

**Wisconsin State  
Laboratory of Hygiene**  
UNIVERSITY OF WISCONSIN-MADISON



# Update on COVID-19 Diagnostic Testing

05-27-20

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MT(ASCP)

WCLN Network Coordinator

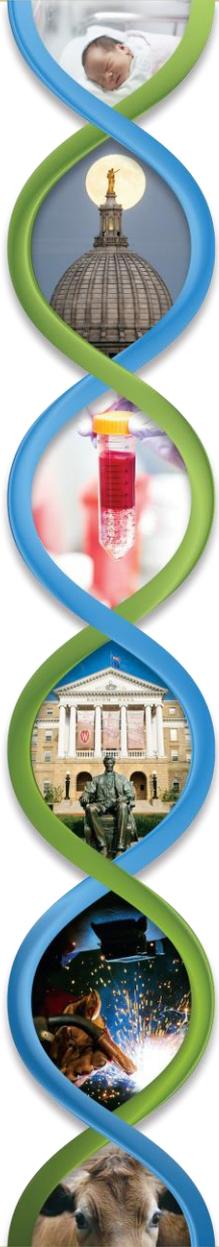
Communicable Disease Division

Wisconsin State Laboratory of Hygiene



# Contents

- Situation Update
- Second Wave?
- WSLH Criteria update
- Pooling specimen
- PCR not good for Test of Cure
- Q and A





# Notice

This information is subject to rapid change.

Please refer to our webpage for the most up to date guidance

<http://www.slh.wisc.edu/clinical/diseases/covid-19/>

The WSLH does not endorse products of any kind





Jacksonville Beach reopened 26 minutes ago. This is a live picture.

