Why Can't We Just open the Church Now?
Jay Hansen

At our virtual meeting on Tuesday, June 2, with reports from several of our sub-groups, a number of people expressed concern about pushback from parishioners who want to get back in the church as soon as possible and start celebrating the Eucharist, listening to the choir, singing, greeting friends, attending forums, etc. Some may portray the concerns about COVID-19 as overblown or even a hoax. "The rest of the country is opening up. Why can't we?" There seemed to be a consensus that we need to provide something that helps explain why it is a problem just opening up everything, as if the worst of COVID-19 is over, and we can go back to "normal." Here is a first stab at something and reasons I believe some people don't appreciate how far and how fast COVID-19 can spread. Understanding what exponential growth means and what effect it has on our community health and risk of infection is important. At this point I erred on the side of too much information rather than not enough.

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First, this virus is not a hoax. Dr. Larry Brilliant is a world-renowned epidemiologist who was part of the World Health Organization team that finally eradicated smallpox from the earth in 1977. They went to every country and hut to hut in remote areas of the world to track down the last traces of the disease and to vaccinate people against this scourge that had plagued the earth for millennia. In a podcast interview with Al Franken on May 10,[1] Dr. Brilliant said:

> "This disease [COVID-19] is terrible. This disease is unique. We are fighting with a virus that does things that no virus that we've encountered does. And I'm pretty cautious about making that comparison. We call it a respiratory disease, and that makes you think immediately of influenza. This disease is nothing like influenza, other than it is spread,

[1] https://alfranken.com/listen/epidemiologist-larry-brilliant-on-where-we-go-from-here.

> among other ways, respiratorily. If this is a respiratory disease, it's more like smallpox which is spread by respiration but affects every single cell in the body. I mean, this disease affects people with illness that are *[sic]* literally nose to toes. You lose your sense of smell, and you get "COVID toes" which look like frostbite. But it also affects your kidneys, affects your liver, affects your heart in dangerous ways, affects your lungs in tragic and poignant ways. But it also affects at least two, we think, cranial nerves, or the sensors of those nerves, by causing a loss of taste and conjunctivitis in your eyes. Sometimes the loss of taste is really just the loss of smell. If you can't smell it, you can't taste it. So we don't know what's going on. And it certainly creates micro-embolisms and micro-clots all over the body. This is not a simple respiratory disease like influenza. And even the death rate is grossly underestimated.

I hope a couple examples will provide a better understanding of how this disease can get out of control. These deal with grasping the concept of what "exponential growth" means. Both harmful bacteria and viruses grow exponentially in the human body.

As a first example, assume someone is unemployed as part of the 40 million Americans who have filed for unemployment compensation. I encounter one of them and say: "I'll make you a deal. I'll hire you, but there's a catch. I'll hire you for just 30 days, and this is what I'm willing to pay. I'll give you one penny the 1st day, two pennies the 2nd day, 4 pennies the 3rd day and so on doubling the amount each day for 30 days. Do you want the job or not?"

Do you know what your pay will be on day 30? It will be **$5,369,809.12!** Yes, $5 million plus for one day's work. And do you know what your total salary would be for all 30 days? It would be **$10,737,418.24!**[2] This illustrates the effect of "exponential growth" used to describe how COVID-19 infections multiply in the population.

Here is another example I heard on TV with a few changes of my own. Suppose you have a large pond that is being infested with lily pods, and the number of them double every day. You are responsible for weeding the pond to remove all of them before they choke the whole pond. If you start early, they are easy to control. You see them, and you yank them out. But if you slack off and let things go, next thing you know the pond is completely filled with them and much more difficult to get them removed. Question: When was the pond only 25% full of lily pods? Answer: Two days ago. The day after it was 25% full, it was half full, and the day after that it was completely full.

Think back to when COVID-19 became big news in the U.S. There was a hotbed of infection in a Washington State nursing home where a lot of residents died and even more got sick.[3] On February 28, 2020, COVID-19 was diagnosed in a woman resident of Life Care Center, a long-

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[2] For the mathematicians, the formula for the daily salary (S) is $S = 2^{(N-1)}$ where N is the number of days worked. For the total paycheck P it is $P= 2^{(N+1)} – 1$.

