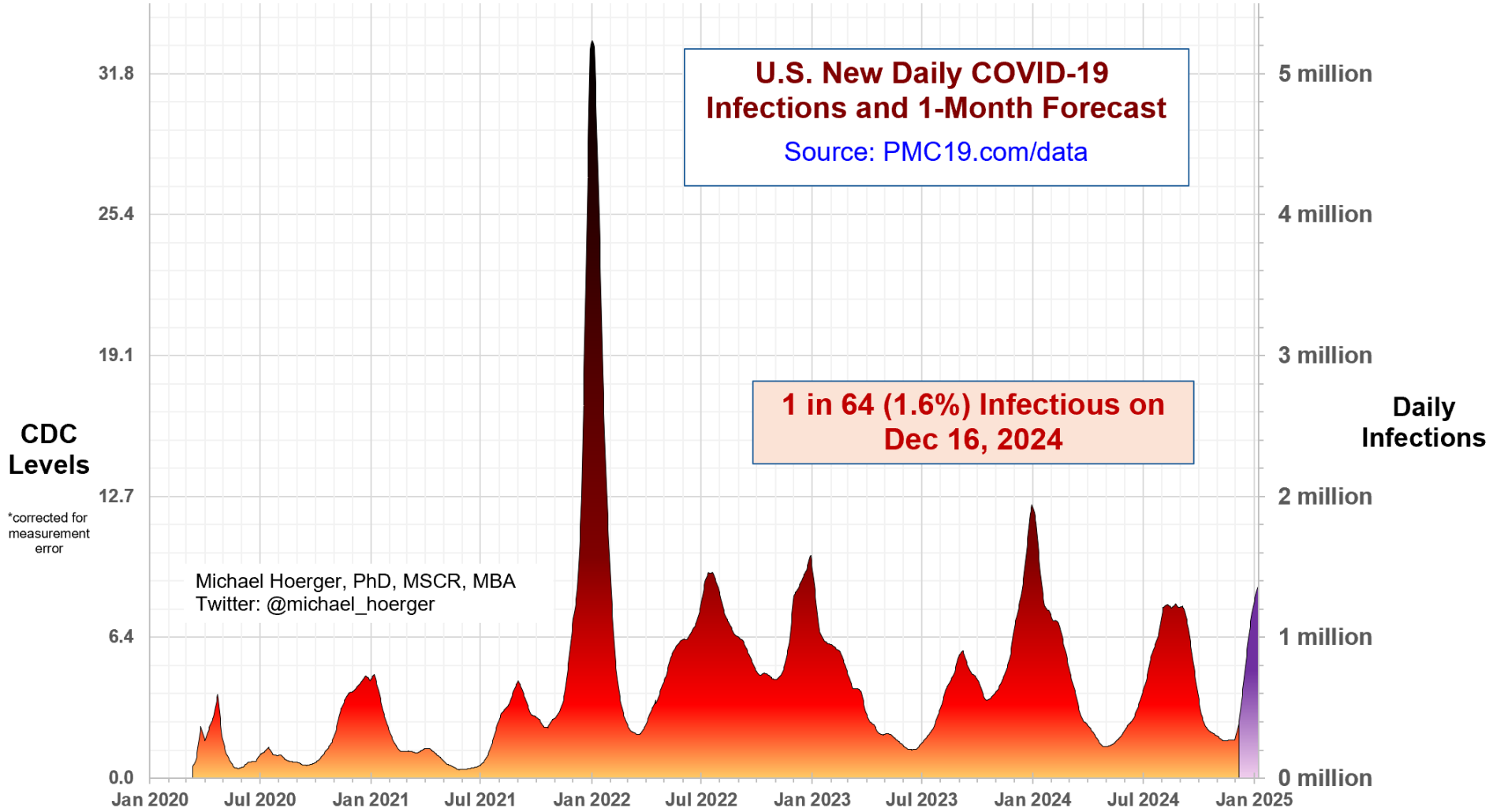
PMC U.S. COVID-19 Case Estimation and Forecasting Model: Report for December 16, 2024, pmc19.com/data

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



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Announcements

PMC Dashboard Survey: Please complete our quick survey about how you use this dashboard. The results will be used in a grant application documenting our public health impact and will hopefully help get additional funding for Covid mitigation supplies for patients with cancer. We would be pleased to share the results with other organizations interested in making the case that people continue to take Covid seriously and that more funds are needed for outreach and supportive activities. Findings will ultimately be published and document the high-level precautions many continue to use.

