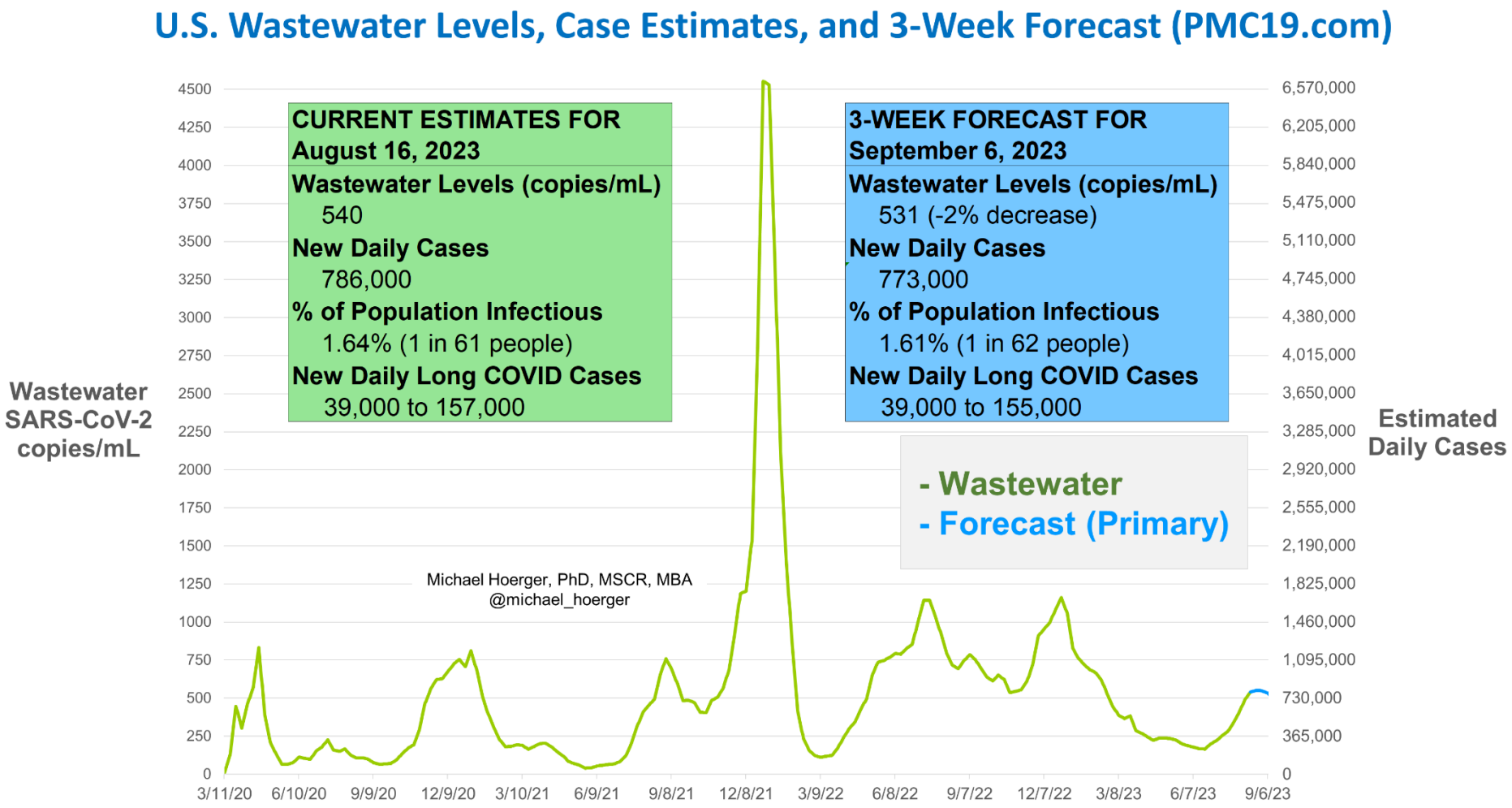
Michael Hoerger, PhD, MSCR, MBA, Pandemic Mitigation Collaborative
U.S. SARS-CoV-2 Wastewater Levels, COVID-19 Cases, and 3-Week Forecast: Report for August 16, 2023, pmc19.com/data



Cite as: Hoerger, M. (2023, August 16). *U.S. SARS-CoV-2 wastewater levels, COVID-19 cases, and 3-week forecast: Report for August 16, 2023*. Pandemic Mitigation Collaborative. http://www.pmc19.com/data

Informal Commentary:

U.S. #wastewater levels are higher than during the majority (61.5%) of the pandemic:

- 1.64% (1 in 61 people) are infectious
- 786,000 new daily COVID-19 cases
- Causing 39,000 to 157,000 new #LongCOVID cases per day

What's the Weekly Picture? How's 2023 Been So Far?

