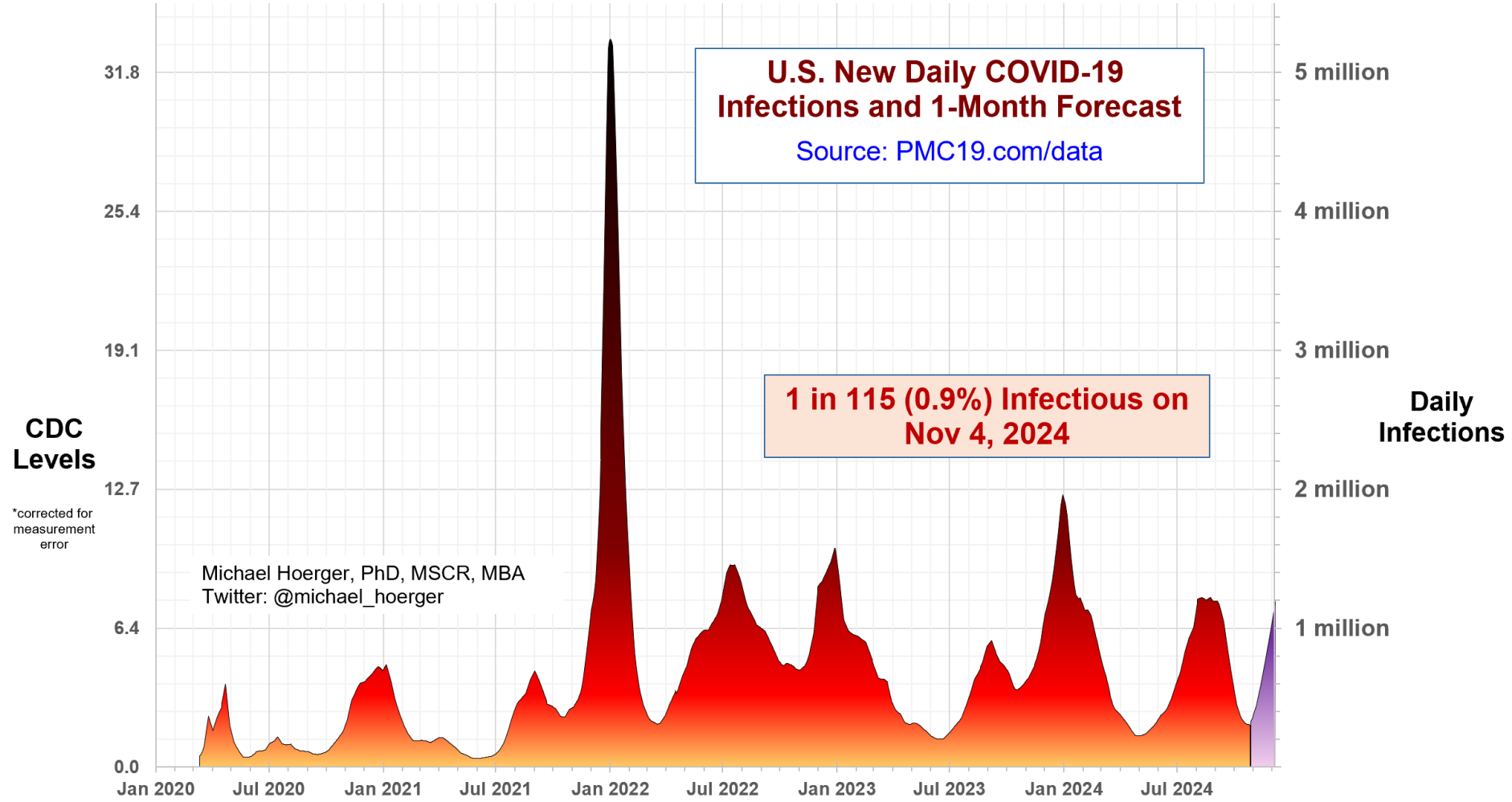
PMC U.S. COVID-19 Case Estimation and Forecasting Model: Report for November 4, 2024, pmc19.com/data

Michael Hoerger, PhD, MSCR, MBA, Pandemic Mitigation Collaborative (PMC)



