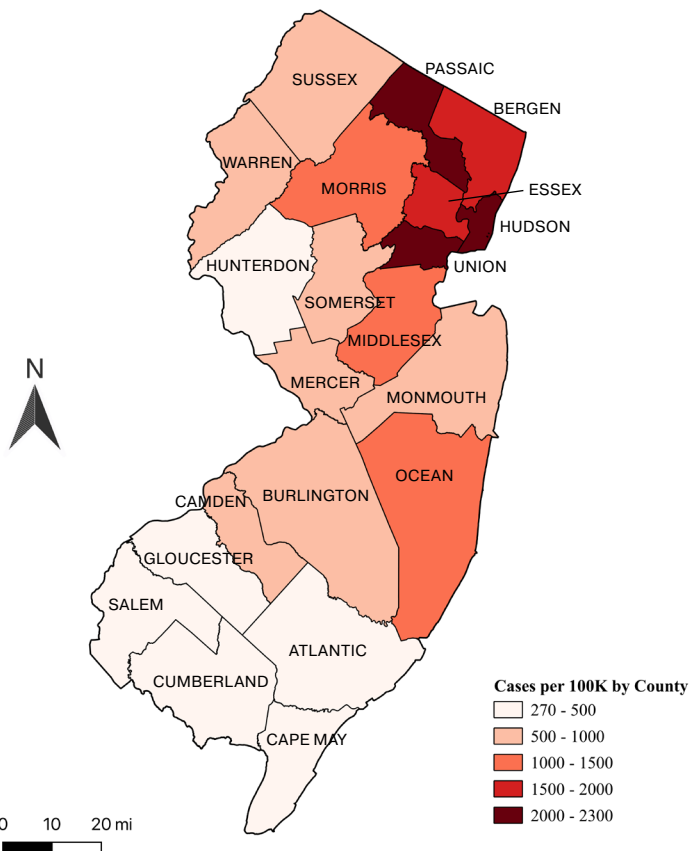


FIGURE 2. Cumulative Cases per 100K by County: April 27, 2020

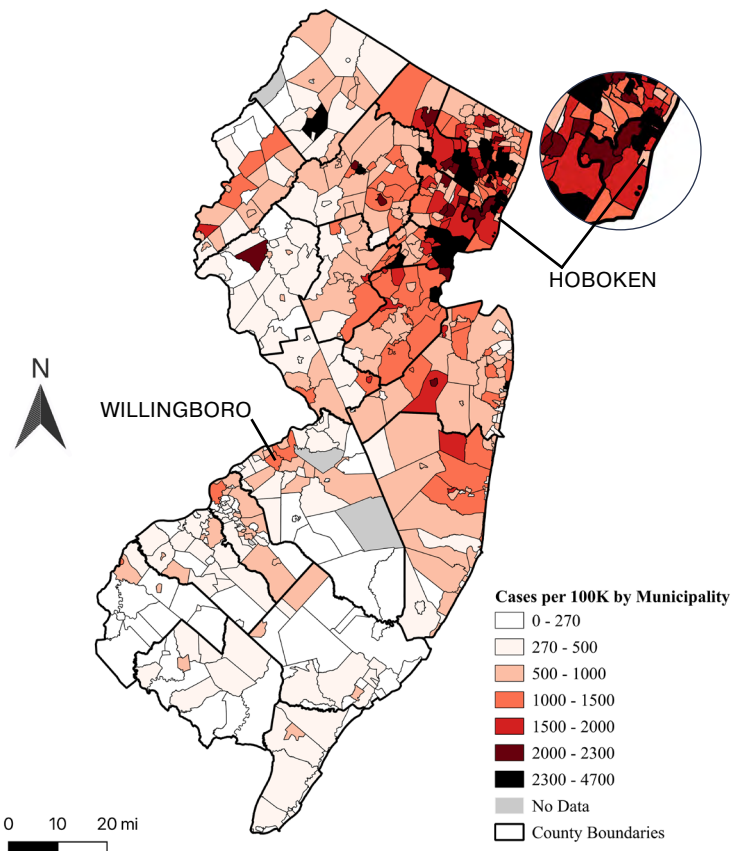


FIGURE 3. Cumulative Cases per 100K by Municipality: April 27, 2020

C. SECOND WAVE: MUNICIPALITY VS COUNTY

In contrast to the first wave, the second wave affected a much broader region of the state. The county (Figure 4) and municipality (Figure 5) maps show that instead of being clustered near New York City, the redder patches of high case rates are spread throughout the state. Visually, there appear to be at least four red clusters in New Jersey: (1) near New York City (in the eastern parts of Hudson, Essex, Passaic, Union and Monmouth Counties); (2) in Ocean County, near Lakewood; (3) near Philadelphia, in the western parts of Burlington County, Camden County, and then spreading through Gloucester County and southern Camden County; and (4) in eastern Atlantic County, near Atlantic City.

Like the first wave maps, the second wave municipality maps also have the speckled pattern hidden by the county maps. For example, Hammonton in Atlantic County had much higher case rates (4383/100K) than nearby municipalities of Folsom (2885/100K) and Mullica (1353/100K), as well as higher rates than the county as a whole (3237/100K).

Similarly, Camden City (4445/100K) and Pennsauken (4697/100K) had case rates much higher than their neighbors in Collingswood (2329/100K), Haddon Heights (1308/100K), and Haddonfield (1768/100K). In northwest New Jersey, Union Township (4808/100K), had much higher case rates than anywhere else in Hunterdon County (1755/100K).