[3] See https://www.nationalreview.com/2020/03/coronavirus-outbreak-how-it-spread-nationwide-from-washington-state-nursing-home/ and https://www.cdc.gov/mmwr/volumes/69/wr/mm6912e1.htm.

term care skilled nursing facility in in Kirkland, WA. By March 24, more than half the deaths in the U.S. had occurred there. A total of 129 cases of COVID-19 came from there that included 81 residents (of about 130), 34 staff members, and 14 visitors. 23 people died, and one person carried the disease to North Carolina. The virus that infected Life Care Center came from the same genetic family tree as the virus from a 35-year-old man who came back from visiting relatives in Wuhan, China on January 15 and that spread to more than 1,100 people across Washington State. Until much more recently, that man was believed to be the first person in the U.S. to be diagnosed with COVID-19.

Another early case involved 61 people who attended a 2½ hour choir practice of the Skagit Valley Chorale in Skagit County, Washington on March 10, 2020, including one with cold-like symptoms. A week later several choir members had become ill. Ultimately there were 33 confirmed COVID-19 cases and 20 "probable" (not tested) cases, so 53 members of 61 or 87% of the group was infected, three were hospitalized, and two died. The CDC investigated and said the choir meeting "provided several opportunities" for the virus to spread, "including members sitting close to one another, sharing snacks, and stacking chairs at the end of the practice."[4]

Then it happened in New Rochelle, NY where one man who was infected attended a wedding, a funeral and a synagogue service. Within one week more than 50 cases were linked to him.[5]

Many Americans and European or other foreigners flew into JFK from points around the world bringing the virus with them. Many Americans and Asian or other foreigners flew into LAX, San Francisco and Seattle from China and other parts of Asia, bringing the virus with them. Then people came from all over the U.S. and crammed into New Orleans for Mardi Gras before February 26 (Ash Wednesday). Some got sick from those who were there, and some locals got sick from those who came. Then the visitors went back home and took the virus with them.

California and other states around the country began to close down, but not Florida. There's a lot of money to be made from college kids hitting the Florida beaches at spring break, so they didn't want to close them before the college kids and their money got there. It was just like Mardi Gras with partying, crowded beaches, drinking, dancing, etc. Some brought the virus with them. Some partied and picked it up in Florida and went back home shedding the virus there, and some stayed behind to spread it around Florida.

Take a look at the areas with the biggest outbreaks of the virus in the early days. I looked at it then, and said to myself, when they go back home, those are going to be the new hot spots. Most of the early hot spots were along the coast. WA, CA, FL, LA and NY all had bad problems. The middle of the country hadn't been hit as hard yet though things were starting to spread in major cities that had airports and passengers that delivered the disease from other parts of the U.S. and

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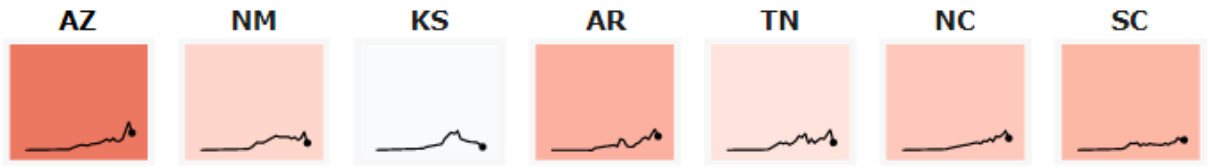
[4] See https://www.businessinsider.com/coronavirus-cdc-says-washington-choir-session-53-cases-2-deaths-2020-5.

[5] See https://www.wdrb.com/news/national/new-rochelle-new-york-was-a-major-coronavirus-cluster-two-weeks-ago-heres-where-it/article_c202b6d0-6e36-11ea-99dd-4b23fc672c3f.html. It began March 2 when a man in his 50s, tested positive for Covid-19. He was an attorney who worked in Manhattan who was hospitalized and put on a breathing tube. It was considered the first case of "community spread," meaning the source of the virus was not known. Officials said that, over the next week, more than 50 cases could be linked to him, including his wife, son, daughter, a neighbor who drove him to the hospital, and another friend and that friend's family. Before testing positive, he attended several religious events at a synagogue.