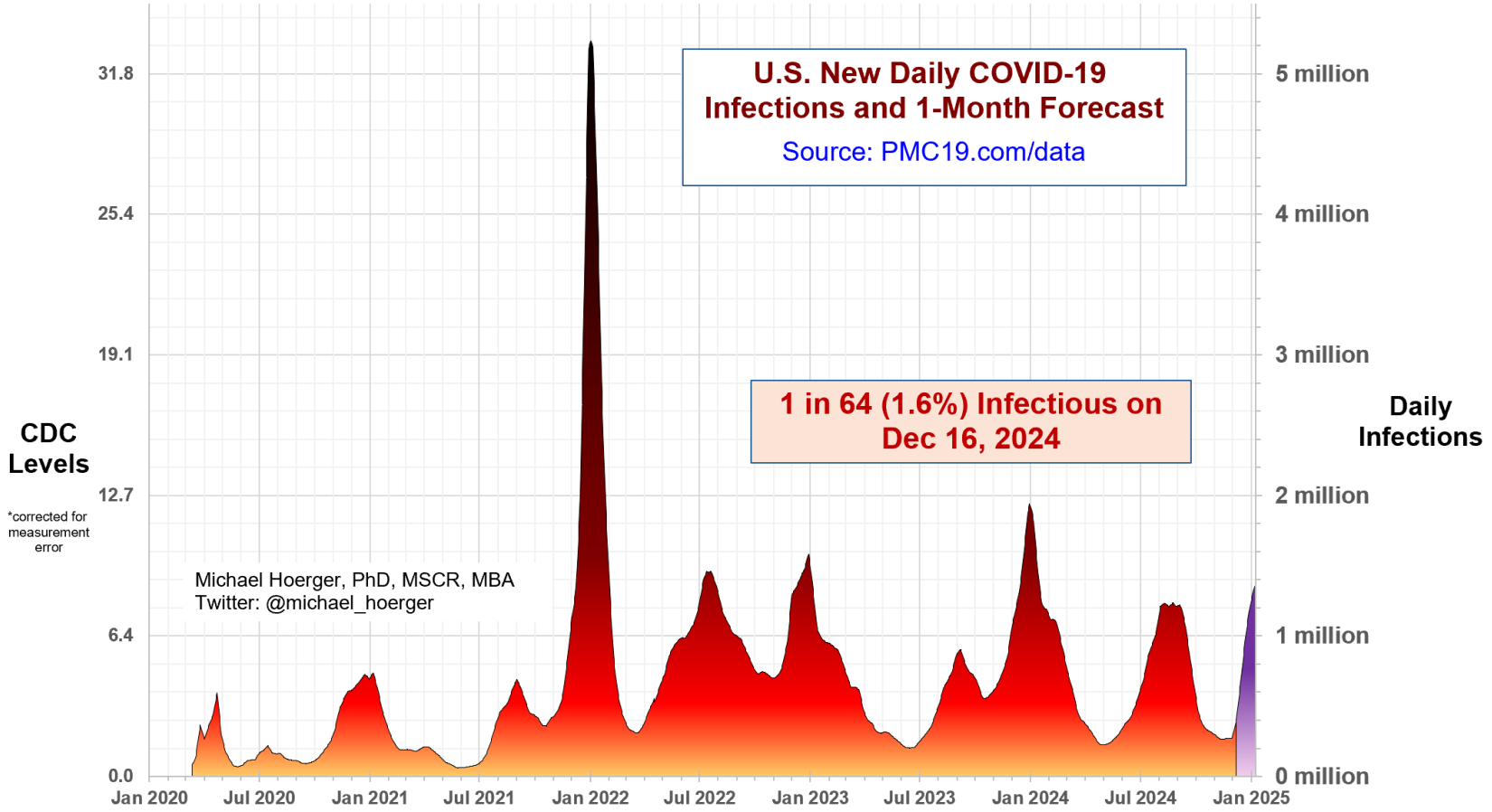
Survey Link: https://tulane.co1.qualtrics.com/jfe/form/SV_0okopCSxA26Mgxo

Letters of Support: We are aiming to expand our COVI-CAN program, which provides Covid Defense Kits (educational booklets, tests, masks, air purifiers) to patients with cancer and are seeking organizational letters in support of continued funding. Please reach out to Dr. Hoerger (mhoerger@tulane.edu) if potentially interested in helping, and we will make the process as easy as possible. Thank you.