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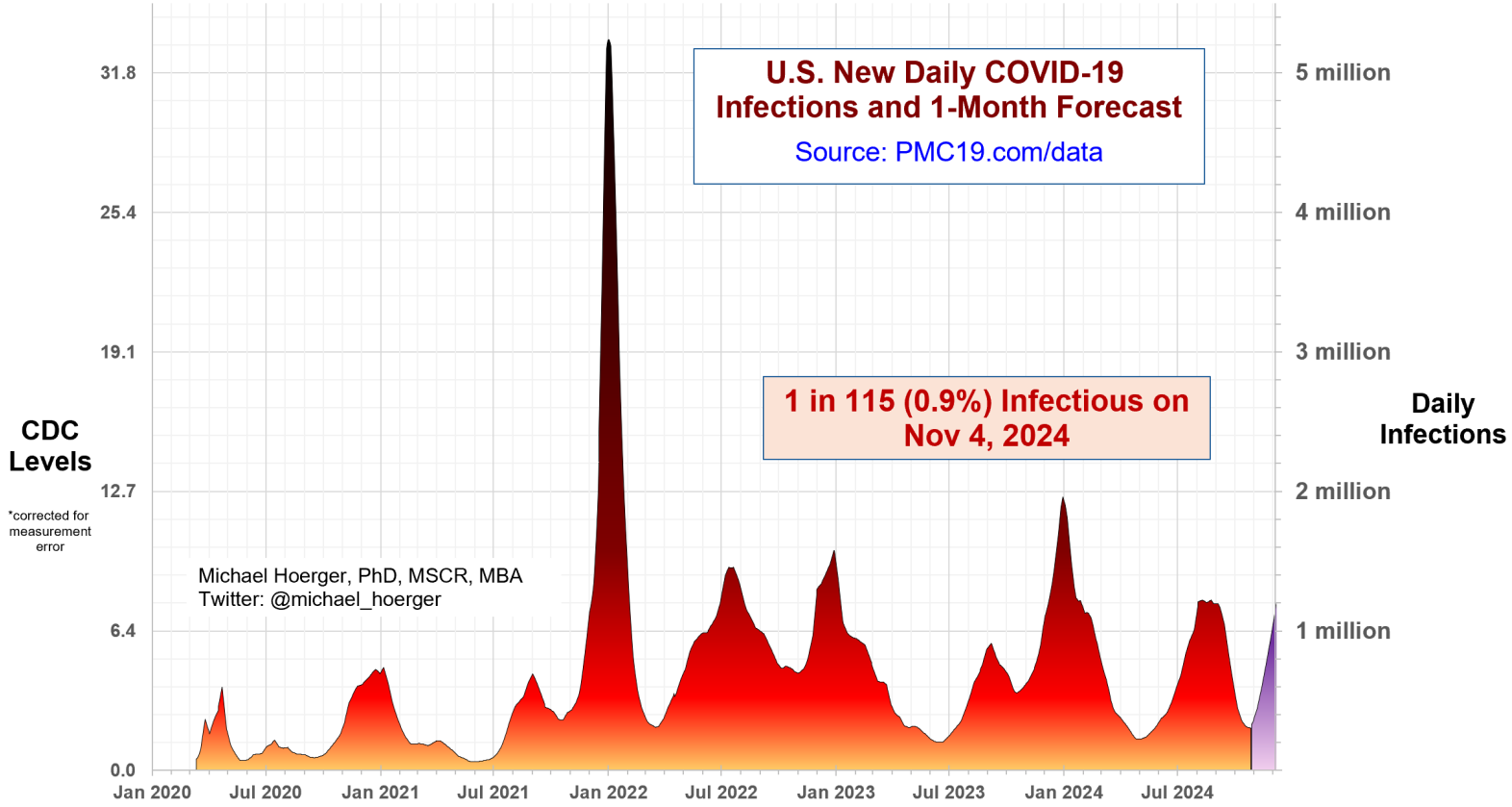
Technical Update