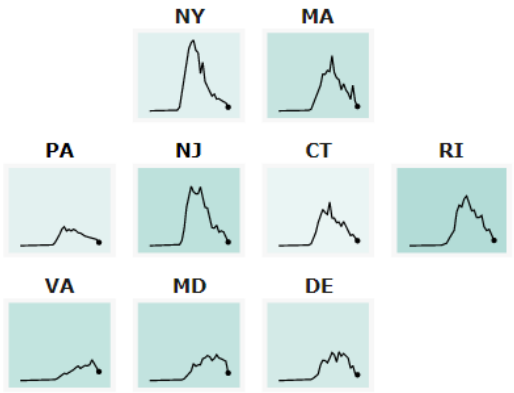
the world. They also came by cars, busses and trains. There weren't as many infected people ending up in middle America in places like Sioux Falls, Iowa. But those virus "seeds" in middle America and places away from the early hotspots were just "planted" later. Once the "seeds" sprouted on cruise ships, Navy ships, meat processing plants, elder care homes, prisons, hospitals, churches and other places where people gathered or were packed closely together, it began to spread like a match dropped in a barn full of hay. The virus didn't just stay in the elder care homes, meat processing plants, etc. The workers went home and spread it to their families, friends and neighbors. That is what exponential growth does. It starts small, then ultimately explodes, particularly since it can't be seen and is highly contagious. Since it takes several days to two weeks for the infection to take hold in individuals, there is an inherent delay between the time of infection and when the virus produces symptoms. Meanwhile, a large number of people can be infected from a few who are spreading it around. I infects two, two infect four, four infect eight, and exponential growth takes off.

If you look at the many graphs of daily diagnosed infections, total infections and deaths, you will start to see trends. The people who analyze the data look at how quickly confirmed infections, total infections and deaths double. It has been common for cases to double every three, four or five days. They look at doubling, because that indicates how fast exponential growth is taking place and how fast the virus is spreading. Early on states in middle America were largely unaffected by infection. You have to look at specific areas and how fast it is growing in each. Look at the maps, like those maintained by the CDC (Centers for Disease Control) at https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html and the Johns Hopkins world corona map https://coronavirus.jhu.edu/us-map. I also like "Our World in Data at https://ourworldindata.org/coronavirus/country/united-states?country=USA. It contains volumes of data, interactive charts and descriptions.

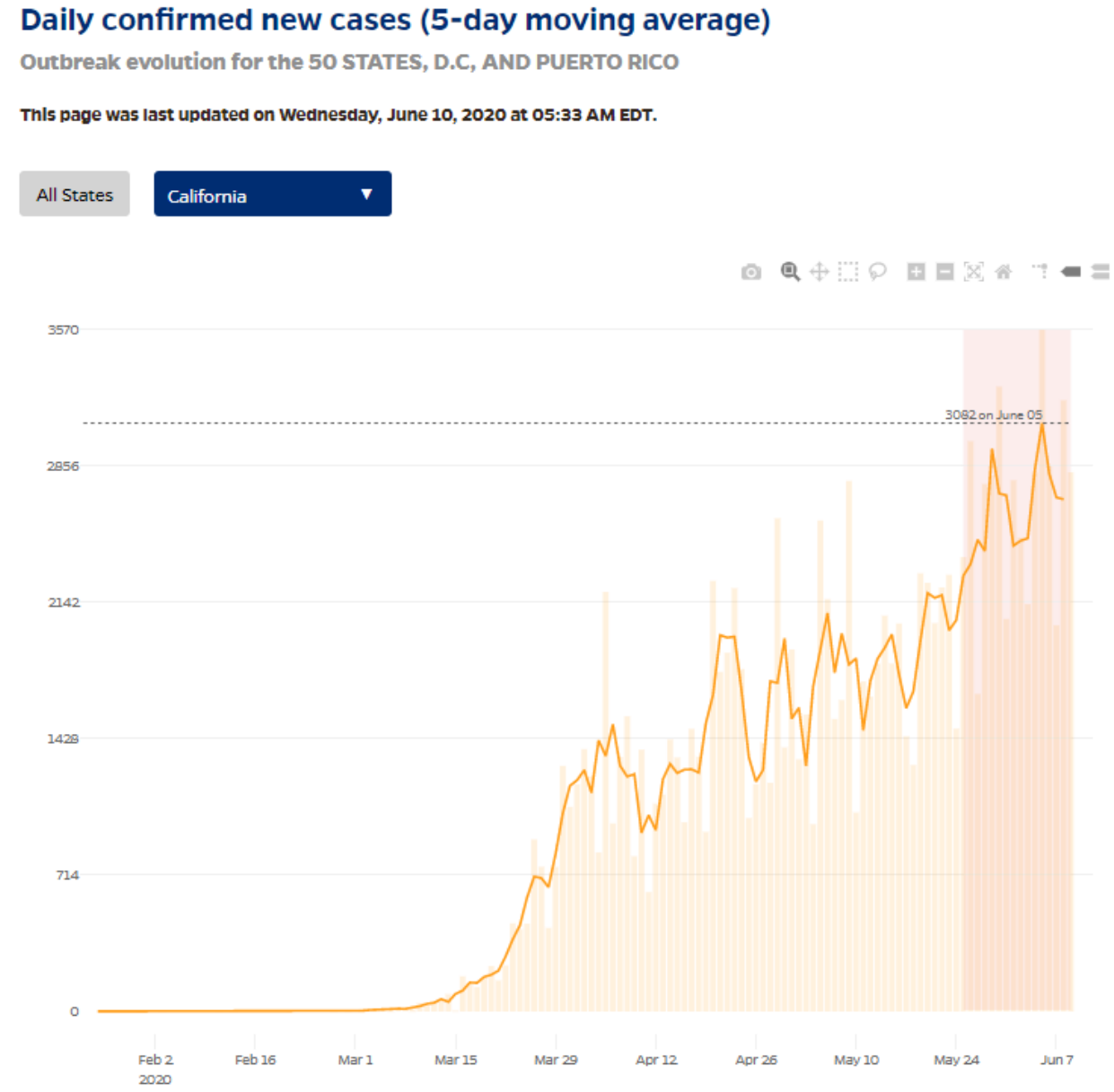
See https://coronavirus.jhu.edu/data/new-cases-50-states for graphs by state showing the number of new cases daily and color coded by how well or poorly each state is doing. To some extent, higher numbers can indicate more extensive testing. The ones below are not interactive, but on the website, you can click on the thumbnail-size graph for each state to see more details. As of June 8, the worst state for new cases was Michigan. Others with high daily increases include Arizona, Utah, North Dakota, Louisiana, Georgia, Alabama, Nevada, New Mexico.



