We compared estimates of available hospital beds, by county, with the likely demand for hospital beds under several virus spread scenarios. The models that generated these numbers are adaptations of the Wu et al model (2020).\(^{[i]}\) The Wu et al model was designed for China data. Our model included additional features and fit the Italian data from “Protezione Civile”.\(^{[ii]}\)

It is best to think of the numbers reported here as one set of possible outcomes given our current knowledge about the disease. As more time passes, more people will be tested, and we will have more data to make model predictions more certain. For example, the predicted shortfalls will be less if we learn that fewer people transmit the disease before they know they are infected. Similarly, we do not know yet if warmer weather will slow the spread of COVID-19. If it does, the curve will flatten further, buying more time for social distancing efforts to impact virus spread.

Note that the main concern here is the health care system. Of those infected with COVID-19, current estimates are that 81% will not experience noticeable symptoms or mild ones. The expected hospitalization rate of those with symptoms is about 40-55%. Under even the worst case scenario, the majority of South Jerseyans will not experience symptoms from COVID-19. This report does not lead us, and should not lead anyone, to panic. To the contrary, the report points to our ability to minimize COVID-19 risk by implementing social distancing policies and practices. We also hope that this report will help the state and health care systems as they plan to address the region’s health needs.

For each county, we show:
- The number of available hospital beds.
- When we will hit peak hospital bed demand under three scenarios: 1) MINIMAL social distancing policies and practices, MODERATE social distancing policies and practices, and STRONG social distancing policies and practices to curb the spread of COVID-19.
- How much demand for hospital beds will exceed capacity under each of the three scenarios.
- The effect of social distancing practices is modeled as a change in R0. Unfortunately the disease is too new to confidently give specifics about how a particular set of policies will change the curves.
- We can say with certainty that more social distancing curbs the spread of COVID-19.
- The majority of South Jerseyans will not experience symptoms from COVID-19. Essential assets such as grocery stores, pharmacies and medical centers will almost certainly remain open and functioning.
To many people, these numbers may seem unexpectedly high. After all, the entire country of Italy had only about 21,000 cases as of March 14, 2020, and we predict a bed shortfall of at least that in South Jersey. To understand why, look at the curves on one of the county graphs. Several days ago, Italy crossed the black line where need for bed exceeds capacity. But on all the curves, the modeling suggests that there are still weeks to go before reaching the peak of the outbreak.

We also note that COVID-19 is different in several ways from the seasonal influenza. First, many people have some immunity to seasonal influenza because of vaccines or previous exposure, and current estimates suggest that no one is immune to COVID-19. Second, the coronavirus that causes COVID-19 is more contagious than the flu. Third, the current model estimates that many infected people do not show severe enough symptoms to get tested and thus may infect others. Fourth, COVID-19 seems to have higher rates of hospitalization and mortality than most seasonal influenza.

Social Distancing Policies and Practices
The term “social distancing” describes infection control actions taken by public health offices and others to stop or slow the spread of a contagious disease. Social distancing practices can prevent COVID-19’s spread from overwhelming health care systems. Across the globe, various levels of social distancing policies and practices have been implemented to delay and reduce the outbreak of COVID-19.
** Beds in each county are taken from the New Jersey Department of Health website on March 13, 2020. The number includes beds reported in profiles of General Acute Care and care-providing Special Hospital facilities.

### Estimated Bed Demand Over Time, Atlantic County

- **Total population = 265,429**

### Estimated Bed Demand Over Time, Burlington County

- **Total population = 445,384**

### Estimated Bed Demand Over Time, Camden County

- **Total population = 507,078**

### Estimated Bed Demand Over Time, Cape May County

- **Total population = 92,560**

Due to the use of multiple models, there are small differences between the figures in the county graphs and the summary figure above.
REGIONAL HEALTH SYSTEM SHORTFALLS WITH A NOVEL COVID-19 MODEL

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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