Project Link: https://covican.com/

The Big-Picture View of the Pandemic

The CDC's most recent data show the highest percentage increase in Covid transmission in nearly 3 years. A simple way of viewing this is that transmission is playing "catch up." The winter wave still has an excellent chance of being smaller than last year, but not quite nearly as small as many had hoped. Transmission is looking quite high. Presently, 1.6% of the population (1 in 64 people) is estimated to be actively infectious with Covid, meaning just under 750,000 daily infections. Transmission is higher than during 73% of the pandemic, and lower than during 27% of the pandemic. We are seeing about 5 million infections a week now, likely resulting in over 200,000 eventual Covid-associated conditions or Long Covid. It is unknown whether LP.8.1 is implicated as the variant data lag more than transmission data. This week's forecast is an early warning signal to take the next several weeks very seriously. Follow Dr. H. on Twitter for daily updates on the various dashboards.

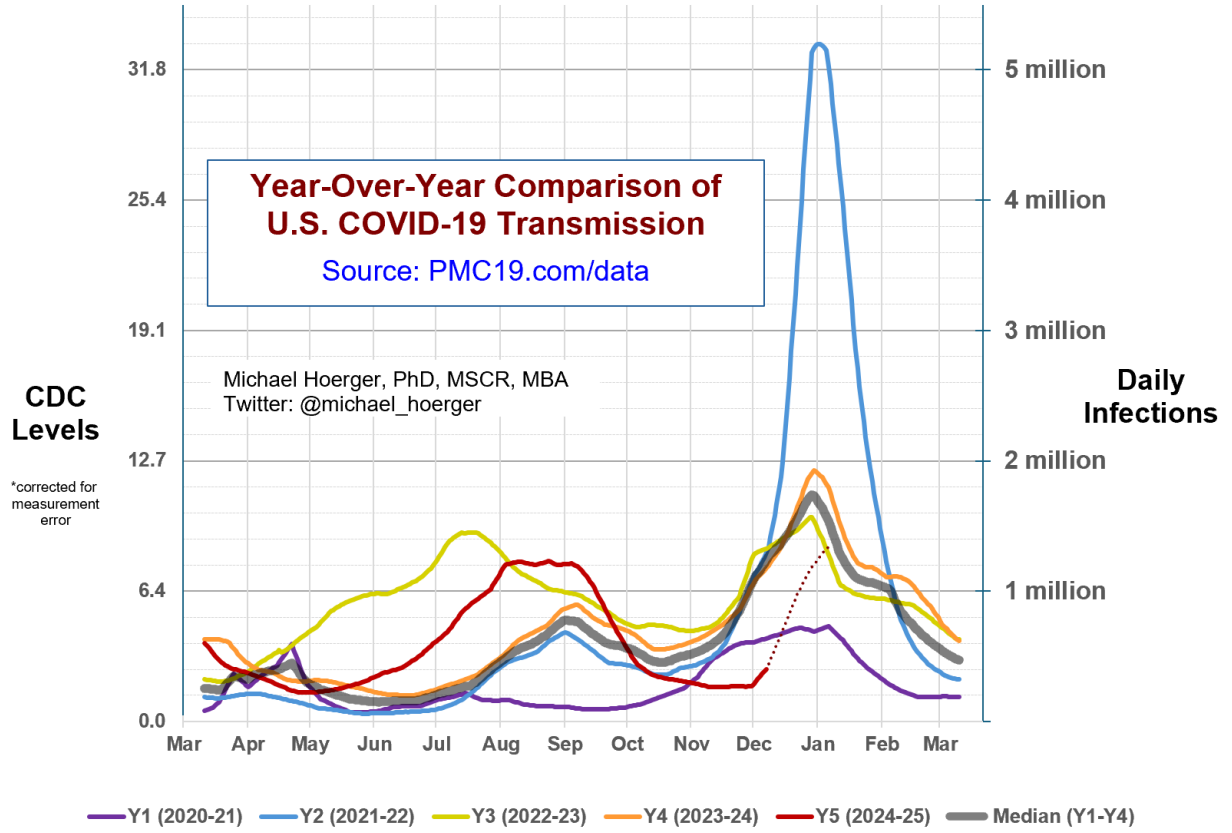


Year-Over-Year Comparisons

This is the most useful graph in this report because it clearly shows how 2024 transmission has varied so considerably from prior years. Notice the large, late, and atypically shaped summer wave, the extremely rapid decline in transmission post-wave, the extended lull, the lack of increase in transmission in November, and now the extremely large increase in transmission.