We have updated the Technical Appendix to note two minor improvements. One, our composite indicator of Covid transmission had been weighted 40% Biobot and 60% CDC. When Biobot abruptly stopped reporting for several weeks in a row during the summer wave, we were forced to downgrade them to 0% with no data coming in. After weeks of consistent reporting and a near-perfect correlation with recent CDC data (r=.95), we have re-included them in our current case-estimation model at 20% Biobot and 80% weight for CDC. Note, some of our pandemic-total estimates are marginally adjusted downward, as Biobot reported a slightly narrower (leptokurtic) late-summer wave. Two, in figure 3 (upper right of dashboard), we have added 50% and 95% confidence bands. See the Technical Appendix for estimation details. Essentially, consider the 50% band (shaded area) the normal variation, and the boundaries of the 95% band (light dashed lines) the worst- and best-case scenarios, barring something nearly unforeseen (approximately 2.5% chance of a worse or better scenario). We encourage non-scientists to provide feedback on that figure, as it is challenging to present more detailed data in ways that are easily digestible.

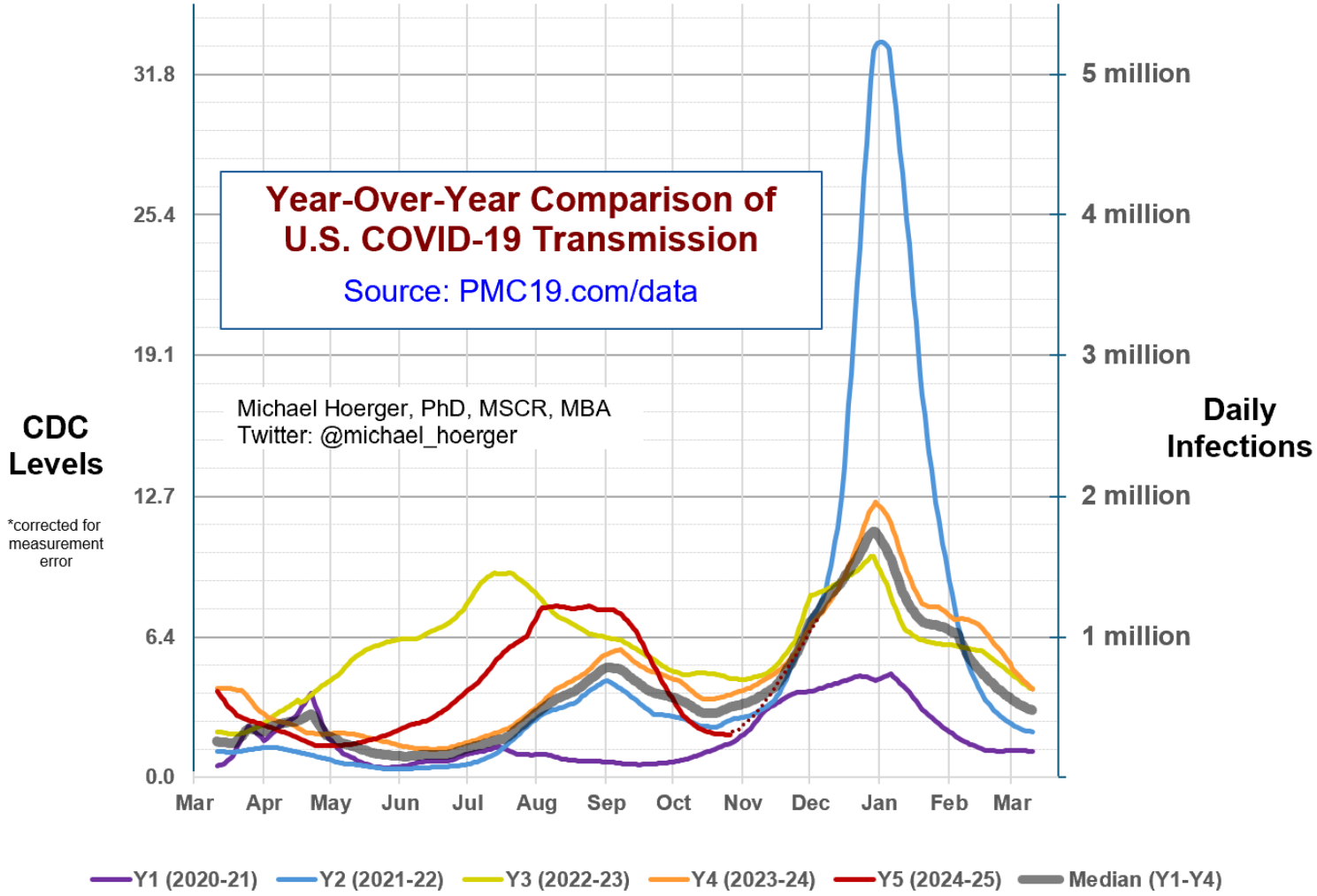
The Big-Picture View of the Pandemic

The 10th wave of COVID in the U.S. has quite likely begun. We estimate that the low point of the “lull” was approximately October 18, but as one will note looking at the summer wave, the most extreme level is a bit moot over the course of a month and likely will not be known with great certainty except in hindsight. Data from the CDC, Biobot, WastewaterSCAN, and others that have 10-12 day lags show stability or rising levels. Transmission is expected to increase rapidly in November, if following historical patterns of transmission and the shape of waves. We expect high transmission the remainder of 2024.



