



# Let Us Go Then ...

## The 2020 Pandemic

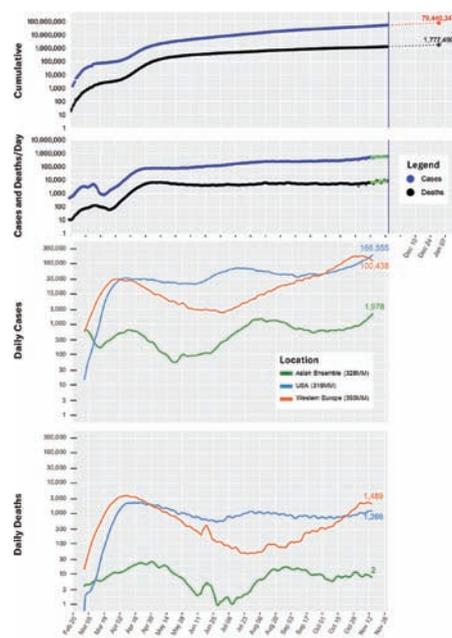
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**B**uried in the pages of the January 6, 2020, edition of the New York Times was an article titled “China Grapples with Mystery Pneumonia-like Illness” ([asamonitor.pub/3pw6KGS](http://asamonitor.pub/3pw6KGS)). Fifty-nine people in Wuhan had been sickened.

As of this writing (November 15, 2020), that has increased almost 1 million-fold. Fifty-four million individuals have been infected worldwide, and 1.3 million have died. With the onset of winter, we are seeing a second global surge. The IHME estimates that 1.9 million will die by the end of the year. Where have we been, where are we going, and what have we learned?

### Where have we been?

- As shown in the second panel of figure 1, the rate of new cases has continuously risen except for one week in early February when China’s efforts successfully controlled the spread of SARS-CoV-2 and it had not yet reached the rest of the world (blue line).



**Figure 1:** The top pair of panels show the global cumulative cases and deaths (first panel) and global daily cases and deaths (second panel). The middle panel contrasts the daily cases in the U.S., Western Europe (Belgium, France, Greece, Germany, Italy, Luxembourg, Netherlands, Portugal, Spain, and the U.K.) and an ensemble of Asian countries (Japan, South Korea, Thailand, and Vietnam). The lower panel contrasts daily deaths in the U.S., Western Europe, and the Asian ensemble.<sup>1</sup>

- For most of 2020, about 2,000-4,000 people died each week, despite constantly rising case numbers (black line). The decreasing case mortality reflects improved diagnostics, therapeutics, and the spread of COVID-19 to populations at lower risk.

- The second and third panels in figure 1 show daily case rates and daily death rates, respectively, in three populations of approximately equal size.

- The U.S. never substantially decreased case rates. Case rates have been surging since October. U.S. death rates fell from mid-April through June, rose in July, dipped in August and September, and are rising again.

- Western Europe decreased case and death rates from April through July. Case rates have surged since July, and death rates have surged since August.

- Taken together, Japan, South Korea, Thailand, and Vietnam have case and death rates 100-fold less in the U.S. or Western Europe. The data speak for themselves: Yesterday, the U.S. reported 166,555 cases and 1,489 deaths. Yesterday, Western Europe reported 100,438 cases and 1,266 deaths. Yesterday, the Asian countries reported just 1,978 and two deaths. *Res ipsa loquitur*.

- Figure 2 shows daily cases, daily deaths, and current hospitalizations over the most recent two months in each state, organized geographically. The trends are deeply disturbing. As of this writing, it appears we are in serious trouble. Cases, deaths, and hospitalizations are rising in nearly every state. The rise in hospitalizations is particularly concerning. Many states are reporting that hospitals are nearly full. By the time you read this, we may have run out of health care resources to care for the rising number of cases.

- An unprecedented effort of the global scientific community has brought deep insight into the precise structure of the SARS-CoV-2 virus, how it attacks us, how it kills us, and how we can defend ourselves. In less than one year, we have developed drugs and vaccines that would typically have required decades to develop.

1. Figures from my daily COVID-19 update as of November 15, 2020. Send an email to [steven.shafer@stanford.edu](mailto:steven.shafer@stanford.edu) if you want to be on the recipient list.