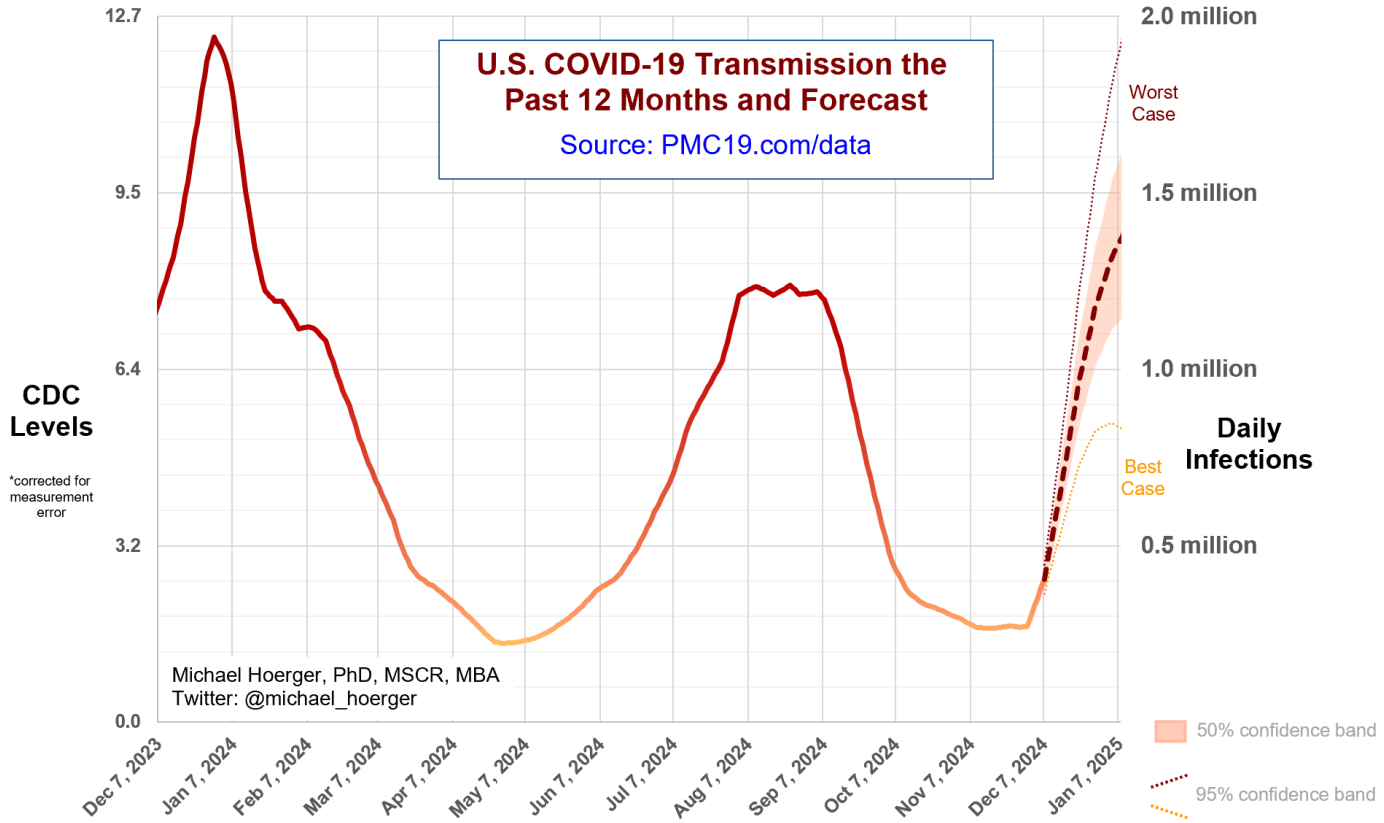
The level and timing of the wave peak remain highly uncertain, as does the level of transmission post-peak. If transmission continues to pick up at rates much higher than average, we could still see a peak around New Year's Eve – a "silent surge" in which we got from lull-to-peak faster than ever before, many are caught off guard, and are shocked to get Covid during holiday travel, family gatherings, and back-to-school. Alternatively, a peak closer to January 7 remains plausible. We are in uncharted territory in terms of the pattern of transmission and behaviorally testing how quickly as a society we can increase transmission.

