Letter 29: A Pandemic Anniversary

March 28, 2021

Dear Daughters,

I wrote my first pandemic letter to you exactly one year ago today. I titled it *Where We Are and May Be Going*. In that first letter I made what seemed at the time an outlandish prediction – that we would eventually reach 900,000 cases in the United States.

Today, the number passed 30 million.

No American deaths from COVID-19 had been reported when I wrote you in March. Today the number of American coronavirus deaths has passed 543,000. That's more than all American combat deaths since the Civil War.

Worldwide, the numbers are staggering: 125 million cases of COVID-19 and 2.8 million deaths.

Looking Ahead

My record at predicting the future clearly leaves something to be desired. In fairness to my modest efforts of a year ago, however, no one could then see what lay ahead. We now know a lot more about this pandemic, after a savage year of instruction by a virus far more deadly than anyone had imagined. So with some trepidation I will again try to assess for you where we are, and may be going.

Today we are seeing something like 50,000 new cases of COVID-19 a day in the United States. While a lot, this is far less than the 300,000 cases we saw in one day early in January! And every day we see fewer new cases.

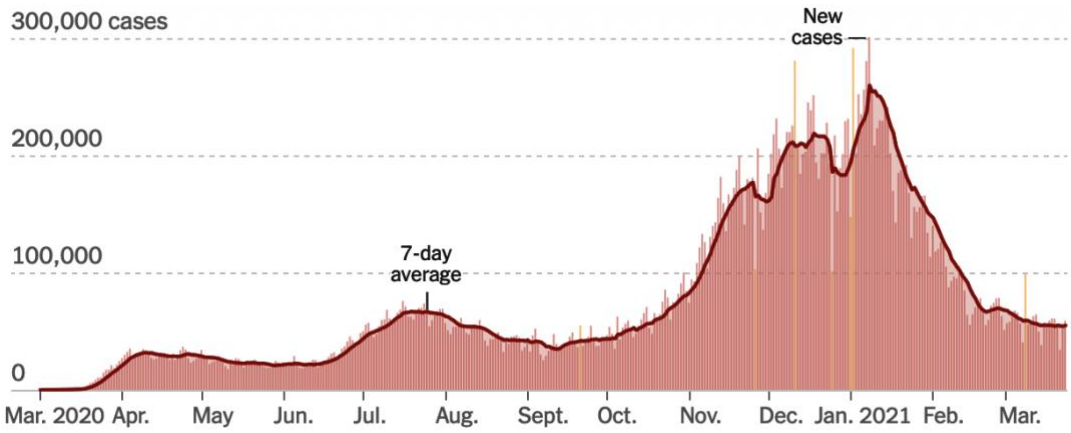
Here's the question we face – are we over the hump? While it looks like yes, we have to grapple with the possibility of another surge.

In the twelve months you have been reading my pandemic letters, the United States has seen three separate "surges" in COVID-19 infection:

SURGE ONE. The first came in March, as I was writing your first pandemic letter. COVID-19 infections, first seen in the West Coast, really began in earnest with travel to the United States from Europe -- not China. New York and then Florida became centers of infection. Daily new cases in the United States peaked at 35,000 by mid-April, and then began to subside. The social distancing, face masks and hand washing being recommended by medical experts like Dr. Fauci were really working.

SURGE TWO. The governors of several states like Florida and Texas thought this subsiding meant the storm had passed, and elected in May to "restart" their state economies. Mitigation recommendations like social distancing and wearing facemasks were dropped, bars and restaurants opened, workers sent to work and kids to school.

Well, removing mitigation in May quickly reversed the improvement Fauci had achieved: within a month, coronavirus infections in the United States again began to increase. By mid-July, new COVID-19 cases soared to twice the levels ever seen before, to 70,000 cases a day!