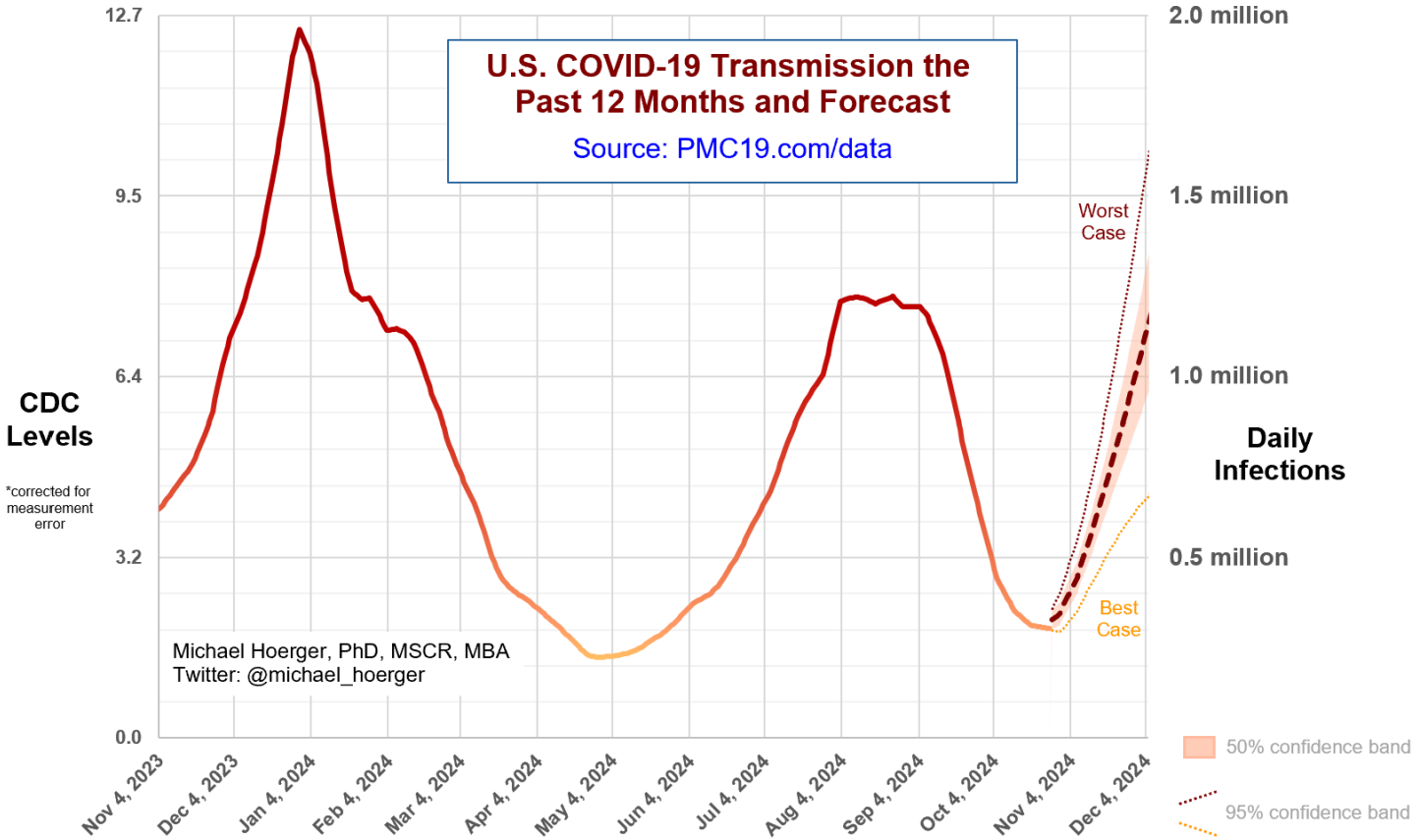
Year-Over-Year Comparisons

The year-over-year comparisons suggest transmission may increase with a pattern very similar to prior years, very close to the gray line for median transmission. It is hard to see the red dashed line on top of it. Accordingly, top medical centers, including the NIH Clinical Center, have begun re-requiring masks.



Close-up on the Current Forecast

Covid transmission is likely on the rise. In the most recent update, we have updated this version of the figure (see Technical Appendix). The red dashed line shows the point estimate (best estimate) for the forecast. The surrounding peach-colored band shows the 50% confidence interval, or typical variation one might expect. The 95% confidence band is shown with the thin dashed lines, which essentially mean the worst- and best-case scenarios within predictable scenarios. Looking closely at the vertical gray line for today's date (Nov 4), note that it is in the forecasted range because the data PMC is working with from Biobot and CDC have a reporting lag time that make them 10-12 days old today. Thus, the numbers for "today" can really be thought of as a 10-day forecast from the most recently-available high-quality data. This is a bit like estimating today's weather based on data from 10 days ago. It is important to acknowledge this because people often look at CDC data and think it is showing today's picture, but that's really only possible with forecasting. The "one month" forecast is, thus, about a 40-day forecast from the data, when accounting for lags. That's analogous to a 40-day weather forecast. In a month, the point estimate is that we will see 1.15 million daily infections, with a typical range of 0.95-1.35 million daily infections, a realistic worst-case scenario of 1.6 million and best-case scenario of 0.7 million.