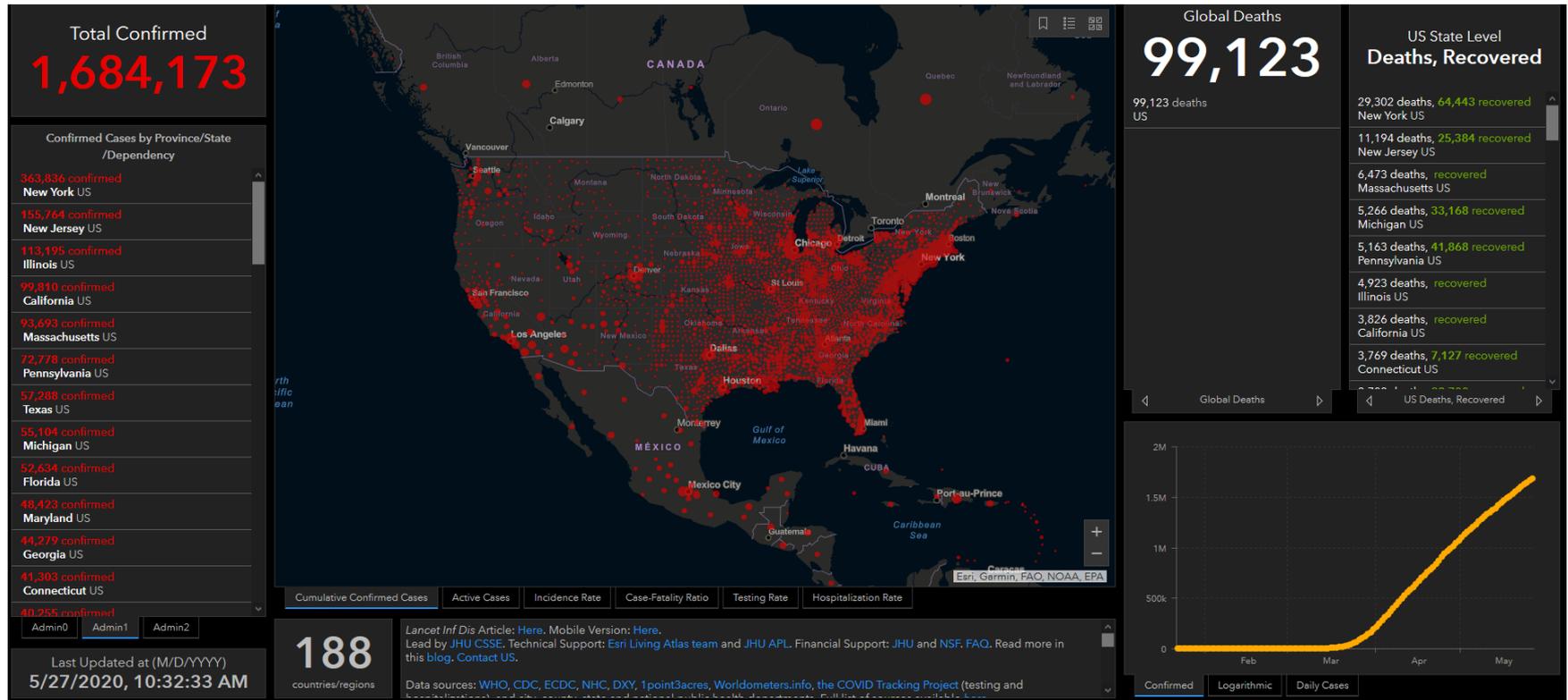


 Coronavirus likes this.





