

For my daughters:

July 7, 2020

The Coronavirus Pandemic

Here We Go Again

In the three weeks since last I wrote you, the coronavirus pandemic has not abated with summer weather. The gently declining plateau of daily new COVID-19 seen for the last few months has over these three weeks exploded in a massive surge of new infections. Today, as I write this, the total number of coronavirus cases in the United States has shot up to over 3 million.

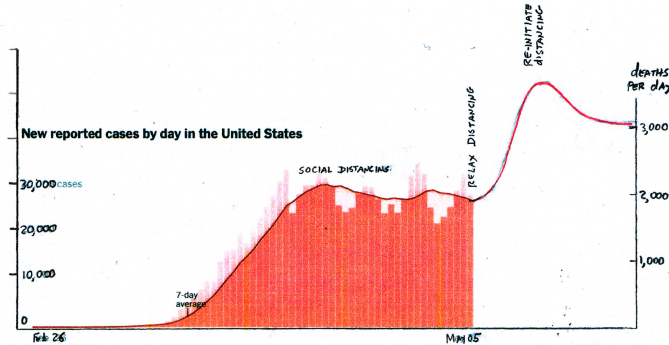
Pence and Fauci

To our political leaders it wasn't at all obvious in early June that things would explode in this way. Vice-president Pence wrote in an Op Ed the day after my last letter that the Trump administration's "*approach has been a success,*" and that "*we've slowed the spread...*" Ten days later, in a televised public meeting of the Coronavirus Task Force, Pence cheered on the efforts of states that were in the process of "*safely and responsibly*" reopening, pointing to improvements in sales. Standing next to Pence was Fauci, unlike Pence wearing a mask. His expression tells a different story. The COVID-19 infection numbers had already started to climb at an alarming rate, and Fauci without commenting on Pence's rosy view pleaded for every American to wear face masks around other people. Four days later Fauci spoke more bluntly: Testifying to the Senate, he said that he "*would not be surprised if we go up to 100,000 a day if this does not turn around.*"



What Happened?

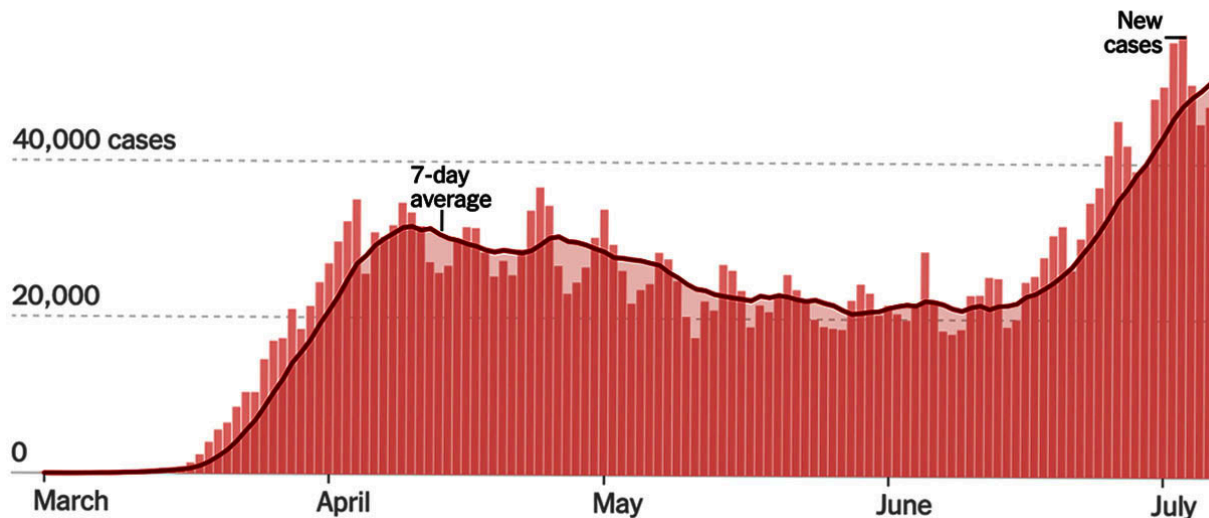
Why are infection rates now exploding? To answer this question, go back two months to early May, when the White House first proposed *Opening Up America Again*. This despite the fact that newly reported cases of COVID-19 had not fallen below about 20,000 per day for a month and showed no signs of doing so. In my May 6 letter to you girls I called this “Sending In the Clowns” and drew a graph of what I thought might happen:



In my graph I suggested that increased person-to-person contact in a pandemic where many of those infected show no symptoms would quickly lead to an explosion, a massive new surge of COVID-19 cases. On my graph I guessed this surge would quickly reach 50,000 new cases a day – and would stop there only if states were to re-initiate severe social distancing.

Here’s what actually happened:

New reported cases by day in the United States

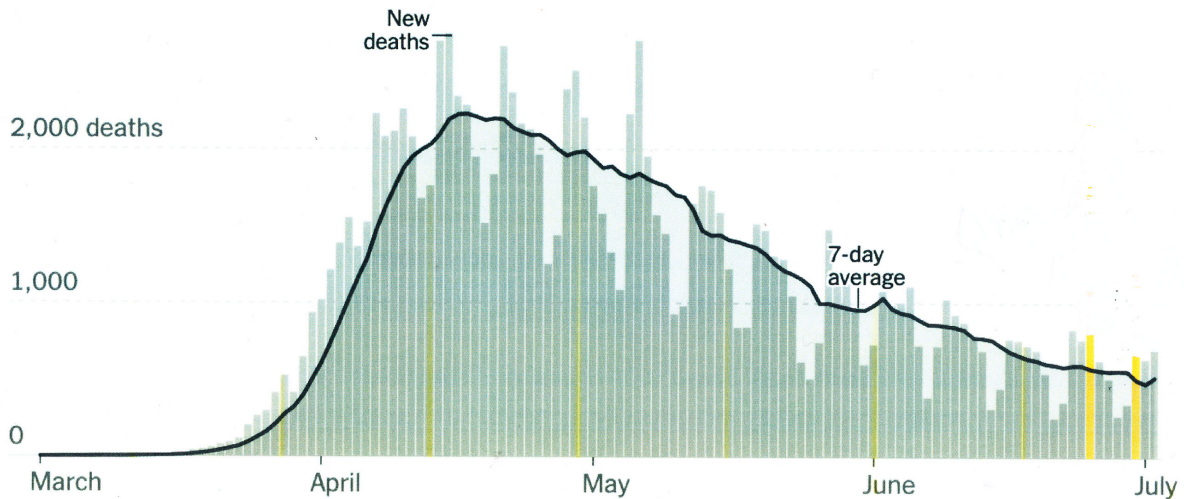


It took a month longer than I had predicted. Then, on June 15 rather than May 15, the bomb went off. The reality of what happened on June 15 matched my prediction made two months ago to a scary degree -- a massive new surge of COVID-19 infection hit the country. As I write this, daily new COVID-19 cases in the United States have reached and far passed 50,000! Unabated, we will reach 100,000 new cases a day by August, just as Fauci predicts, with total cases exceeding four million and continuing to rise.

So Why Isn't Everybody Dying?

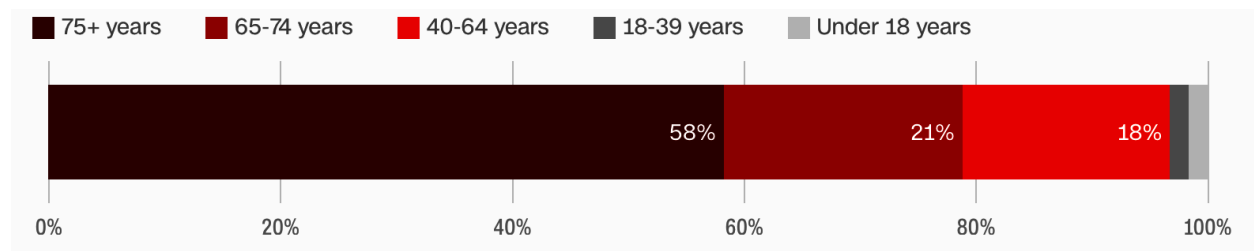
Luckily, I didn't get it all right. In my May 6 prediction I estimated that the surge of new COVID-19 infections would result in some 2,500 to 3,000 deaths a day, the extra deaths the cost of relaxing social distancing. It seemed a reasonable guess: the number of COVID-19 cases worldwide is a bit over 10 million, with 500,000 deaths, a fatality rate of 5%, and 5% of 50,000 American COVID-19 cases would be 2,500 deaths. However, that is not what has happened:

New reported deaths by day in the United States



Despite the surge of new infections, deaths have fallen, not risen! Today we are looking at less than 500 COVID-19 related deaths a day and the numbers are falling still lower.

What in the world is going on? The answer is simple, looking us right in the face. When a state opens up its bars, restaurants and beaches, who goes and mingles? Mostly twenty and thirty year old young adults. They are just as easily infected by the COVID-19 virus as older individuals, and can get just as severely ill – but are much less likely to die. According to the Centers for Disease Control and Prevention, just 3% of COVID-19 deaths occur in people under 40 years of age:



The reality is that hospitals are now better prepared to handle severe COVID-19 cases, which I do not doubt is the reason daily death numbers have been steadily declining since mid-April. The added caseload of under-40 COVID-19 patients has not countered this decline, as few of these new patients are dying, but their large numbers will soon begin to stress hospital capacity, which will increase the mortality risk of everyone sick, of whatever disease or illness.

Is the Virus Changing?

Is it possible that the virus is changing to be less fatal? While this virus does make mistakes (“mutations”) while copying itself inside human cells, and so could in theory evolve to a less dangerous form, that is not what is happening. Scientists have been determining the genome sequence of COVID-19 from infected individuals since early in January. Very few mutations have occurred, far fewer than would be expected for flu. Only one has become widespread, a change in the spike protein of COVID-19. The new variant switches one amino acid – number 614 – from “D” (shorthand for aspartic acid) to “G” (short for glycine). This is not a trivial change, as it removes an electric charge from that spot on the spike protein, and so would be expected to affect the forces folding the spike protein chain into its functional shape.

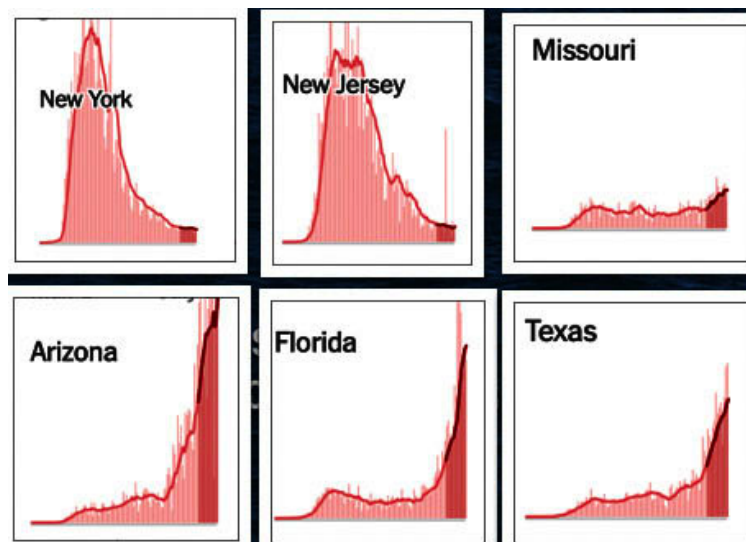
Where on the protein chain of COVID-19’s spike protein is amino acid 614 located? Each spike is shaped like a club sticking out of the virus envelope, and amino acid 614 is located right where the stem of the club attaches to its outer business end. In a normal COVID-19 infection, this business end binds to the ACE2 receptor proteins present on human respiratory cells, triggering their entry into the human cells. The new “G” version changes the shape of the spike’s business end a bit, making the ACE2- binding process work better. The result? The virus is more infectious.