Supplemental Statistics

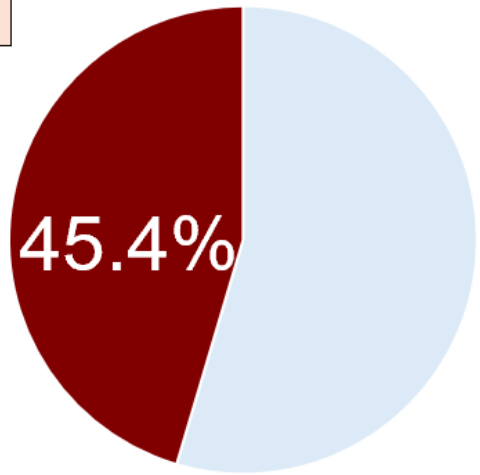
These supplemental statistics may prove useful in conversations about transmission and mitigation. The numbers are comparable to last week. We see that 1 in 115 are actively infectious, or 0.9% of the population, an increase over a week ago (0.7% in corrected numbers). In a university classroom of 75 people, it should be assumed that someone (about a 50% chance) has infectious COVID. Transmission is higher than 45% of the pandemic and lower than 55% of the pandemic. The impact on potential Long COVID cases the next month will be staggering, and expect high transmission throughout the remainder of 2024. Note that the "Running Totals" are retroactively corrected downward ever so slightly due to reintegrating Biobot data, which had a smaller summer wave.

Current Levels for Nov 4, 2024
% of the Population Infectious
0.9% (1 in 115)
New Daily Infections
417,000
New Weekly Infections
2,919,000
Resulting Weekly Long COVID Cases
146,000 to 584,000

Monthly Forecast
Average % of the Population Infectious
1.5% (1 in 65)
Average New Daily Infections
735,033
New Infections During the Next Month
22,051,000
Resulting Monthly Long COVID Cases
1,103,000 to 4,410,000

Running Totals
Infections Nationwide in 2024
227,349,000
Average Number of Infections Per Person All-Time, U.S.
3.46

How Does Risk Increase with More Social Contacts?			
Number of People	Chances Anyone Is Infectious	Number of People	Chances Anyone Is Infectious
1	0.9%	15	12.3%
2	1.7%	20	16.1%
3	2.6%	25	19.7%
4	3.4%	30	23.1%
5	4.3%	35	26.4%
6	5.1%	40	29.6%
7	5.9%	50	35.5%
8	6.8%	75	48.2%
9	7.6%	100	58.4%
10	8.4%	300	92.8%