SURGE THREE. Alarmed, every state in the nation began to take mitigation more seriously. Businesses sent workers to work from home, restaurants and bars were closed, schools taught on-

line, and the CDC asked everyone to wear facemasks. Nationwide, daily new COVID-19 cases again began to subside, and by mid-September infections had fallen back almost to early-summer levels. Mitigation worked again.

Again Texas and several other states responded to this September drop in infection rates by declaring the coronavirus storm over and opening for business (Florida had never shut down). Surely we were over the pandemic, these state leaders thought, and could get back to school and work.

But then came fall weather.

The cold temperatures of November foster respiratory viruses, which is why fall is called "flu season" – a time of year when people get flu and common colds. With the advent of fall weather and relaxed mitigation, numbers of COVID-19 infections exploded. By December the United States was seeing a quarter million new COVID-19 cases each day!

Back came mitigation, with a vengeance. Even Texas shut down. As I have explained to you in last week's letter, I do not know with any degree of certainty what broke the back of this November-January COVID-19 surge. I suspect that fierce mitigation efforts had a major impact, although clearly other factors did too. As you can see in the graph above, today's levels of COVID-19 infection are back down, for the third time, to near early summer levels.

SURGE FOUR? As predictable as clockwork, the governor of Texas has responded to today's decline in COVID-19 infection just as he did twice before: On March 10, Texas (joined by Mississippi, Alabama, Wyoming, Montana, and North Dakota) removed facemask mandates. Texas opened all bars, restaurants, theaters and other business, sending the kids back to school. Governor Abbott declared loudly that the citizens of the Lone Star state are free to make their own mitigation choices without the government imposing its will.

And, like clockwork, we are going to see a surge in new COVID-19 cases later in the spring. This virus is every bit as predictable as the governor of Texas. New more-transmissible variants will speed the process. Only mitigation and vaccination will slow it.

Vaccination

The good news about where we are is that the new administration in Washington has been quite successful in getting COVID-19 vaccines into arms: As of today, 85 million Americans have received at least one dose of vaccine, which is 27 % of the total population.

So how safe should you girls feel going forward?

I have given some thought to this. It seems to me a lot depends on where you are living. If you are living in a community with high positivity (a high percentage of COVID-19 tests scoring "positive") you are in more danger of infection, while if you are living in a community where many of the people you might come in contact with are vaccinated, you are in less danger of infection.

The Covidometer

How can we measure how endangered you girls are, in concrete numbers? Well, my off-hand estimate, my "Covidometer" if you will, compares how many of the people in your communities pose a risk to you, relative to how many do not:

- **Risk to You**: I take reported values of % positivity in COVID-19 tests in your community as my measure of your risk of infection, what I call *% infected*.
- **No Risk to You**: I assess the number of people with antibodies to the virus in your community as my measure of *% protected* from infection.

There are three sorts of people with antibodies to COVID-19:

1. ***those vaccinated against COVID-19***. For my estimate, I have included everyone with at least one shot.
2. ***those who have been ill with the virus***. If you have had COVID-19, your chances of not getting it again are 80%, according to a new study from Denmark (the Danes tested an astonishing 70% of their entire population in 2020) -- so to estimate those survivors actually protected, I reduced the reported number of cases by 20%.
3. ***Those with asymptomatic COVID-19 infections***. I estimate the asymptomatic individuals likely to be protected as being a third of those 80% of reported cases.

Add these three numbers up and you have a simple ball-park estimate of the fraction of people living in your community with antibodies directed against COVID-19, the *% protected* from the virus.

My assessment of endangerment in your community is the ratio of risk (*% infected)* to no risk (*% protected*):

Covidometer

United States	% infected: 4.2	
	% protected: 36.3	0.12 endangered
Saint Louis	% infected: 8.6	
	% protected: 16.4	0.52 endangered
NYC	% infected: : 6.7	
	% protected: 42.9	0.16 endangered
Atlanta	% infected: 4.5	
	% protected: 35.0	0.13 endangered
Santa Fe	% infected: 2.5	
	% protected: 33.1	0.08 endangered

Mom & Dad. On balance, the members of our family living in greatest danger of COVID-19 are your mother and I, living in Saint Louis. Not only do we have quite high *% infected*, indicating a lot of virus circulating in our community, but we have very low *% protected*. As a result, my Covidometer rates St Louis as 0.52 endangered, four times the national average!