Please share this information with others immediately. Most people are not monitoring transmission and detect a wave based on "anecdata" of the number of people they personally know who have recently gotten Covid.



Close-up on the Current Forecast

During this less certain time period, this graph gives a range of the likely scenarios as we enter 2025. With transmission picking up at a faster rate than any time since the climb toward the BA.1. Omicron surge in December of 2021, the model has recalibrated upward. However, the uncertainty is still quite apparent. Note that Biobot (20% of model weight) has taken two weeks off from reporting, so these projections are based on the CDC data (normally 80% model weight). Nonetheless, the transmission patterns are consistent with the Walgreens dashboard as well as the WastewaterSCAN dashboard. The model suggests we will approach 1.3-1.4 million daily infections as we enter 2025. Better and worse case scenarios are both plausible. First, the optimistic projections. We had a late and extended lull, with transmission normally rising rapidly in November, but quite delayed this year. It is possible the current numbers could get retroactively corrected downward, especially when Biobot catches up on reporting, and we may still peak at “only” 800,000 daily infections. This would assume continued good luck with a lack of immune escape. In contrast, we have never had such a delayed spike in transmission, and it is possible that incautious behavior will continue to drive up transmission more quickly than in prior winters, “catching up” essentially to where we ordinarily would have been heading in a more typical year. If LP.8.1 takes off, this could catalyze the larger peak.



Supplemental Statistics

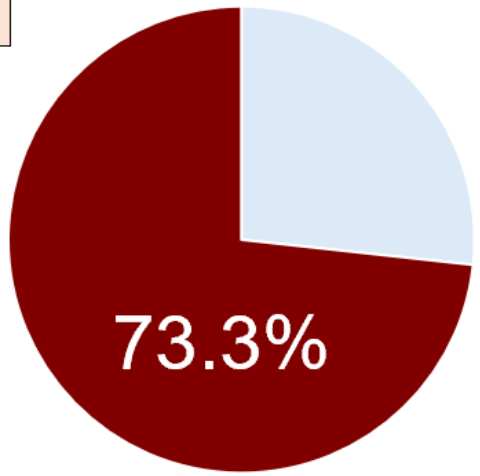
These supplemental statistics may prove useful in conversations about transmission and mitigation. The numbers have gotten substantially worse relative to last week. We see that 1 in 64 are actively infectious, or 1.6% of the population. In a university classroom of 40-50 people, it should be assumed that someone (about a 50% chance) has infectious COVID. On a flight of 100-300 people, that's a 80-99% chance someone is infectious. Transmission is higher than 73% of the pandemic and lower than 27% of the pandemic. We may see 35 million infections over the next months, if the middle estimate of the model holds.

Current Levels for Dec 16, 2024
% of the Population Infectious
1.6% (1 in 64)
New Daily Infections
748,000
New Weekly Infections
5,236,000
Resulting Weekly Long COVID Cases
262,000 to 1,047,000

Monthly Forecast
Average % of the Population Infectious
2.5% (1 in 41)
Average New Daily Infections
1,178,167
New Infections During the Next Month
35,345,000
Resulting Monthly Long COVID Cases
1,767,000 to 7,069,000

Running Totals
Infections Nationwide in 2024
242,424,000
Average Number of Infections Per Person All-Time, U.S.
3.50

How Does Risk Increase with More Social Contacts?			
Number of People	Chances Anyone Is Infectious	Number of People	Chances Anyone Is Infectious
1	1.6%	15	21.1%
2	3.1%	20	27.1%
3	4.6%	25	32.6%
4	6.1%	30	37.7%
5	7.6%	35	42.4%
6	9.0%	40	46.8%
7	10.5%	50	54.6%
8	11.9%	75	69.4%
9	13.2%	100	79.3%
10	14.6%	300	99.1%