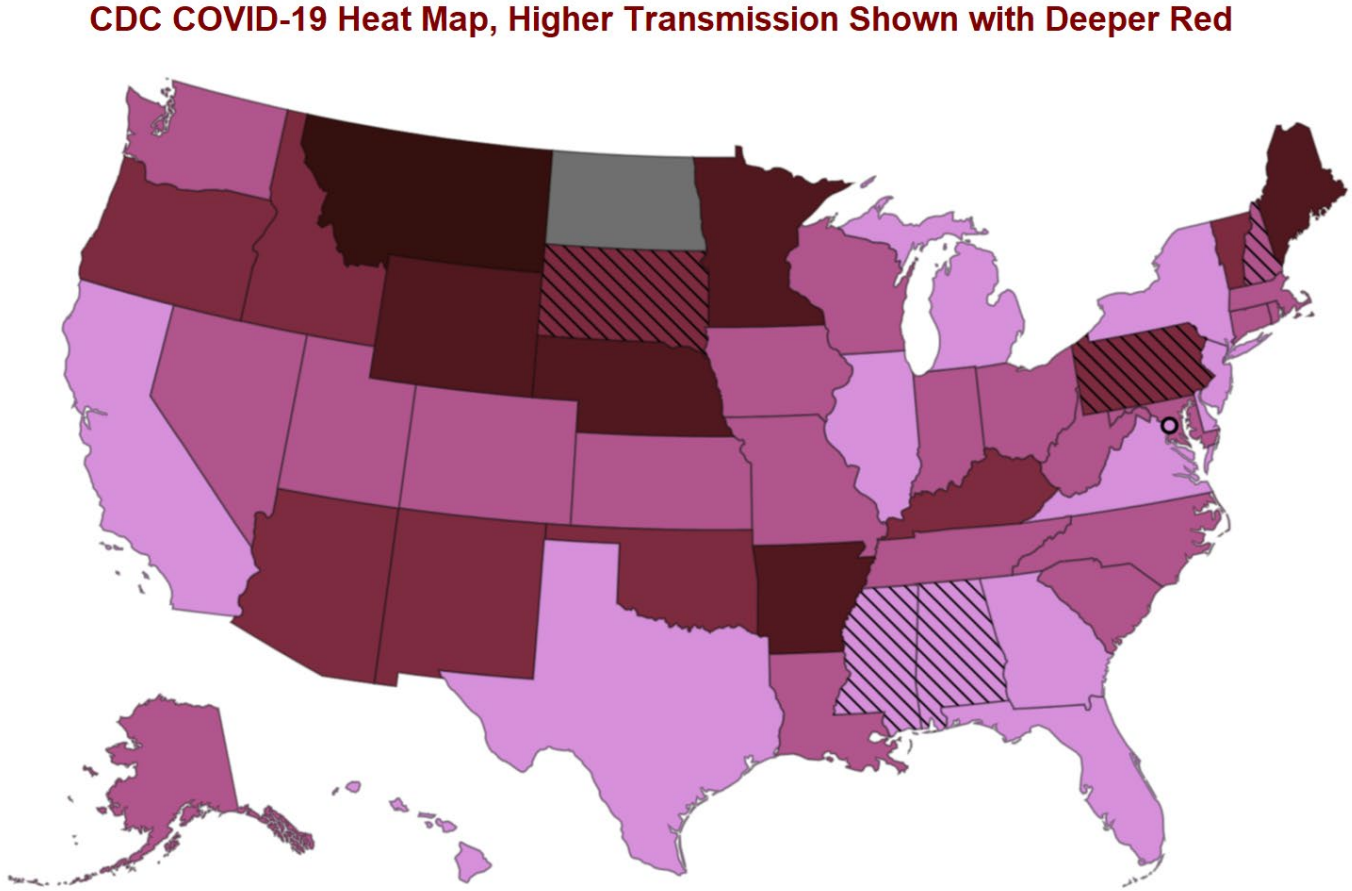
There is more COVID-19 transmission today than during 45.4% of the pandemic.

