

Neuberger Berman Equity Research Team

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COVID-19 Update: Spring has arrived and I am feeling a bit more optimistic, but with a healthy dose of caution. We believe today's positives outweigh the negatives. With the number of US cases increasing by ~4,000 per day for the past few days, we think we are now in the middle innings of the inflection resulting from increased testing. Supportive of this notion was today's updated US testing numbers which have reached >195,000 and now includes the CDC, the 91 public health labs across 50 states, DC and the 5 territories, as well as the clinical reference labs Labcorp, Quest, Bioreference, Sonic and the Mayo Clinic. Importantly, the fatality rate is 1.2% across the US and the infection rate stands at 11.2%.

We believe it is time to take a step back, and allow the increases in cases, hospitalizations, recovery and unfortunately deaths to be reported off of a larger "n", which should give us a better picture in the coming days now that testing is approaching >10,000 tests per day in the US.

I am going to start today's update with where I concluded on Thursday:

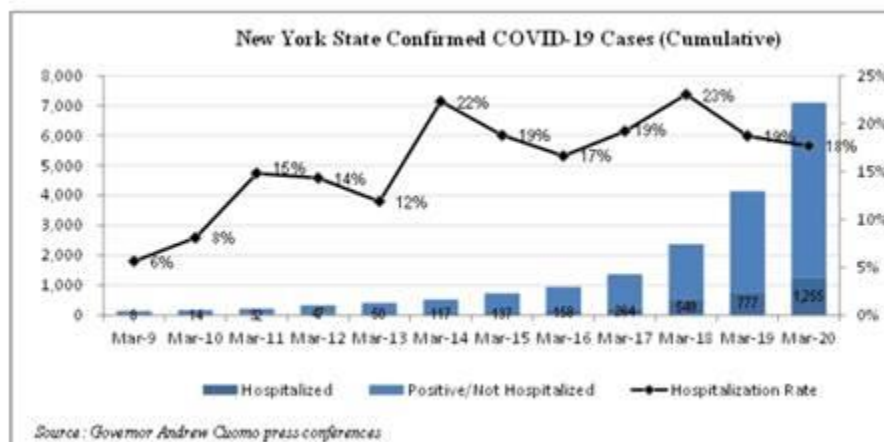
In summary, we are firm believers in the actions taken to date, are encouraged by increased testing and faster turnaround times, are still monitoring the impact to our hospitals and healthcare system in general, and cautiously optimistic regarding eventual therapies, especially Chloroquine as a bridge to a vaccine.

Actions such as work from home, social distancing (closure of bar, gyms, restaurants etc.), school closures (public & private):

We have put together a spreadsheet which tracks NYC confirmed cases, changes day/day, hospitalizations and deaths (too early for recovery statistics). Early days note the following: since school closures were announced and WFH/closure of gathering places, cases grew 49-53% day/day from March 17 through March 19, and then began falling over the past few days, up 30% and 24.5%, respectively. While the number of data points are small and do not make a trend, we are somewhat encouraged, and recognize the data will be noisy with week/week statistics becoming more informative going forward.

Testing: On increased testing, the >195,000 tests confirmed on the President's media briefing on March 21 supports our view that increased testing is needed in order to gain a better picture of infection rates and mortality rates. As of 5:30 PM on March 21, the fatality rates in the US, New York State and New York City were 1.2%, 0.5% and 0.6%, respectively. Additionally, today the FDA granted emergency use authorization of the Cepheid point of care test for SARS-CoV2, which is a 45-minute turnaround time test and should be available beginning at the end of next week. According to Danaher (a manufacturer of molecular systems and tests, and Cepheid's parent company), there are 23,000 installed instruments globally capable of running this test, with 5,000 of those in US hospitals and a concentration in the VA system.

Hospitalizations; a picture is worth a thousand words: The chart below is from ISI (they have been doing great work and have helped us during this crisis) and notably, today's updated number is below the 19% from yesterday at 15.4%, still too high in our view, but trending in the right direction. We caution the numbers are not high enough yet to formally call a trend.



Source: ISI, Cuomo's press conferences

Update on Chloroquine: There is a paper describing the treatment effects of Chloroquine in 100 Chinese COVID-19 patients that appears promising, but unfortunately has no reported data/numbers of viral load drop, improvement in pneumonia, etc. Additionally, comments made by President Trump regarding 10,000 units of Chloroquine being used in New York City by healthcare workers is interesting and supportive of commentary from friends on the front lines at various New York City hospitals. Physicians are either given Chloroquine and told to take 400mg per day prophylactically, or told to self-prescribe a 14 day supply of 200mg tablets taken BID (2x per day) as precautionary supply should they need it.

Regarding supply: Provided a “dose” is a 200mg tablet, we believe that 189M doses could treat ~6.7M people

- Teva has committed to the distribution of 6M doses to US hospitals by March 31
- Sandoz has donated 130M doses as part of their \$20M COVID-19 Fund
- Bayer has donated 3M tablets to the US
- Mylan has committed to 50M tablets by mid-April, which they claim will treat >1.5M people

Negatives from today’s update:

- 15.4% of COVID-19 patients are hospitalized in New York State
- Governor Cuomo’s estimate that ~11M will be infected seems overly dire to us
- 54% of cases in New York State are between 18-49 years old, a different profile than published statistics globally early on in the pandemic, and may force us to rethink our view on the impact to the healthcare system should a large percentage of these patients require intense medical treatment

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For more information on COVID-19, please refer to the Center for Disease Control and Prevention at [cdc.gov](https://www.cdc.gov)

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