The northeastern states below that were hardest hit early on are the ones that have been improving the most. The intensity of green or red in the thumbnail indicates how good or bad the trend is moving.

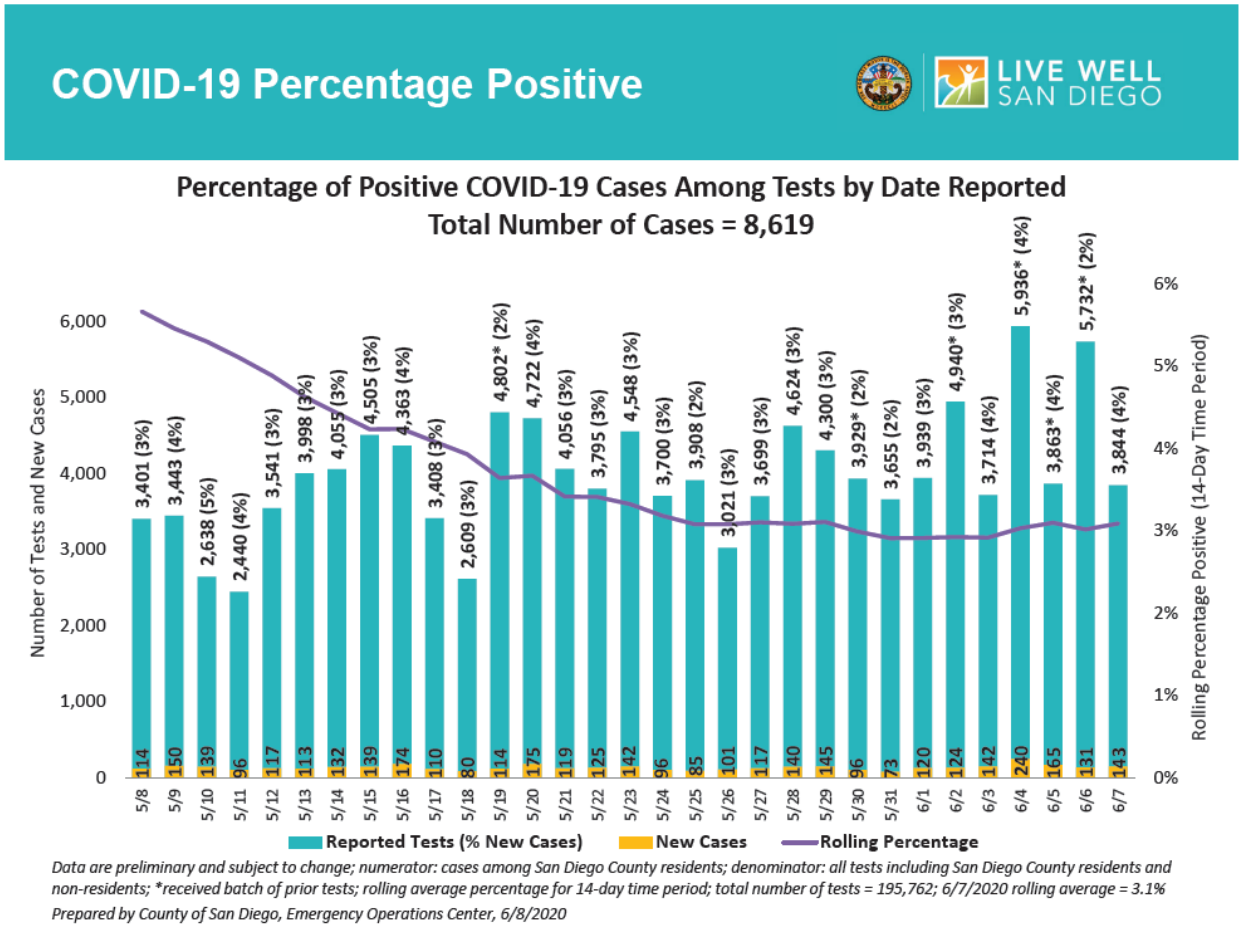


Below shows the full state of CA as of June 8.



Look at cases by counties or local areas. In San Diego County the data is on the Department of Health website at https://www.sandiegocounty.gov/content/sdc/hhsa/programs/phs/community_epidemiology/dc/2019-nCoV/status.html. There are links to various graphs and slides that tell the story of the spread or control of the disease over time in the county. This link for the Latest News Briefing Slides is a PDF of slides that is updated daily showing the current status of testing, cases, hospitalizations, ICU patients, deaths, and the like over time. They show at a glance whether various statistics are improving, getting worse or holding steady. San Diego County has had a relatively stable incidence of new infections, but if businesses and other places open up too quickly that can change for the worse.

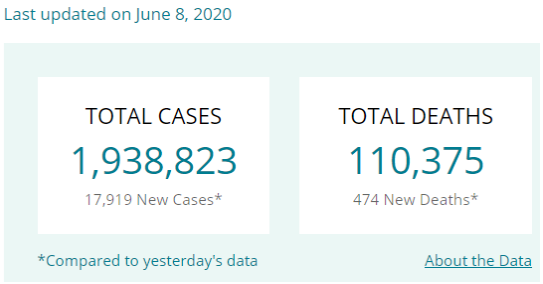
The graph below, shows the both the number of positive COVID-19 tests daily (yellow bar) versus the total number of tests done daily (yellow plus turquoise bars) and the percentage of tests that were positive (purple line as an average of the prior 14 days). The yellow bars range from a low of 73 to a high of 240 positive tests per day. The rolling 14-day average (purple line) shows a relatively stable percentage of positive tests since about May 25. It's an average slightly greater than 3% positive tests.



How fast the number of new cases and deaths are doubling is important. In the early stages, if you can test and find the infections early, they can be traced backward to find people who may have undiagnosed cases from whom a given patient may have acquired the infection or spread it unknowingly to persons the patient contacted. But testing alone is not enough. It will take tracing all the people a given patient contacted before being diagnosed to locate the persons from whom the patient may have contracted the virus and to whom the patient may have spread the virus. Until there is a vaccine or an effective treatment, the only way to stop the virus from spreading is to isolate them until they no longer test positive.

There is a point at which the number of cases and doubling rate can overwhelm the medical system and make tracing virtually impossible to carry out. That is when the only method to prevent the spread of the virus further is to shut down everything, including the economy, at least in a localized area. That is what was done in New Rochelle, NY when an area with a 1 mile radius was shut down before the entire state was closed. The number of infected patients who need ventilators to breathe and how long they are on them before they get better (or die) becomes critical on whether beds and ventilators will be available for new patients. In less populated areas, there are fewer hospital beds and intensive care unit (ICU) beds, so they can be overwhelmed with fewer cases.