pmc19.com/data

Michael Hoerger, PhD, MSCR, MBA
Twitter: @michael_hcerger

CDC COVID-19 Heat Map

This map uses the CDC state-by-state data to show areas with higher transmission in deeper red. Notice the considerable geographic variation. The CDC version of the map, colored in cool blue is available online. Blue tends confuse people into thinking transmission is “cool” or low, so we and various popular media outlets (e.g., Newsweek) tend to recolor. The dashed lines indicate atypically low representation from the wastewater sites within a state.
https://www.cdc.gov/nwss/rv/COVID19-currentlevels.html

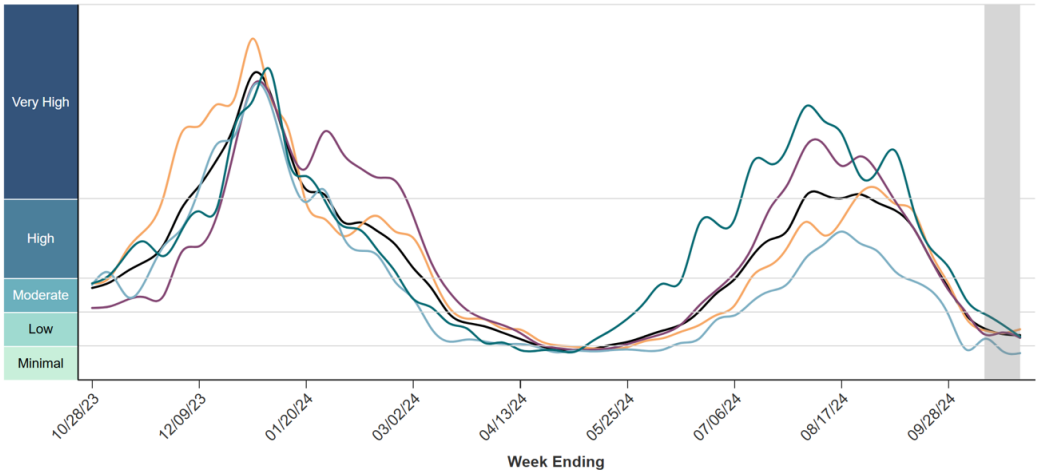


Regional Case Estimation

This graph from the CDC shows regional variation in transmission. You can use the “PMC Regional Multiplier” to get a ballpark estimate the proportion of a given region actively infectious with COVID-19 (see Technical Appendix document on the dashboard page). Notice that the Midwest was highest and increasing in these data from 10 days ago.

The CDC regional data are available online:
https://www.cdc.gov/nwss/rv/COVID19-nationaltrend.html
State-level data are also available: https://www.cdc.gov/nwss/rv/COVID19-statetrend.html

CDC Regional Levels with PMC Estimates of the Percentage Actively Infectious



Estimated Percentage Actively Infectious*		PMC Model	Raw CDC Data
	National	0.9% (1 in 115)	0.7% (1 in 154)
	Northeast	0.5% (1 in 192)	0.4% (1 in 257)
	Midwest	1.0% (1 in 101)	0.7% (1 in 136)
	South	0.8% (1 in 122)	0.6% (1 in 163)
	West	0.8% (1 in 119)	0.6% (1 in 159)

* The "Raw CDC" values are simply the value in the CDC chart multiplied by the PMC Regional Multiplier. The "PMC Model" estimates adjust those data by accounting for reporting time lag.

PMC Regional Multiplier*
0.329

* CDC level multiplied by the PMC Regional Multiplier provides an approximate estimate of the percentage actively infectious.