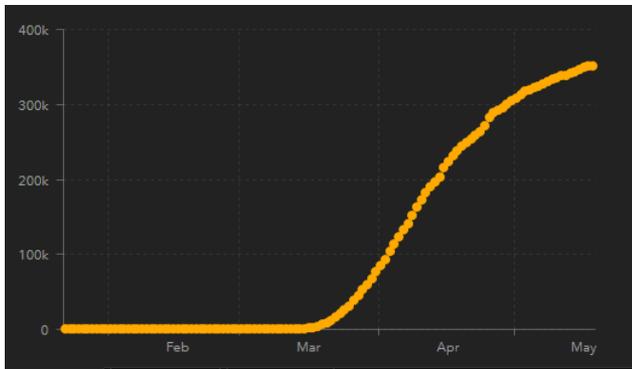
# COVID-19 in the US



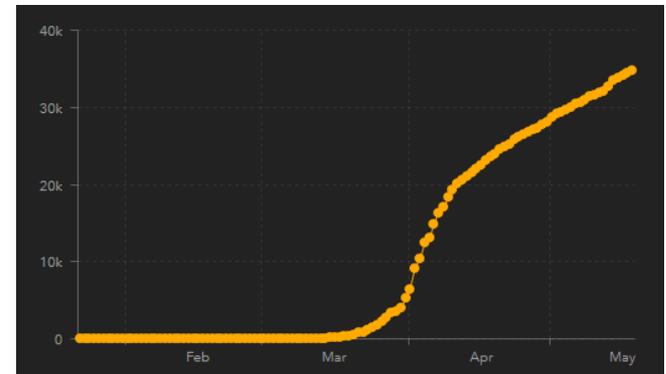


# Where are We on the Curve?

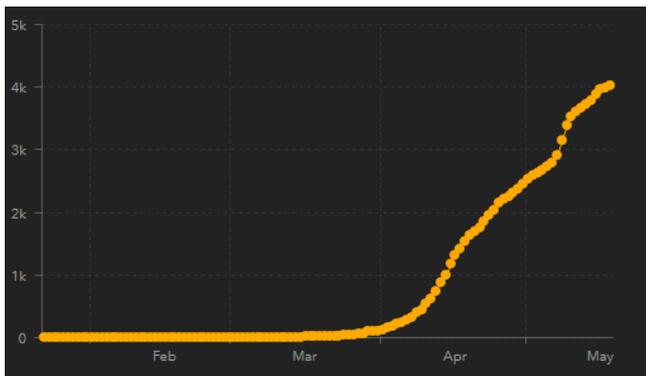
## New York



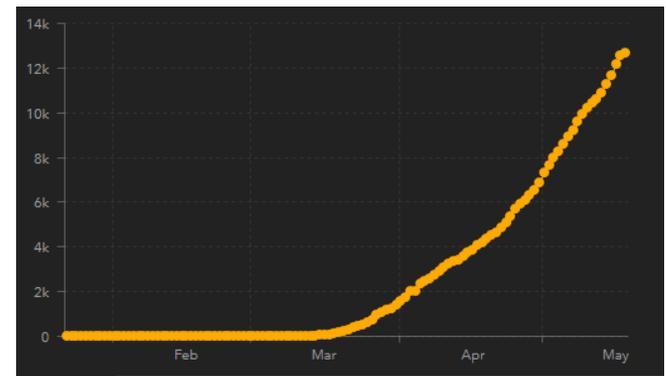
## Louisiana



## South Dakota



## Wisconsin

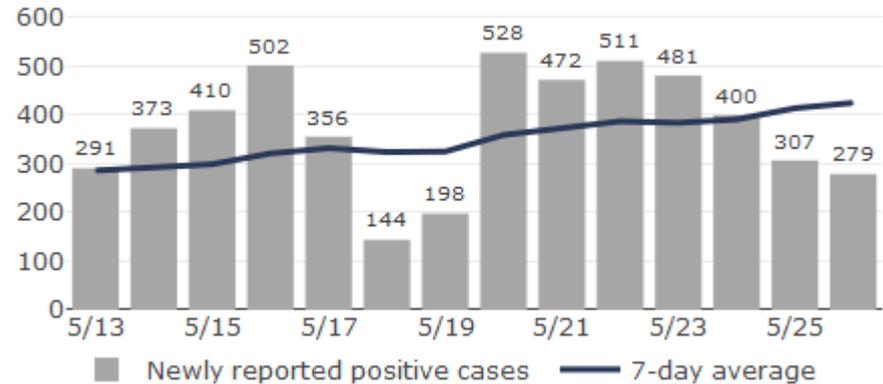




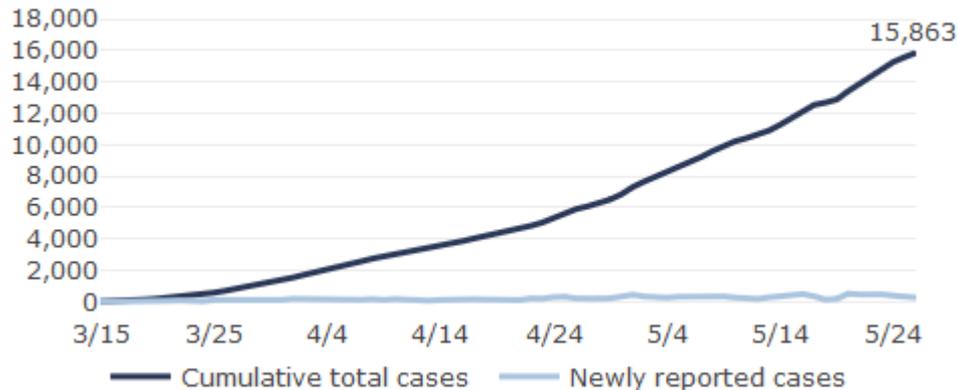
# Wisconsin

Status	Number (%) of People as of 5/26/2020	
Negative Test Results	200,874	$\Delta 88,126$
Positive Test Results	15,863	$\Delta 5,252$
Hospitalizations	2,362 (15%)	$\Delta 485$
Deaths	517	$\Delta 99$