When the number of infections, like the lily pads, are few, the odds of randomly encountering a lily pad or an infected person are lower. When businesses, churches, restaurants, etc. open too quickly, or when protests involve thousands of people not wearing masks and not keeping adequate social distancing, the odds of encountering people with infections begin to increase exponentially. Keep your eyes on the figures in the cities where there have been large protests recently for increases in cases in the 14 days after the protests started. It stands to reason that the more places you go, and the more different people you encounter, the more likely it is that you will encounter someone who is infected, and that increases the odds of your being infected. Also, as the number of cases increase, the number of deaths do too. As of June 8, the CDC figures show 110,375 deaths out of 1,938,823 or about 5.7% of cases result in death.[6]



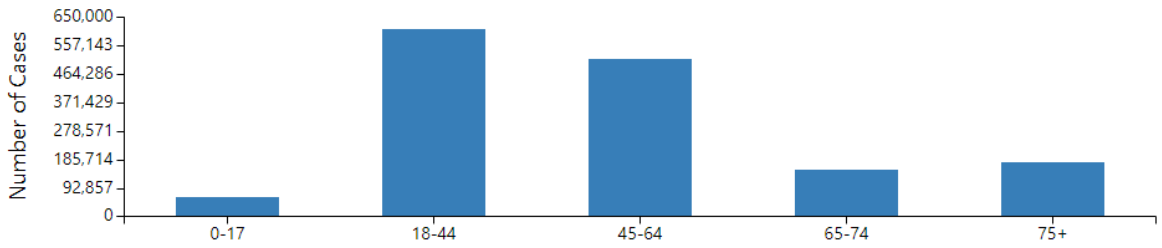
COVID-19 is not stopped by political or geographic boundaries, or by age, gender, race, religion or any other demographics you might consider. People of all ages have been infected.[7] While the percentage of people in each age category may vary, every age is affected from small children to people over 100, and people of all ages are dying. See the graph below.

[6] https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html (6-8-2020).
[7] https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html

Cases by Age

The following chart shows the age of people with COVID-19. Hover over each bar or click on the plus (+) sign below the chart to see the number of cases in each age group.

Data were collected from 1,500,126 people, and age was available for 1,497,211 (99.8%) people.