There is more COVID-19 transmission today than during 73.3% of the pandemic.

pmc19.com/data

Michael Hoerger, PhD, MSCR, MBA
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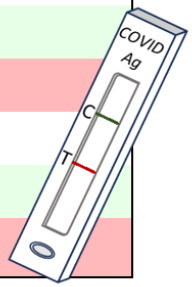
Holiday Estimates

Here are some estimates for plausible scenarios for Christmas and New Year's Eve. Last year, we posted these much earlier because transmission patterns closely followed the median or "typical" patterns of transmission. With this year following an atypical pattern of transmission, it was wiser to hold off in posting. Note, these tables assume the likelihood of exposure (not necessarily infection) under circumstances where people are not testing or isolating. Consider them sort-of a base model. Testing and isolation policies reduce exposure risk. Vaccinations, masking, good indoor air quality, and limiting exposure time all help to reduce infection risk even when exposed.

PMC Christmas Day Forecast - December 25, 2024

How Does Risk Increase with More Social Contacts?

Number of People	Chances Anyone Is Infectious	Number of People	Chances Anyone Is Infectious
1	2.3%	15	29.0%
2	4.5%	20	36.6%
3	6.6%	25	43.5%
4	8.7%	30	49.6%
5	10.8%	35	55.0%
6	12.8%	40	59.8%
7	14.8%	50	68.0%
8	16.7%	75	81.9%
9	18.6%	100	89.8%
10	20.4%	300	99.9%



Assumes no testing/isolation protocols, forecasted 12/15/24 (U.S.)

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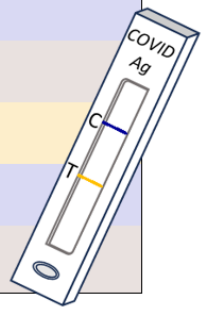
PMC New Year's Eve Forecast - Dec 31, 2024

How Does Risk Increase with More Social Contacts?

Number of People	Chances Anyone Is Infectious	Number of People	Chances Anyone Is Infectious
1	2.6%	15	32.5%
2	5.1%	20	40.8%
3	7.6%	25	48.1%
4	9.9%	30	54.4%
5	12.3%	35	60.0%
6	14.5%	40	64.9%
7	16.8%	50	73.0%
8	18.9%	75	86.0%
9	21.0%	100	92.7%
10	23.0%	300	99.9%