Updated: 5/26/2020



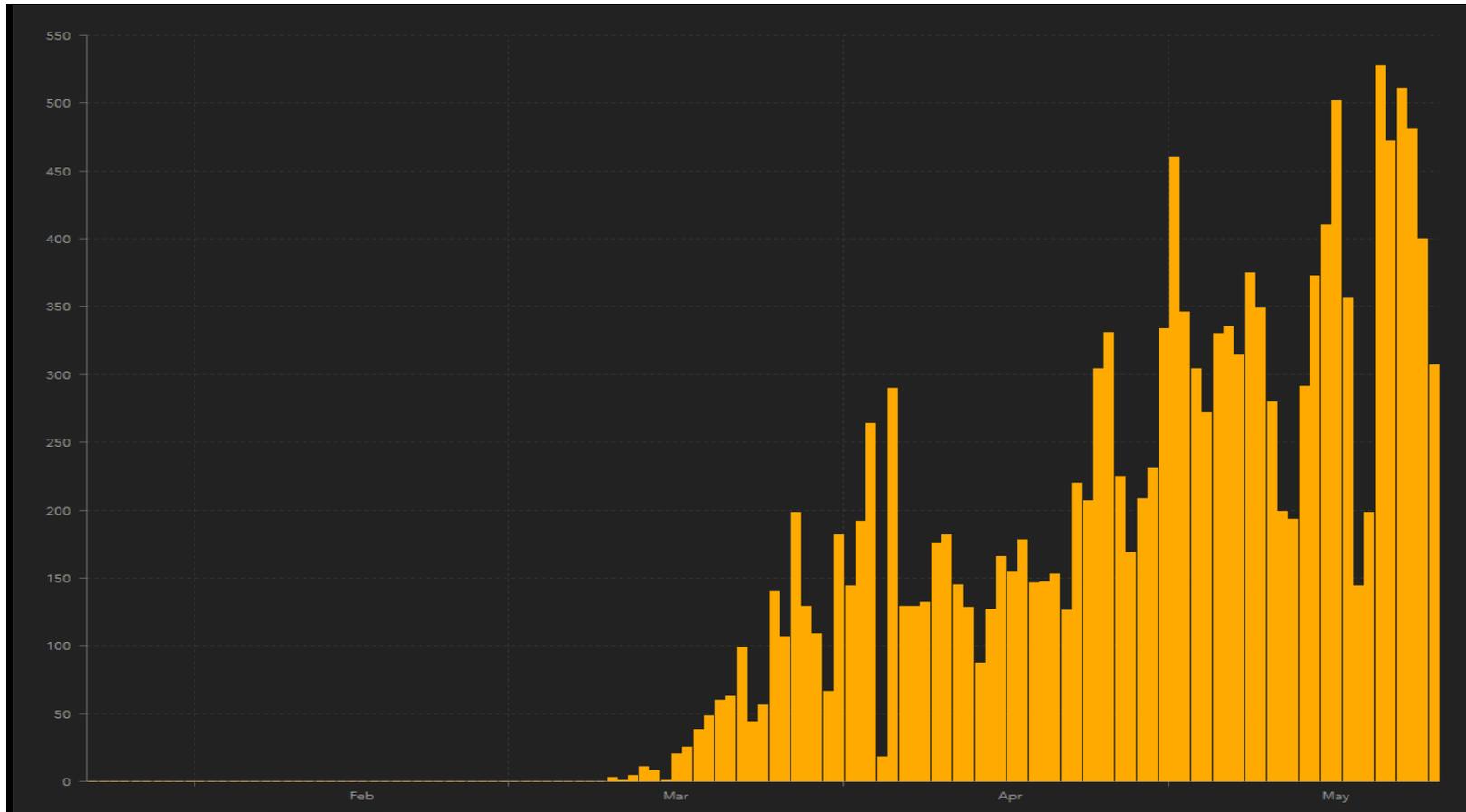
Updated: 5/26/2020



<https://www.dhs.wisconsin.gov/outbreaks/index.htm>



# Daily Cases

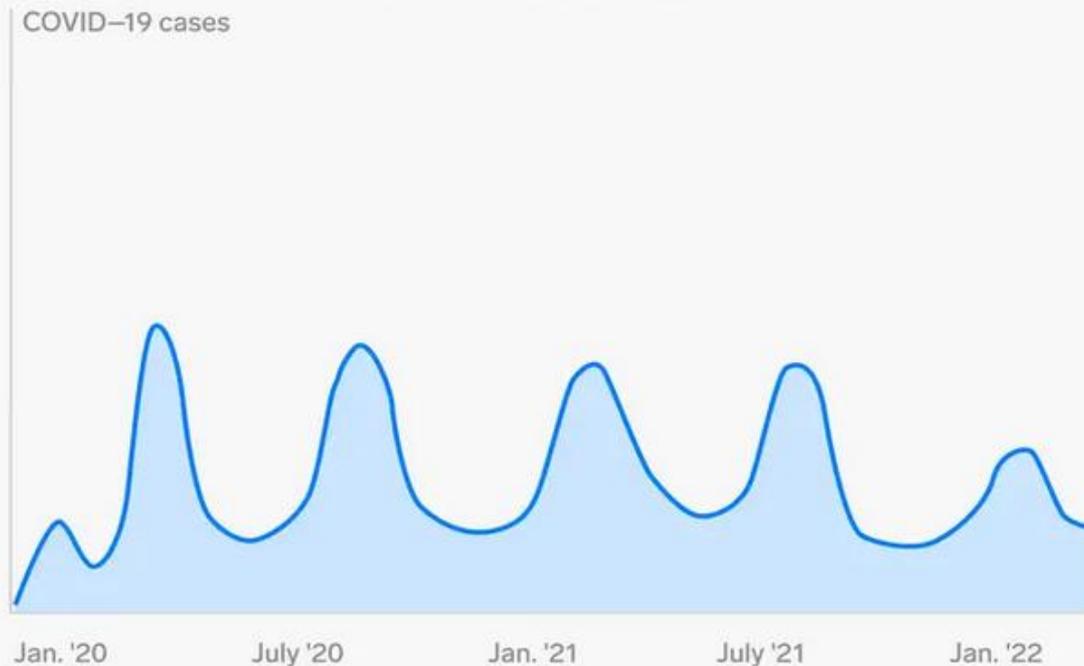


<https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