

For my daughters:

June 15, 2020

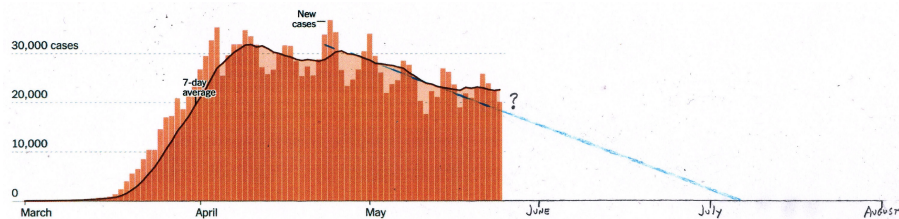
## The Coronavirus Pandemic

### *Summertime, But the Livin Ain't Easy*

When last I wrote it was Memorial Day and the country was reopening for business. The now-famous party at Lake of the Ozarks that day was an extreme example, but in many states social distancing was relaxing.



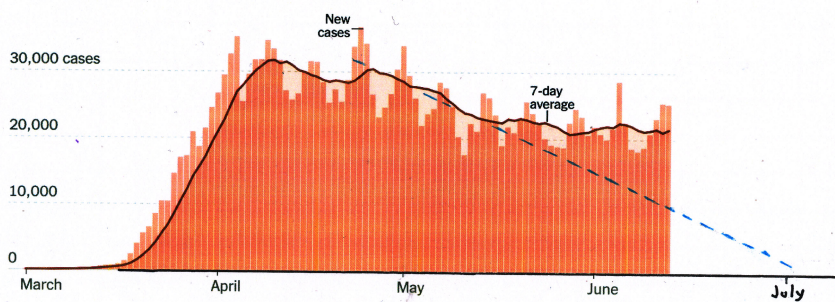
If you recall, on Memorial Day the number of daily new cases had been slowly falling for over a month, and my “line drawing” extrapolation had pointed to early July as a possible end point for the pandemic, with daily numbers falling below 1,000. But in the graph I presented



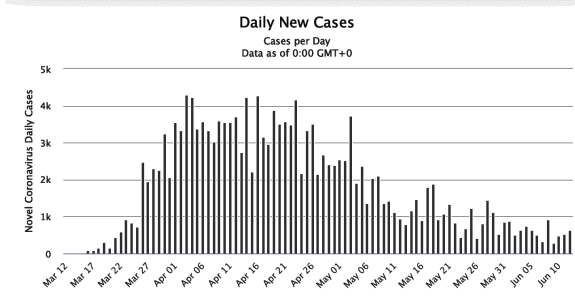
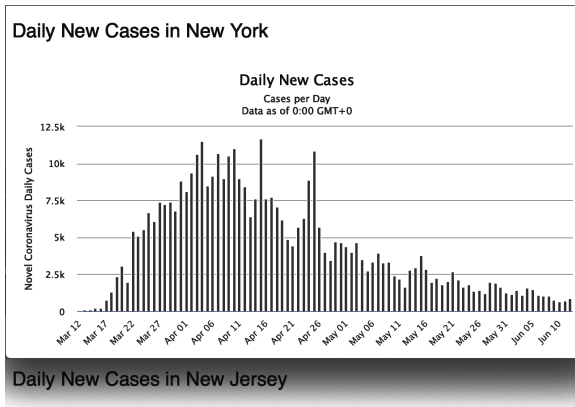
there was a worry-some tick upward in the last week. I marked the tick with a question mark, worrying that as people-to-people contacts increased nationwide, we might see not an early July end to the pandemic but rather an extended plateau of daily new cases.

So what happened? As you can see, the number of daily new cases of COVID-19 abruptly stopped falling. The “tick up” became the steady unchanging rate of the pandemic. We are seeing an average of 20,000 cases a day, week in and week out – the plateau I feared.

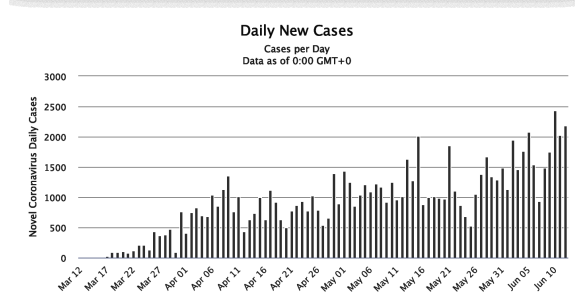
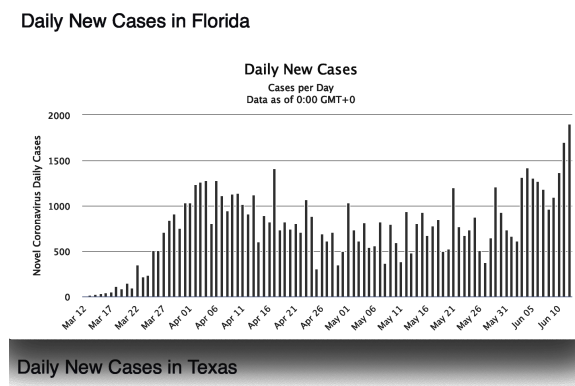
**New reported cases by day in the United States**



Not every state took part in the pandemic-promoting party. New York and New Jersey, for example, have relaxed restrictions only very gradually, and their daily number of new cases has fallen nicely. New York fell below 2,000 and New Jersey below 1,000 around May 9.