The PMC model estimates over 5.5 million U.S. C0VID cases per week, leading to >275,000 weekly Long C0VID cases. The PMC model estimates over 130 million U.S. C0VID cases so far in 2023, leading to at least 6.5 million Long C0VID cases so far this year. These estimates are, arguably, quite conservative (lower limit assumes 5% of cases result in Long C0VID) and highly concerning. As noted previously, to put in context, about 2 million Americans get cancer per year. We're basically ignoring a disease with high incidence, prevalence, and impairment in terms of very bad known consequences and unknown 5-10 year consequences.

WEEKLY ESTIMATES FOR August 16, 2023
New Weekly Cases
5,502,000
New Weekly Long COVID Cases
275,000 to 1,100,000

2023 CUMULATIVE ESTIMATES AS OF August 16, 2023
Total 2023 Cases To Date
130,381,000
Total 2023 Long COVID Cases To Date
6,519,000 to 26,076,000

What's the Risk in an Office or in a Classroom?

As shown in subsequent posts, the office and classroom risks are presently quite bad. In a group of 10 people (daycare, team meeting, etc.), there's a 15% chance someone will have infectious COVID. In a group of 20-25 people (e.g., K-12 classroom, department meeting, busy hospital waiting room, etc.), there's about a 34% chance someone would have infectious COVID. In a university classroom of 40-50 people, it should be assumed someone has infectious COVID. This is quite troubling for instructors or students who mix time with multiple groups of classmates each week.

Not all classrooms and meetings are the same. Virtual meetings reduce risk close to zero. Outdoor meetings are often safer than indoors. Testing reduces risk, as do policies that encourage people to stay home when symptomatic. High-quality, well-fitting masks greatly reduce risk. Air quality monitoring and improved air cleaning reduce risk. Recent boosters reduce risk. It remains troubling that elected leaders and public health officials choose to model poor mitigation when ongoing risk is so high.

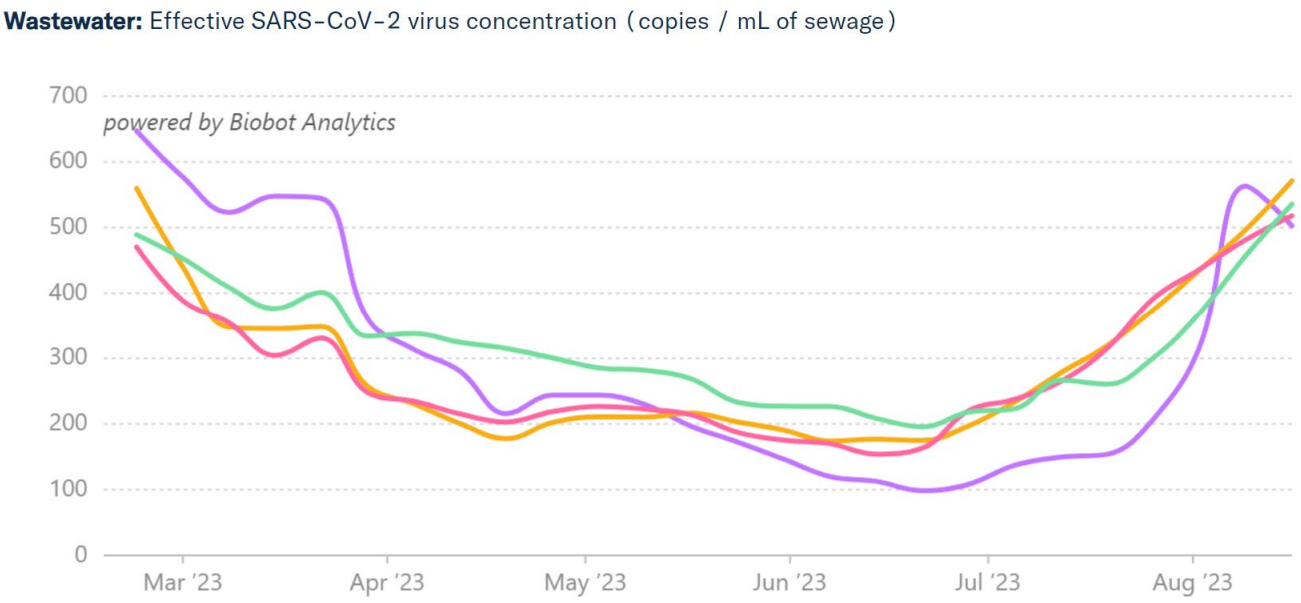
Number of People	Chances Anyone is Infectious	Number of People	Chances Anyone is Infectious
1	1.6%	25	33.9%
2	3.3%	30	39.1%
3	4.8%	35	44.0%
4	6.4%	40	48.4%
5	7.9%	50	56.3%
6	9.5%	75	71.1%
7	10.9%	100	80.9%
8	12.4%	150	91.6%
9	13.8%	200	96.3%
10	15.3%	300	99.3%
15	22.0%	400	99.9%
20	28.2%	500	>99.9%

