**C-SPEC estimates of COVID-19 disease in New York City, March 24, 2020**

The COVID-19 Statistics, Policy and Epidemiology Collective developed a dynamic transmission model that tracks the possible paths of COVID-19 infection though a given population which depends on the estimated rates of infection and detection. Using data provided on 3/21, we fit the model to the cumulative detected COVID-19 cases in New York City.

We estimate the current rate of infection (R0) in New York City to be between 2.2 and 3.2, and we provide projections for 3 different estimates of R0 (See Appendix 1, Model Fits), with some caveats:

* This estimate was fit to 4 days of detected cases. If New York City is able to up testing capacity, we may be able to include more data points and shrink the uncertainty around our estimate.
* If social distancing efforts are implemented, R0 may decrease

We modeled the impact of social distancing under various scenarios consistent with the current case trajectory projected out to the end of April (6 weeks after the implementation of social distancing directives in NYC).

With the current rate of infection, and without social distancing measures, cumulative cases could hit 2 million in the most optimistic scenario, and top 8 million in the most pessimistic. In the plots below, day 1 is February 29, 2020

**R0 = 2.2**



**R0 = 2.8**

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**R0 = 3.2**



With social distancing implemented at day 15 (March 14, 2020), cumulative cases and hence hospitalizations will be reduced significantly. The figures below show the range of percentage reduction in cumulative cases at day 50 for each R0 scenario. Cases will drop between 20% and 65%



These measures will also increase the amount of time before hospitals are at capacity. Using the rough estimate of **53,000 hospital beds** in New York City from this article https://www.npr.org/sections/coronavirus-live-updates/2020/03/23/820150795/cuomo-orders-all-hospitals-to-add-beds-as-new-york-confirms-20-000-coronavirus-c, social distancing measures can buy between 2 and 12 days to increase hospital capacity. Without social distancing, we estimate that hospital capacity will be exceeded between 28 and 51 days after day 1 of our trajectory, or between March 27 and April 20, 2020.



Appendix 1, Model Fits

Fit of R0 values 2.2, 2.8, 3.2



Appendix 2:

Figures for 50% Social Distancing Intervention

**Reduction in Cumulative Cases**



**Extra days before reaching hospital capacity**