### Where are we going?

- Influenza peaks in the winter months, as do the four endemic coronaviruses ([asamonitor.pub/3lljOH2](http://asamonitor.pub/3lljOH2)). The current surge in the U.S. will likely continue through the winter months. This is similar to the pattern seen in the H1N1 influenza pandemic of 1918.

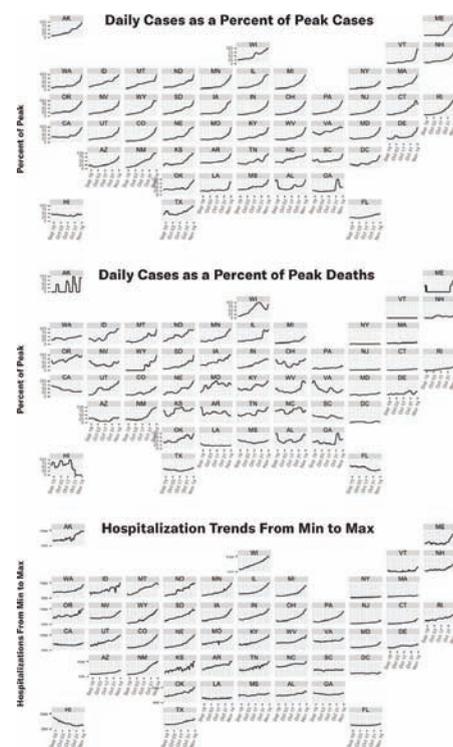
- As of this writing, two mRNA vaccines have been found to be highly effective in phase 3 trials (see “Progress in the Pursuit of a COVID-19 Vaccine” on page 1). It will take many months to produce and distribute vaccines, but vaccination will bring the pandemic to an end.

- Once the vaccines have immunized most of the population, (see “SARS-CoV-2 Immunity: What Have You Herd?” on page 37). SARS-CoV-2 will become endemic. We will likely need regular vaccinations similar to the yearly flu shot since robust long-term immunity is unlikely (*Nat Med* September 2020), reinfection can occur (*medRxiv* September 2020; *Lancet Infect Dis* 2020;S1473-3099:30764-7; *Clin Infect Dis* September 2020), and SARS-CoV-2 escape mutations have already been reported (*bioRxiv [Preprint]* July 2020; *bioRxiv* November 2020).

- People will still get sick with SARS-CoV-2. Fortunately, antibody cocktails are highly effective in treating COVID-19 (see “The Evolving Armamentarium of COVID-19 Therapeutics” on page 32). Immune therapy will dramatically reduce the morbidity and mortality of COVID-19.

### What have we learned?

- Science works. Science has taught us how to manage severe COVID-19, reducing mortality from >5% to about 1% today ([asamonitor.pub/35yWnKw](http://asamonitor.pub/35yWnKw)). Science has brought us new therapeutics, one of which may have saved the life of President Trump. Science has brought us vaccines, which raise the possibility of ending the pandemic.
- Public health measures work. If the U.S. had tackled SARS-CoV-2 as rigorously as South Korea, Japan, Thailand, and Vietnam had, we could have reduced the number of cases and deaths 100-fold while restoring our economy ([asamonitor.pub/36JeZqj](http://asamonitor.pub/36JeZqj)).
- Lockdowns work exceptionally well and fail miserably. Lockdowns effectively reduce case and death rates, buying time to implement public health measures. When followed by rigorous public



**Figure 2:** Daily cases (top), daily deaths (middle), and current hospitalizations (third) over the most two months for U.S. states. Each curve is normalized to the peak since February 22, 2020.

- health measures, lockdowns reduce case numbers to levels amenable to contact tracing, case isolation, and quarantine, hugely mitigating the health and economic consequences of the pandemic (e.g., Japan, South Korea, Thailand, Vietnam, Australia, New Zealand, Iceland, Israel). When lockdowns are not followed by rigorous public health measures, they only delay surges while inflicting enormous economic damage.
- Policy matters. By politicizing public health guidelines, including something as simple as wearing masks, we have inflicted untold harm on ourselves (*N Engl J Med* 2020;383:1479-80).
- Hydroxychloroquine does not work (*JAMA* November 2020).
- We are all in this together. In January, I thought COVID-19 would be limited to China and its neighbors. Within two months, SARS-CoV-2 had spread globally. In the U.S., it appeared limited to major cities. Today, rural hospitals are overrun with cases. We live in an interconnected world. What happens in a city on the other side of the planet may radically alter life in the most remote areas of the U.S. ■