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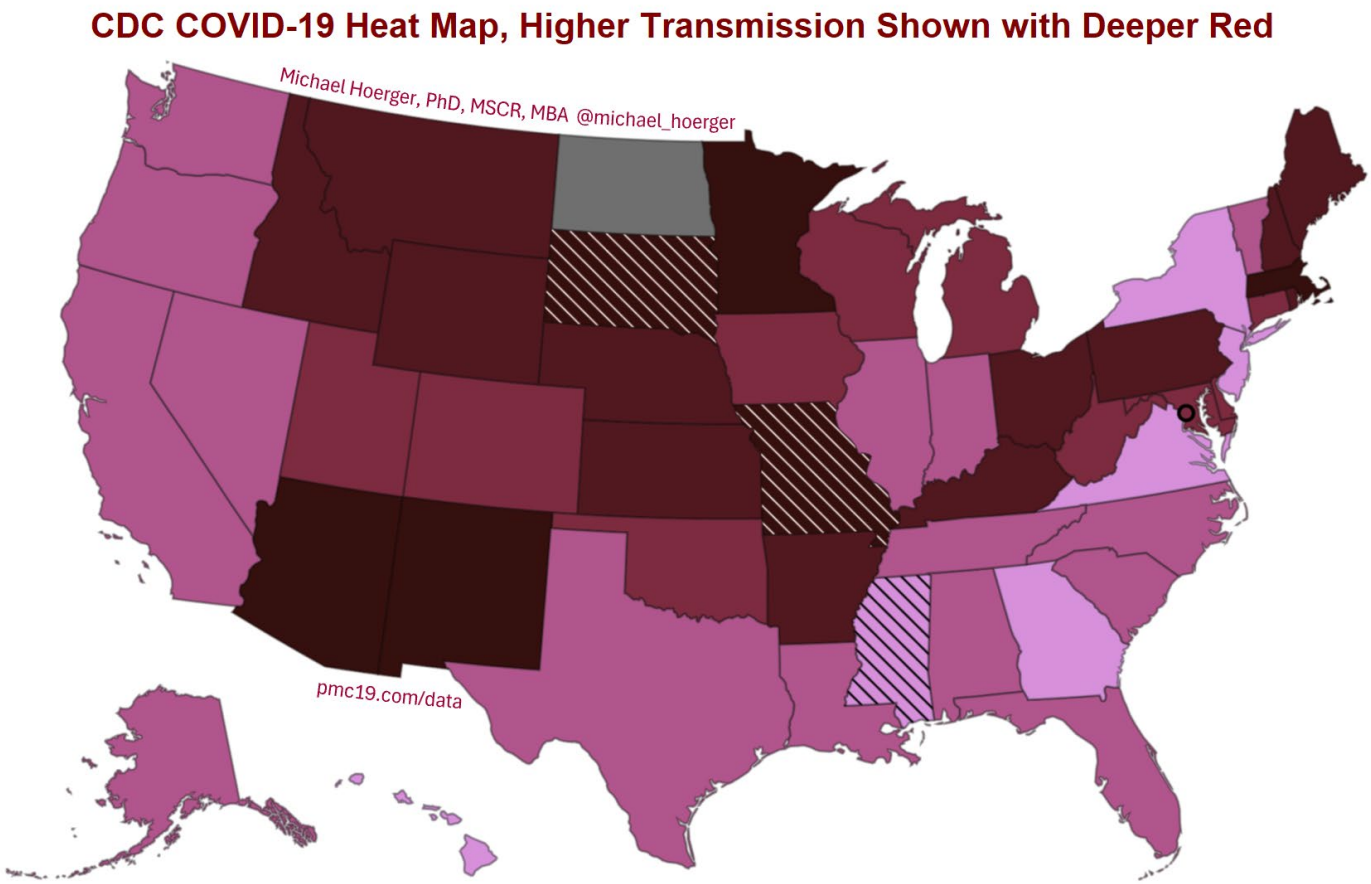
CDC COVID-19 Heat Map

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

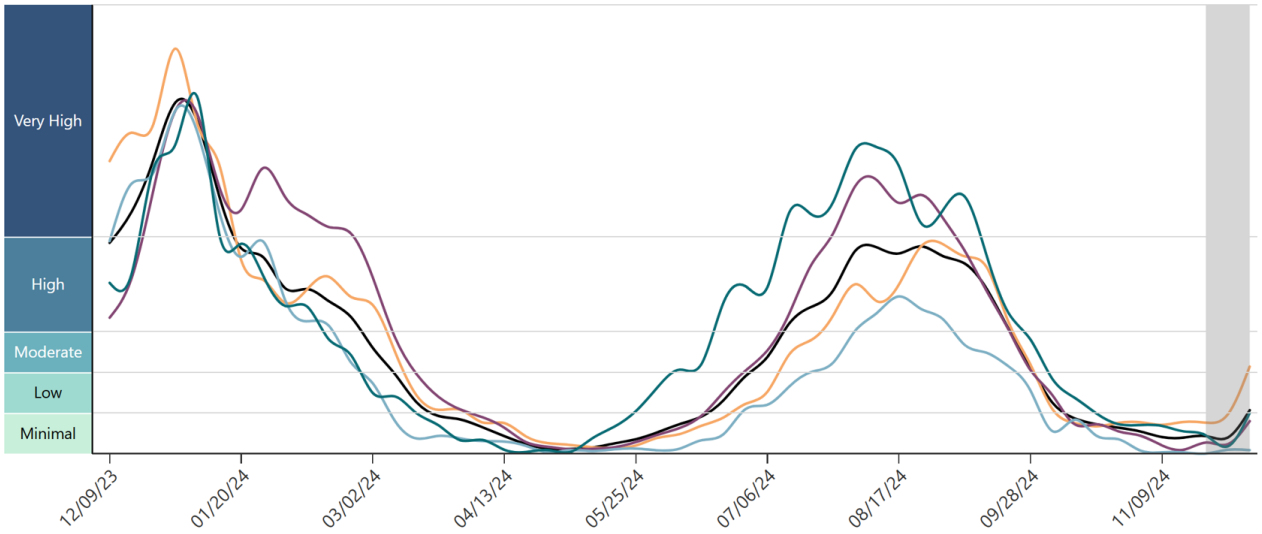


Regional Case Estimation

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).