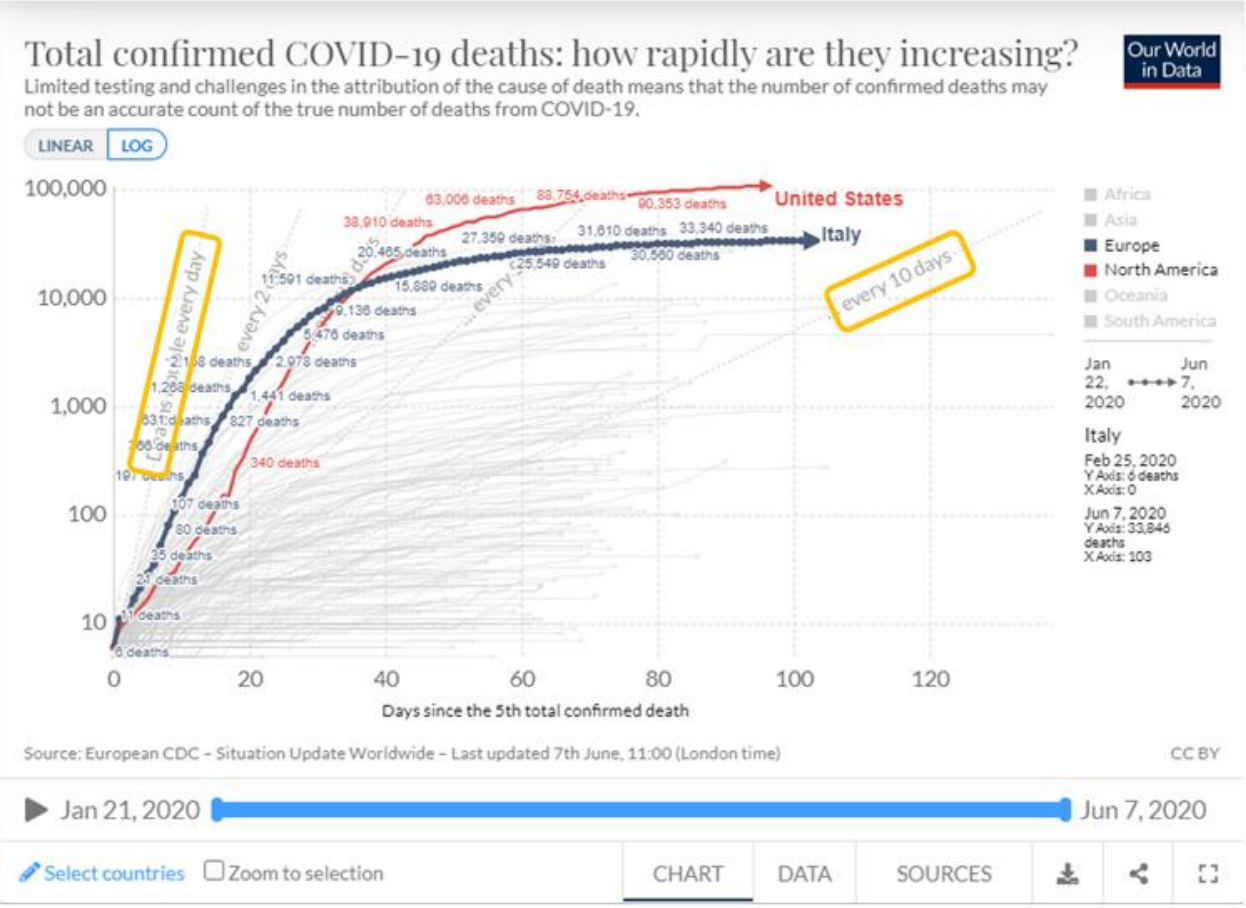


Opening up a church and being exposed to an infection will depend, in part, on how common or rare the infection is in the general population in that locale, how often churchgoers attend a church service or church function, how often they come near to someone who is infected, and what precautions are in effect (e.g., distancing, masks, surfaces touched, etc.) to reduce the likelihood of picking up the virus from someone else who is or was there. The likelihood of becoming infected is also increased or decreased by the uninfected person's age, the number and severity of other pre-existing health conditions, even undiagnosed cardiovascular disease or excessive weight.