The states that opened wide, like Florida and Texas, did not have the same happy outcome. Their daily new caseload shot up, not down, and are now higher than they have ever been:



### States Doing the Worst

Over the three weeks since Memorial Day, twelve states have done the least well at fighting the virus, with numbers of new cases of COVID-19 exceeding 1,800 per million people in each of them. Every one of the twelve belongs to the “open for business” group of states:

2,454	Arizona
2,266	Nebraska
2,240	Maryland
2,017	Alabama
1,981	Mississippi
1,947	Iowa
1,935	Texas
1,891	Virginia
1,826	Arkansas
1,816	Louisiana
1,805	North Carolina

Ten states had fewer than 500 new cases per million, including Maine with 499, Illinois with 467, and Missouri with 368. The best state in the Union was Montana, with 100 new cases.

I had expected that new cases of COVID-19 would be more prevalent in states with higher population densities – makes sense, right? But that did not prove to be the case. I looked up the population density of each state and madly plotted graphs vs. number of new cases, but all I got was scatter. What the data say here is very clear and unambiguous: new cases are most prevalent in states with less social distancing. There is no wiggling around this: The cost of prematurely opening our economy is the indefinite prolonging of our pandemic.

### Just When You Thought Things Couldn't Get Any Worse...

On May 25 something happened that may have a severe effect on the pandemic: A white Minneapolis policeman knelt on the neck of a black man, George Floyd, in a way that killed him, despite his protests that he could not breathe. Smart phone videos of the incident were shot by nearby people, and when they were shown on TV the country exploded. The initial protests were large but unorganized, and at night degenerated into violence in a few cities, marred by late-night looters and agitators. But the nation's anger grew, and all over the country people began to parade in protest. This is Brooklyn on June 1:



Some cities had enormous crowds. This protest march in Portland on June 2 had in excess of ten thousand demonstrators:



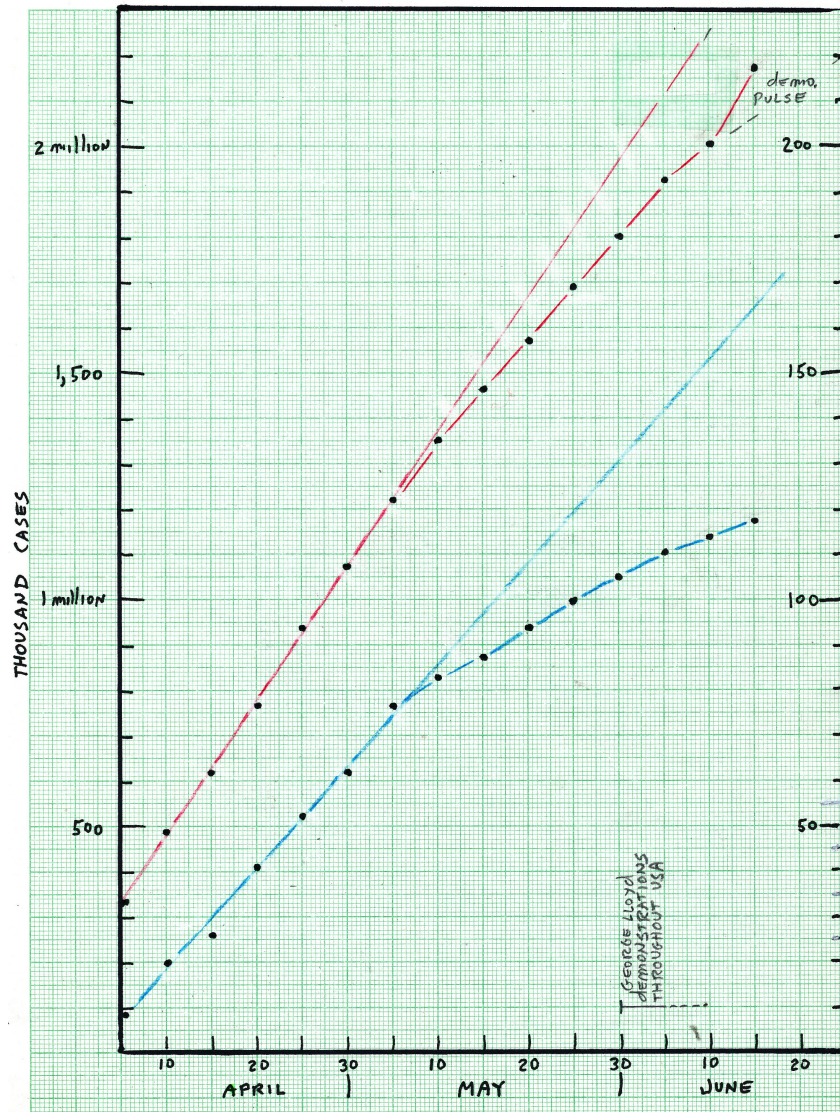
The COVID-19 problem this creates, of course, is lack of social distancing. When you look closely at the people in the crowds (UTUBE provided access to pretty much continuous coverage), three out of four are wearing face masks, but that's still a lot of people crammed near one another for quite a long time, with much shouting.