#/bda7594740fd40299423467b48e9ecf6>



# Multiple Waves?

## Possible coronavirus waves scenario 1: Peaks and valleys



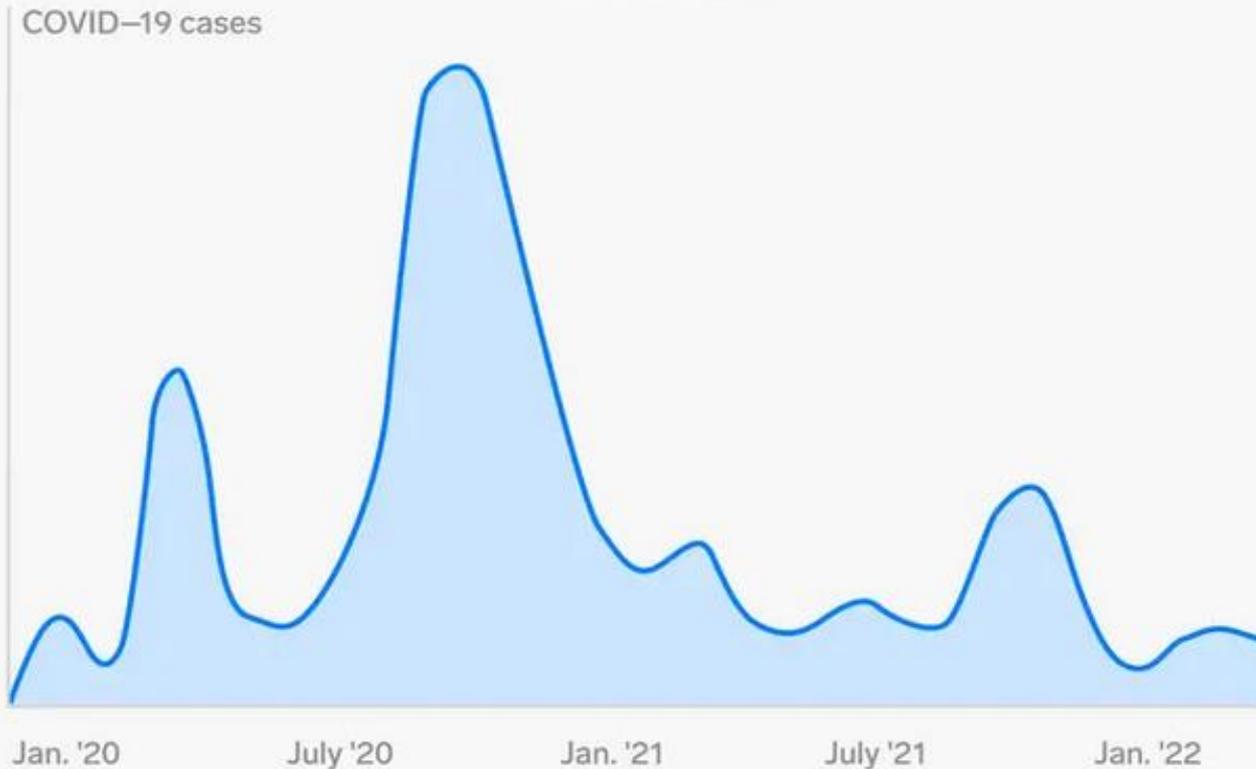
Source: Center for Infectious Disease Research and Policy at University of Minnesota