Jesus said in John 10:10: "The thief comes only to steal and kill and destroy. I came that they may have life, and have it abundantly." We are responsible for carrying out Jesus mission of bringing life abundantly on earth. We need to pray that we will use our God-given brains to think, to act carefully and to protect as best as possible the health and lives of all who come to our church.

Sample Exhibits of Exponential and Linear Graphs on Corona Virus

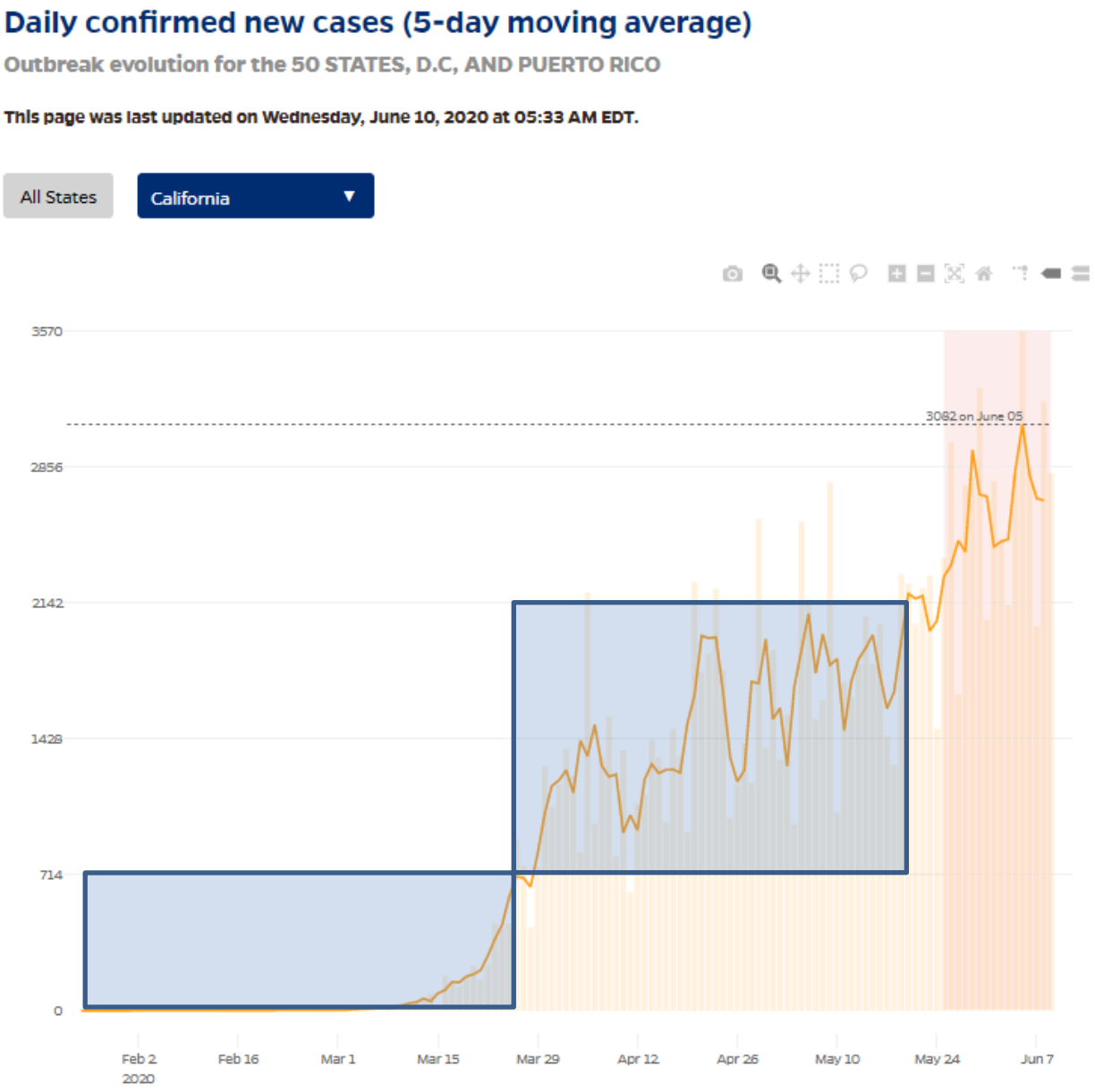
See this website https://ourworldindata.org/coronavirus/country/united-states?country=USA. It contains volumes of data, charts and descriptions. The one below is a screen snip of an image of an interactive graph showing confirmed deaths in different countries and continents.