As mentioned last week, this is the longer-term horizon for mid-December:

	Chances Anyone is Infectious		
Number of People	Low Estimate	Med Estimate	High Estimate
1	2.2%	3.1%	4.6%
2	4.3%	6.0%	9.0%
3	6.4%	8.9%	13.2%
4	8.4%	11.7%	17.1%
5	10.4%	14.4%	20.9%
6	12.4%	17.0%	24.6%
7	14.3%	19.6%	28.0%
8	16.2%	22.1%	31.3%
9	18.0%	24.4%	34.5%
10	19.8%	26.8%	37.5%
20	35.7%	46.4%	60.9%
30	48.4%	60.7%	75.6%
40	58.6%	71.2%	84.7%
50	66.8%	78.9%	90.5%
75	80.9%	90.3%	97.1%
100	89.0%	95.6%	99.1%
200	98.8%	99.8%	>99.9%
300	99.9%	>99.9%	>99.9%

What's Going on in the "Midwest"?

Last week, I cautioned against what many were interpreting as a "surge" in the "Midwest." There was a spike in 2-3 counties in Kansas, Missouri, and a lesser extent in Iowa. That's not a "Midwest surge" in my view. There are usually spikes in 5-ish BioBot counties at any given time, so it's best to avoid overinterpreting if a few happen to fall within a very broad geographic region. The Midwest jumped from the lowest of the 4 regions to the highest. Now it's (marginally) the lowest again. Good to avoid overinterpreting.