Why is the *% protected* so low in Saint Louis? Because in Missouri the governor has chosen to prioritize allocation of vaccine to rural areas. Kansas City and Saint Louis, the two major cities in the state, are "vaccine deserts" which are only now beginning to receive significant allocations. So the Saint Louis metro area as of today has 166,567 vaccinated people in a population of 2,280,511 -- that's only 7.3% vaccinated!

Nikki. New York City has a somewhat high *% infected*, but this is countered by its very successful vaccination program. Of the 8.4 million people living in NYC, 2.8 million have been vaccinated – fully 33%. Overall, NYC is but a little more endangered than the national average. Vaccination continues at a rapid pace in NYC, so I expect its endangered number to fall further in coming weeks.

Susie. Atlanta has lower *% infected* than NYC, so although its vaccinations are not quite as spectacular (26%), it did vaccinate you, and like NYC is a relatively safe place to live (and raise a granddaughter). Georgia has a very high 10.7 % positivity, leading to a high endangered number (0.39) -- the city is clearly doing a far better job than the state.

Caitlin. Santa Fe comes out the safest of the four cities in which our family now resides. While fewer residents are vaccinated than in NYC or Atlanta (21%), there is far less virus circulating than in the other cities (*% infected* is only 2.5%). It is far less endangered than the national average.

So the risk to our family, while far from zero, does not seem excessive. Mom and I, while living in a dangerous place, are fully vaccinated. So is Susie, and Nikki has that on the horizon. The city where you live, Caitlin, is thankfully much less dangerous than those of the rest of the family. Be careful while you await your chance to be vaccinated, but not fearful.

The New York Variant

Of course the elephant in the room is the E484K ("Eeek") mutation.

No amount of vaccination will protect you from a variant that evades the antibodies the vaccine produces, as any variant carrying the Eeek mutation does. There do not seem to be a lot of Eeek-carrying variants circulating in the United States yet, although it is difficult to be certain because of the dearth of coronavirus genomic screening.

One place Eeek has popped up: NYC.

The city does not carry out routine genomic screening of COVID-19, but a database called GISAID is shared by scientists working at the various hospitals and universities. A new variant called B.1.526 first appeared in samples collected in the city in November 2020. Dr Fauci says it likely originated in Washington Heights, in upper Manhattan.