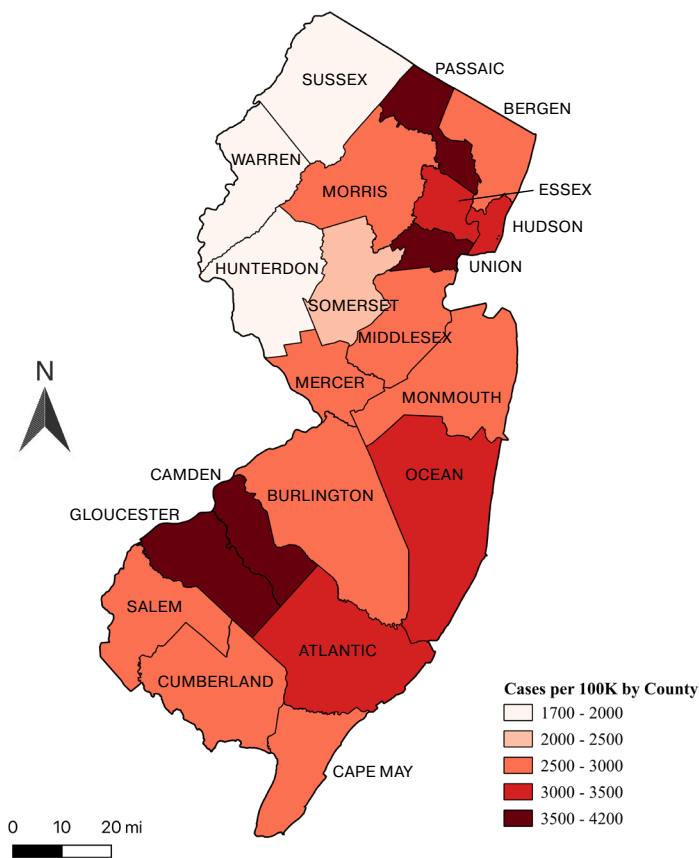


FIGURE 4. Cumulative Cases per 100K by County: June 30, 2020 - December 13, 2020 (Second Wave)

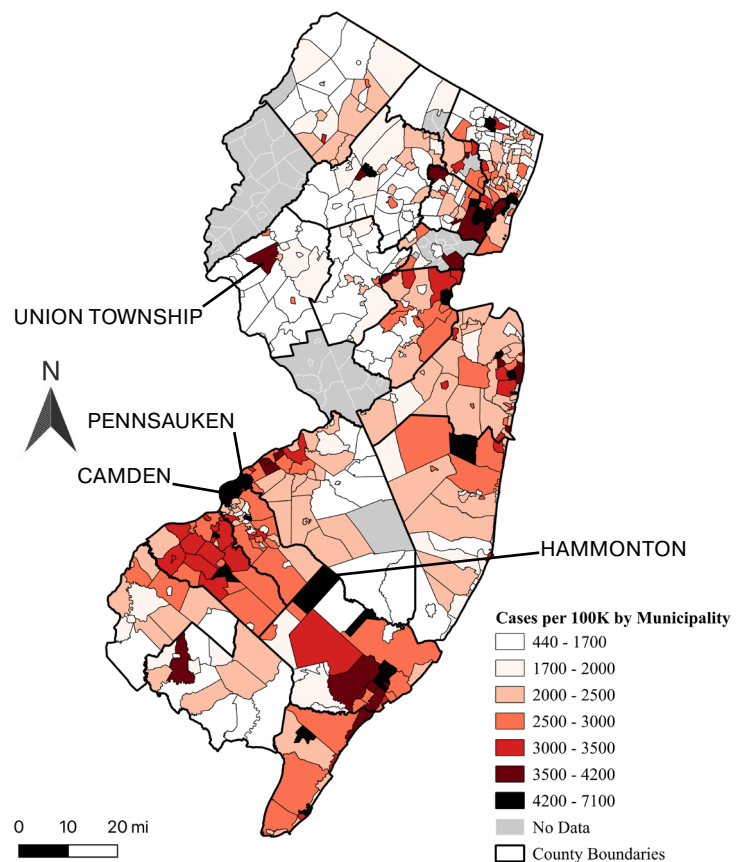


FIGURE 5. Cumulative Cases per 100K by Municipality: June 30, 2020 - December 13, 2020 (Second Wave)

II. CONCLUSIONS

The data presented in this brief clearly show that in New Jersey, there are broad regional differences in the number of COVID-19 cases during the first two waves of the pandemic. In addition, the municipality-level data reveal patterns that are masked by the county-level data: nearby municipalities can have COVID-19 case rates that are very different from each other and from the average rates within their county. Although the rate of COVID-19 cases is only one indicator of the impact that COVID-19 has had in communities, the large variation in this municipal indicator suggests the value of looking at municipal-level variation in other indicators related to COVID-19 impact. Combining economic and social indicators such as labor force participation rates and social vulnerability indices with rates of COVID-19 help inform how aid and policies can be tailored to address disparate levels of impact and community need.

This brief provides a visualization of the substantial variation in COVID-19 rates that exists across municipalities. This information can be essential to groups seeking resources to address the impacts of COVID-19 in their municipalities and regions. These data are available for download on [WRI's website](#). In addition to their potential value for research, the data also can serve as a tool for advocacy efforts around equitable distribution of resources. In addition, these data can provide insight to those seeking to make evidence-informed decisions and planning on equitable aid allocations across the state and within counties. We encourage questions and caution that to more fully understand COVID-19 impacts, these data are best used within the broader context of other municipality demographics and indicators.

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Senator Walter Rand Institute for Public Affairs (WRI) is an applied research and public service center at Rutgers University-Camden working to address issues impacting residents and communities in southern New Jersey. With two decades of experience in evaluation, public policy, and organizational development, WRI has helped organizations in the public, private, and nonprofit sectors develop partnerships and achieve optimal effectiveness. WRI aims to contribute knowledge for sound policy and practice in South Jersey through research, community engagement, and coalition building.

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