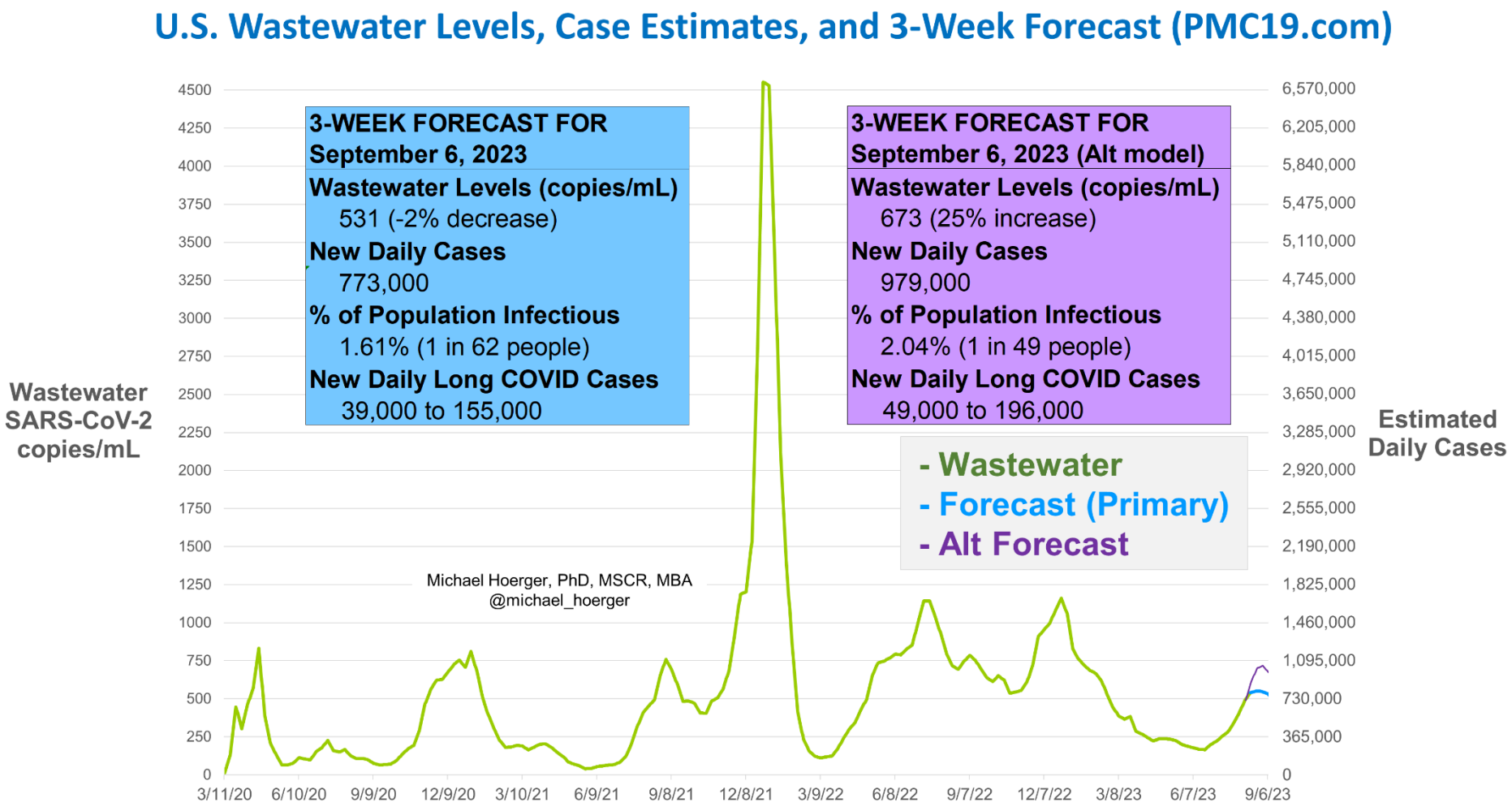
From Biobot.com

How is the Forecast Performing?

The forecast continues to perform extremely well given the data we have, but I will note some caveats and an alternative model.

Each week, BioBot corrects their wastewater level estimates for the last several weeks to account for slow reporting. Often these corrections are random (as likely to be overcorrections as undercorrections) and small, mostly affecting the prior week's numbers. However, the past few weeks, they've had to make substantial corrections to the prior week's numbers, increasing them by >10% (e.g., if they say 400 units/mL one week, the next week they end up correcting that value to 440 units/mL). This could be random error, but it could be a bias in the real-time data toward underestimating, such as if they regions with higher transmission experience delays reporting. Thus, this week, we report our standard model, which is quite conservative in many respects, and an alternative model that assumes an underestimation bias in the BioBot real-time data and predicts a slightly taller hill for the next few weeks.

I'll walk you through our numbers. Last week's (August 9) BioBot estimate was updated from 431 copies/mL to 490 copies/mL, an increase of 13.7%. Other updated values from prior weeks were marginal. Before those BioBot corrections (using the real-time data), we would have forecasted levels of 454 copies/mL for this week. After the BioBot corrections, we would have forecasted 554 copies/mL for this week. That's a big difference. This week's actual value is 540 copies/mL. Thus, the real-time forecast underestimated by 15.9%, so most of the error was driven by the BioBot data underreporting real-time wastewater levels. The model using BioBot's corrected values underestimated by just 2.6%. In the last report, we underestimated by 1.9% with the corrected values.

The PMC reports are usually much more pessimistic than public perception of the pandemic, so it's better to underestimate than overestimate at the margins. For now, we will continue to report our main model as primary. However, I'm also including an alternative model that assumes an underestimation bias in the real-time BioBot data. In future weeks, I may revise the model to avoid or correct current-week real-time data to improve the forecasting model further.

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