INSIDER



# Multiple Waves?

## Possible coronavirus waves scenario 2: Fall peak

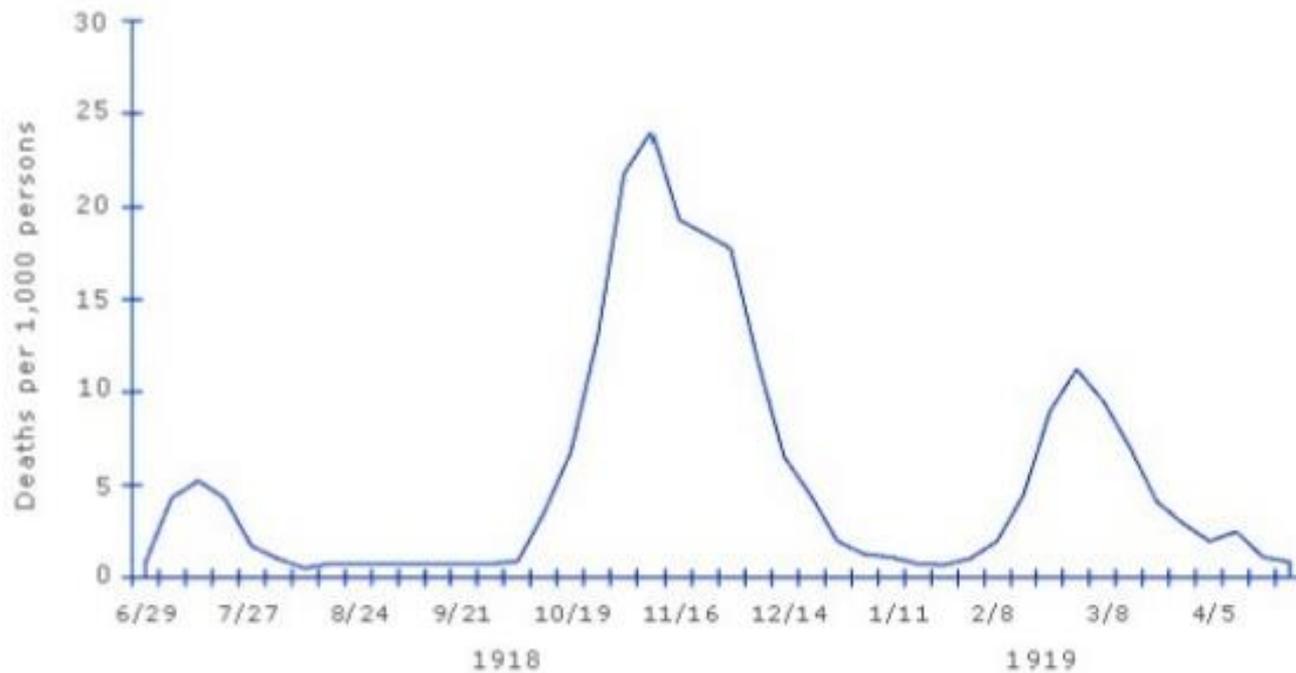


Source: Center for Infectious Disease Research and Policy at University of Minnesota

INSIDER