This new “G” version of COVID-19 was first detected among patients in Northern Italy, and, being as much as nine times as infectious as the original “D” version from China, rapidly spread through Europe. In the United States 96% of early sequences belonged to the China “D” variant, but by mid-June over 90% of sequences carried the “G” amino acid instead.

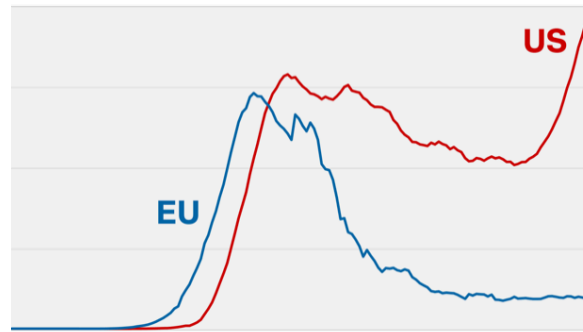
So yes, the virus is changing, but in ways that tend to make things worse, not better.

New Hot Spots

New York and New Jersey were for several months the epicenter of U.S. COVID-19 infections, but with aggressive social distancing measures, closing of schools and all public sporting events, and, of particular importance, widespread COVID-19 testing and tracing, things quickly improved. Where have things gotten worse, leading to today’s new surge of infections? As you might expect, the new hot spots are those states that “opened” early, particularly Arizona, Florida and Texas (Florida is reporting more than 11,000 new coronavirus cases each day!):



Europe, once devastated by COVID-19, has largely recovered, although countries of the EU have only slowly opened their economies and still mandate extensive surveillance testing. Their only real future danger, having largely eliminated the virus, is infection from outside. Not blind to the massive upswing of COVID-19 infections in the United States in recent days, Europe has omitted our country, along with Brazil and Russia, from the list of countries admitted to the EU. If you wish to travel there, you will have to quarantine for two weeks upon arrival.



What did Europe, New York and New Jersey do right that Arizona, Florida, and Texas did wrong? In a word, testing. Winners did it, losers didn't. By refusing to federalize testing in this country, the White House is in my opinion directly responsible for this mess. We have wasted two months of time that the nation-wide lock down bought us to establish nation-wide testing of ALL individuals. It is that simple hard fact that our leaders have failed to grasp: when a large fraction of the infected show no symptoms, you can't just take temperatures to screen individuals. You MUST identify and isolate the infected. Fully 300 million people in this country remain susceptible. Until we act on this simple imperative, there will be no end to this.

Pence tells us we have "lots of testing." That is simply not true. In most places you must drive to a testing site and wait in miles-long lines to be tested, as in the photo below. If you don't have a car, or don't think you need to be tested (most people), you aren't tested.