Large demonstrations like this occurred all over the country, for more than a week. Some still occur as I write this. It would not be easy to imagine a more COVID-dangerous series of events.

## The Demonstration Pulse

So, has all this mass demonstration had an impact on the pandemic? To see, we can update our graph of # cases and # deaths. You will recall from three weeks ago that the points on this graph had been right on a straight line throughout April, only to leave the line to the right in early May. It seemed to be a seasonal effect, infection and death both falling to a lower rate. As you can see below, the seasonal effect has continued to pull the lines to the right, establishing a new lower but constant rate.

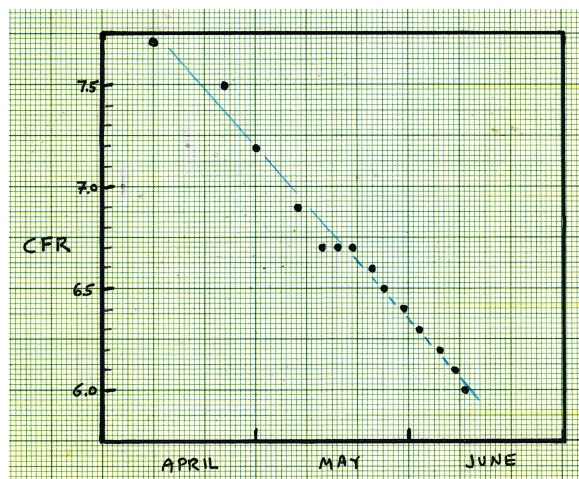


Now look closely. Two weeks after the demonstrations, the number of cases jumps up from this new red line. A "demonstration pulse" if you will, the number of cases on June 15 is more than a hundred thousand more than it should have been. The # deaths does not yet show this pulse; it would be expected to lag behind the # cases by 1-2 weeks. We won't know for a few weeks the full size of the pulse in COVID-19 cases, but we should not be surprised if it is even more substantial.

## A Changing CFR

You might have noticed in the graph we just examined that the death rate (blue line) seems to be behaving differently than the case rate (red line). It is. This reflects a change that has been occurring since early May in how many people are dying. To get a sense of the mortality of COVID-19 – how often an infection will lead to death – you'd think you could just divide the number of deaths by the number of cases. The problem with this straightforward approach is that the newly-reported cases are not resolved yet. Some will die and others won't, and you don't know which. You need to correct the case number to eliminate these guys, and there is an easy way to do it. The CDC estimates the average time from admission to death of COVID-19 is seven days, so divide the total number of deaths that have occurred by a particular date by the number of cases reported 7 days earlier. A rough sort of mortality estimate, the number you get is called the Case Fatality Rate (CFR).

Unreported cases have the effect of inflating the CFR (they decrease the denominator in the calculation), so as we get better at reporting cases, we might expect CFR values to fall. The number of Coronavirus tests have tripled since mid-April. CFR values would also be expected to fall if the virus became seasonally less virulent. Both of these factors are probably contributing to the decrease we are seeing in COVID-19 CFR values, which is what makes the blue "death" line curve more to the right than the red "case" line. Here is a look at how COVID-19 CFR values have been changing this Spring:



## So We Wait

There were 7.3 million global cases reported today, and it doesn't seem that things are going to get better soon. The virus is not "*reduced to just the embers and ashes of a spent pandemic,*" as our president has claimed. To the contrary, in the United States we are gaining an average of twenty thousand new cases each and every day, and this steady progression is likely to continue unabated through the summer. Later in the fall the COVID-19 caseload is likely to increase. Vaccine in the Spring.

In the meantime, thank each of you for your warm birthday wishes as I passed 78 on June 11. With luck and care, we will have many more years to enjoy life, and love each other.

Dad