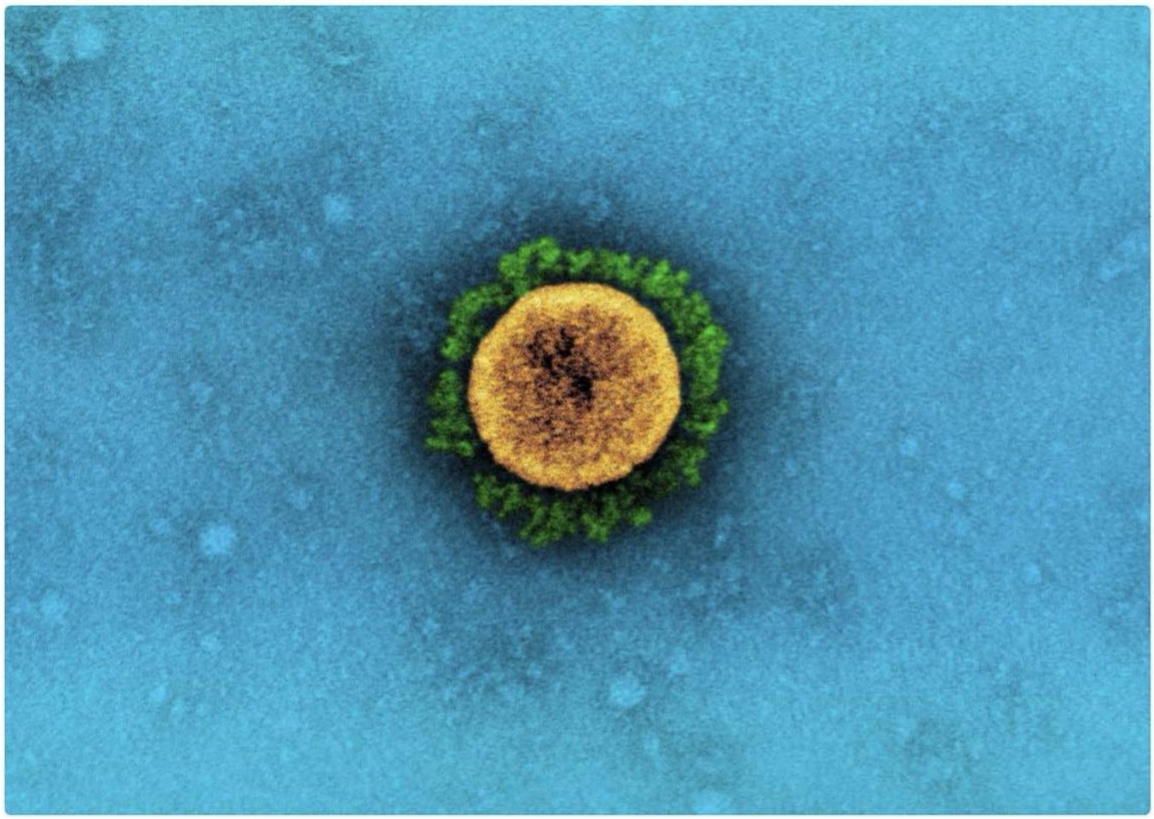
By mid-March 2021 this B.1.526 variant had come to account for about one in four viral sequences in the database. When examined more closely, researchers found that B.1.526 had already split into two versions: one had acquired the E484K mutation – our old friend Eeek. Soon this B.1.526 variant also acquired a mutation S477N (dubbed "Sean") that causes the virus to bind more tightly to human cells and thus become more infectious.

The Eeek variant is spreading rapidly in NYC. Of 1,142 samples from patients at Columbia Medical Center, 12% of coronavirus patients had been infected with the Eeek version of B.1.526.

Nikki, this means that you will have to be extra careful. While your NYC Covidometer reading of 0.16 endangerment is low, Eeek makes endangerment a whole new ball game. I know you are already being very careful, and that you have been vaccinated. But while your vaccine is said to do a good job of protecting you from Eeek hospitalization or death, it will not protect you from Eeek infection or illness. Until Moderna's Eeek booster vaccine becomes available (this fall?) you will have to continue considering yourself endangered.

There is no sign of this variant in Santa Fe, Atlanta, or Saint Louis, but with so little genomic screening it is difficult to know how much faith to place in that. The Sean mutation will be a

powerful accelerant, dragging Eeek along with it. I have no doubt variant B.1.526 will quickly spread out from NYC.



Study: A Novel SARS-CoV-2 Variant of Concern, B.1.526, Identified in New York. Image Credit: NIAID

Because to the danger of exposure to Eeek, all of us must act as if endangered.

This will continue to be true, even as we all become vaccinated. That is what Dr Fauci was trying (in vain) to explain to Senator Rand Paul at a Senate hearing on March 18, when Senator Paul argued that telling vaccinated people to wear face masks was “just theater.” Dr Fauci replied that the masks were not for show, but to protect the wearer as well as others from variants. Variants are the future of this pandemic.

And on that theatrical note I bid you a safe and happy week.

Dad