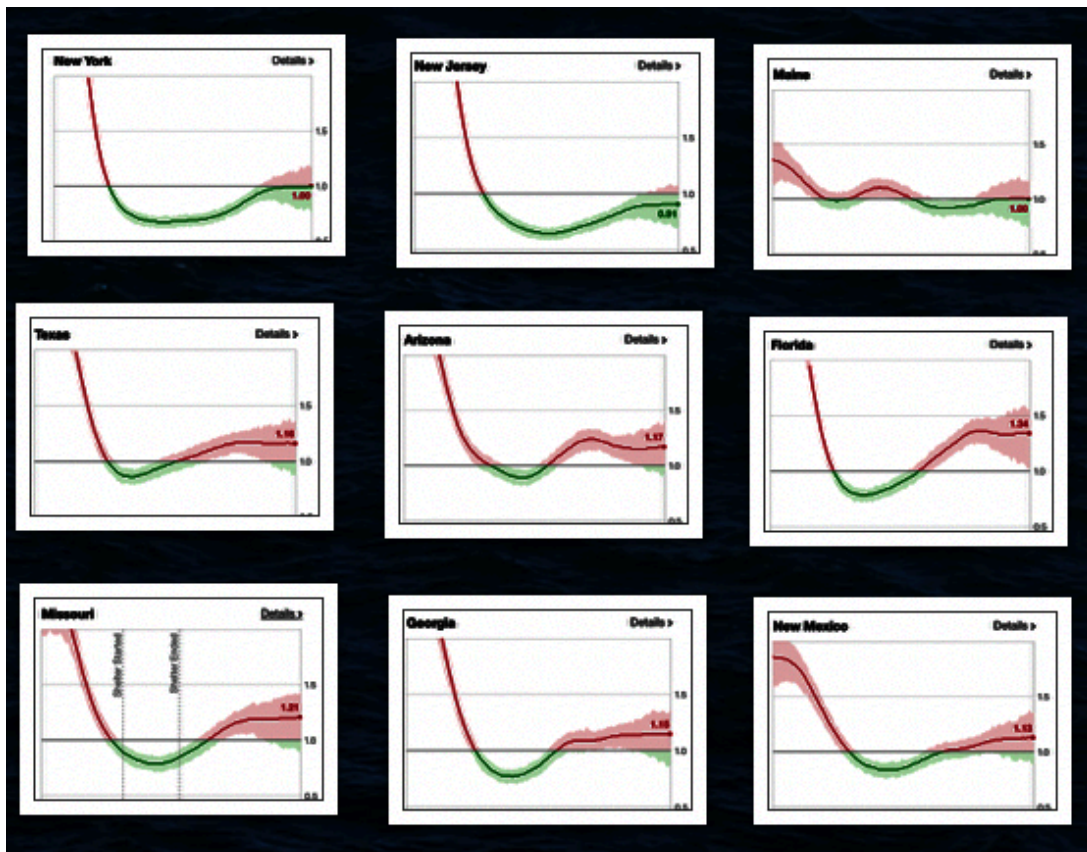
An aerial view of people in cars lined up to be tested for COVID-19 at Dodger Stadium amid the coronavirus pandemic on June 26, in Los Angeles, California. Mario Tama/Getty Images

It's Going to Be a Long Summer

There is a lot you can do to survive what is going to be a dangerous summer. In St Louis, the mayor is mandating face masks in public for everyone, a very good idea. Also, I trust no daughter of mine would be so ill-informed as to socialize in a bar or to eat within a restaurant – social distancing is still your best defense.

None of you are living in hot spots, but we are not out of the storm either. Saint Louis County has about 600 COVID-19 cases per 100,000, a rather high and worry-some number. DeKalb County Georgia (Atlanta) has a similar number, 770 cases per thousand, while Santa Fe County in New Mexico has only 158.

The best way to look at danger of COVID-19 infection is the r_t number. You will recall that the r number estimates how many people an infected person will infect. Any r_t value above 1.0 indicates the number of cases will increase. As we don't have a firm estimate of how many people carry the virus without symptoms, we have to guess that fraction from the small number of situations where everyone is tested, if we wish to estimate r_t . With that uncertainty firmly in mind, how do the r_t numbers in our states look? Not good:



No question about it, each of us face real danger of infection from the world around us. Social distancing will be the key to our safety, and for this dangerous summer must include extreme care: quarantining the mail you receive for a day, wiping any new groceries with a disinfectant cloth, not letting anyone outside the household pet the dog, no social gatherings, and close friends only at a distance. Not a fun summer, but it's important we live through it.

For now, our family should all simply hunker down where we are and wait for our federal government to take widespread testing seriously. Until testing folk are banging on all our doors, we are not going to be truly safe.

With luck – and I mean we will have to be incredibly lucky – we will have a vaccine available to us in about a year. On July 1 the FDA released its conditions for approving a COVID-19 vaccine, including evidence that a vaccine is safe and effective. Now “effective” is a slippery word. The July 1 FDA directive states that any vaccine “must be at least 50% more effective than a placebo in preventing COVID-19 disease.” This 50% benchmark is used routinely for flu vaccines, but is a low bar – 70% is what any effective vaccine reaches for. The FDA has promised that it would not use “emergency use authorization” to allow early use of a vaccine that does not reach the benchmark. We will see if it can resist vaccines that provide “some hope of prevention, and do no harm.”



In the meantime, we will ZOOM every Sunday, and keep loving and supporting each other. Your mother and I walk “the beast” several times a day and every evening, so we’re not totally isolated. Still, we long for the time we can all hug and be together for real. It will come.

Dad