PMC COVID-19 Dashboard

Here is the complete PMC COVID-19 Dashboard. Please share the images across social media and other websites.
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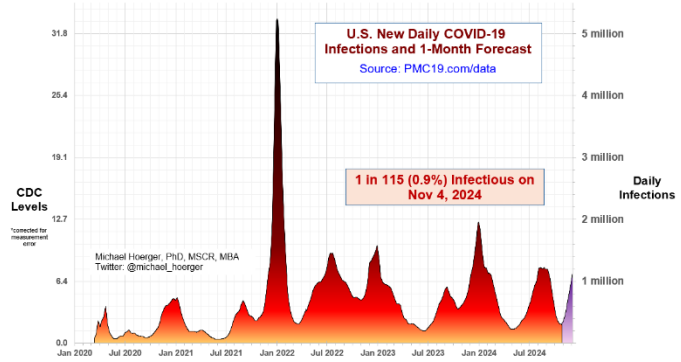

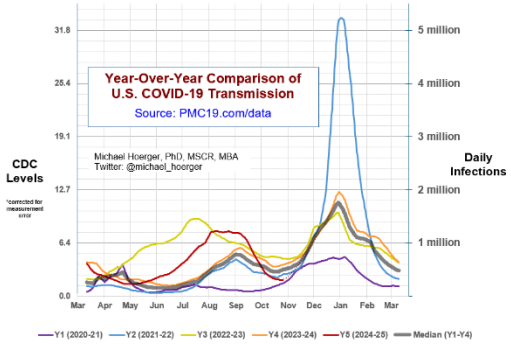

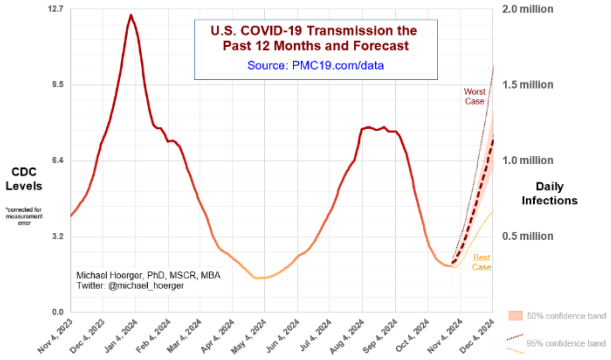

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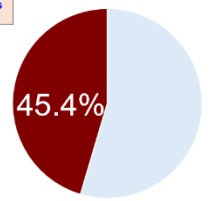
pmc19.com/data Michael Hoerger, PhD, MSCR, MBA Twitter: @michael_hoerger



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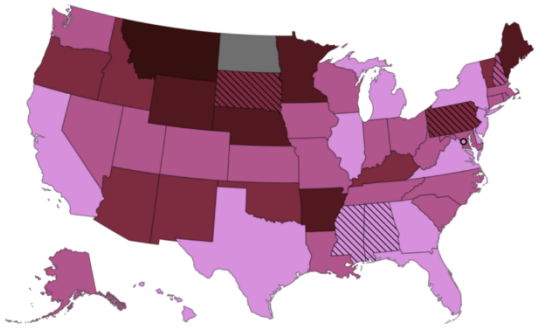
CDC COVID-19 Heat Map, Higher Transmission Shown with Deeper Red



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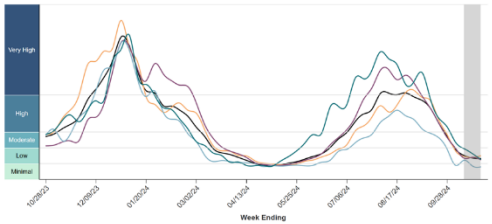

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Announcements

Aug 1
Check out our new empirical article in JAMA-NO framing masking in healthcare as a healthcare quality indicator.
Article: https://jamanetwork.com/journals/jamanetworkopen/article-abstract/2821699
Summary: https://www.msn.com/en-gb/health/other/masking-policies-prevalent-in-top-cancer-centers-amid-winter-covid-wave/ar-BB1qZWnr
Twitter Spaces Conversation: https://x.com/i/spaces/1OdKrXllryAJX
*If new to Twitter, it is not terribly challenging to create an account. Do so, and check in once a month or so. You may find it more useful than realized. I did.
PPT for the Space: https://pmc19.com/jama.pdf

Aug 15
The dashboard and a related pilot project were featured on CBS, NBC, and FOX:
https://www.wwltv.com/article/news/health/new-orleans-free-home-air-filters-for-cancer-patients-covid-cases-special-kit-safe/289-5d873151-7069-478a-ab03-2260cd08c22a

Sep 17
Dr. Hoerger joined Dr. Moriarty and COVID-19 Resources Canada. We will post a link when the archived video is available. We received an update that the archived version is in progress.

A separate document called a Technical Appendix appears on the dashboard page and has more methodologic info.