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	1.6% (1 in 64)	0.9% (1 in 113)
	Northeast	0.8% (1 in 132)	0.4% (1 in 234)
	Midwest	2.4% (1 in 41)	1.4% (1 in 73)
	South	1.3% (1 in 74)	0.8% (1 in 132)
	West	1.5% (1 in 66)	0.9% (1 in 118)

* 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*
0.331

* 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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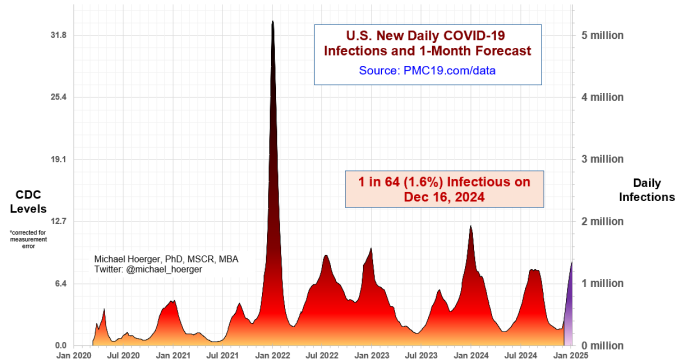

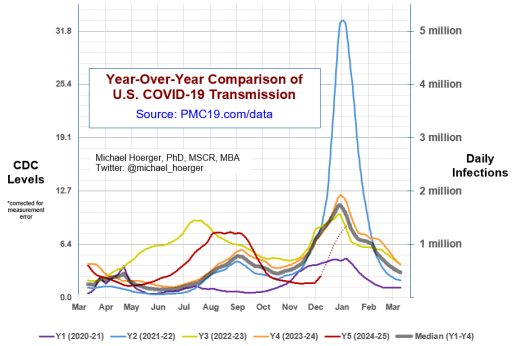

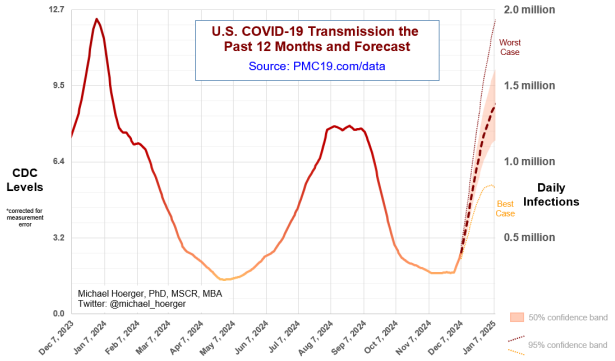

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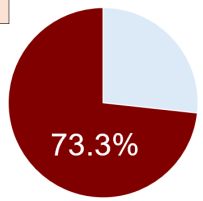

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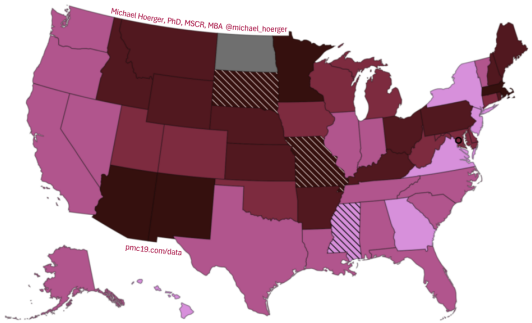
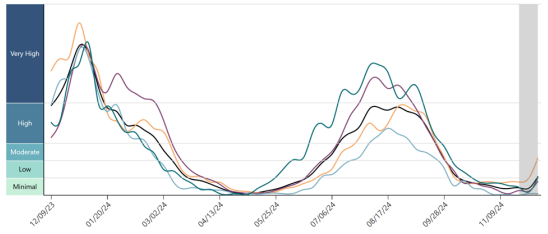
CDC COVID-19 Heat Map, Higher Transmission Shown with Deeper Red



CDC Regional Levels with PMC Estimates of the Percentage Actively Infectious



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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.

Later in 2024
Dr. Hoerger joins as a guest on the new podcast, Public Health Is Dead. No financial COIs. Catch the trailer online:
https://www.publichealthisdead.com/

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