On the website itself, you can move the blue time scale back to January 2 and forward in time to see how and where number of deaths increased in any give time period. On the website version, you can move your cursor up and down across the graph to see specific countries and figures appear and become legible. The others are grayed-out until your cursor touches them.

This is an exponential graph on which each evenly-spaced step on the vertical axis shows 10-fold increases (10, 100, 1000, etc.) in deaths at each new level. Also note the orange rectangles on the straight lines. Those two lines represent a doubling of deaths every 1 day on the left and every 10 days on the right. The lines for 2, 3 and 5 days are shaded but visible but do not have orange rectangles around them. If a graph of the actual number of deaths over time has the same slope or angle as one of the straight lines, it indicates the number of deaths is doubling at the same rate as that line. If you look at the red line, from 0 days up to perhaps 30-35 days, the red line closely follows the straight line for doubling every 3 days. As the line begins to curve to the right and flatten, the rate of doubling is slowing down. If the line becomes horizontal, it means the daily increase in the number of deaths is zero, and deaths due to COVID-19 will have

stopped. This has happened in a few countries. It is important to observe whether a graph you are looking at has linear intervals where each vertical interval is the same (e.g., 0,10, 20, 30, etc.) or exponential intervals (1, 10, 100, 1000, etc.). On an exponential graph, a straight line shows a doubling over a given time period. As the line bends toward horizontal, the doubling is slowing down, and if it becomes a horizontal line, it shows doubling has stopped and there are no new cases. The virus has been contained. An exponential graph is valuable to see how fast or slowly new cases or more deaths are occurring. See the differences in the graph below.



This is the State of California graph from page 5 that uses a linear scale.[8] Each vertical space above shows the increase in multiples of 714. In this case, to figure out the time period for doubling, you have to compare the time to increase one vertical space with the time to increase

[8] See https://coronavirus.jhu.edu/data/new-cases-50-states

two more vertical spaces illustrated by the shaded rectangles. On this linear scale, the orange line has to start dropping to show a slowdown in the number of cases. On an exponential scale, each curve to the right is a decrease in the number of new cases, a curve upward is an increase in the number of new cases and a horizontal line is a rate of zero. On a linear scale, any movement upward is an increase in the number of cases, a drop in the line is a decrease in the number of cases, and a horizontal line shows that the number of new cases is the same from one day to the next. The line has to drop back to zero to show when there are no new cases.