## Pandemic Waves (1918-1919)

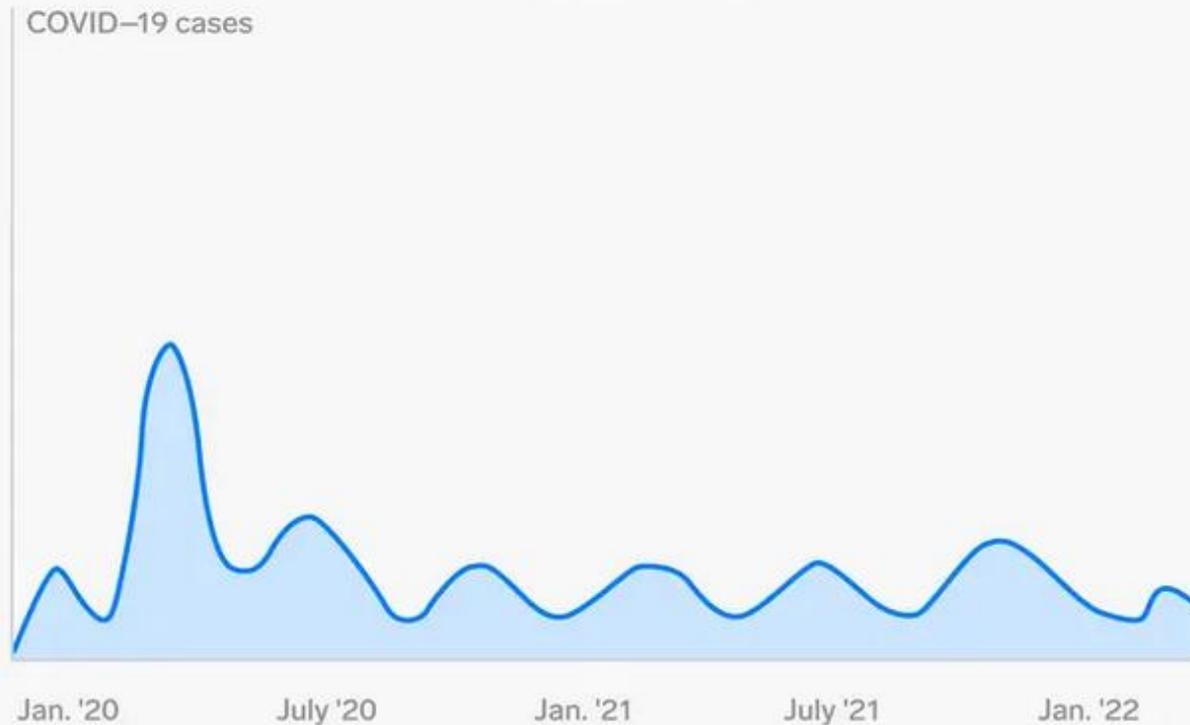


Source: CDC Emerging Infectious Diseases · Vol. 12, No. 1, January 2006  
Link: <http://www.cdc.gov/ncidod/EID/vol12no01/05-0979.htm>



# Multiple Waves?

## Possible coronavirus waves scenario 3: Slow burn



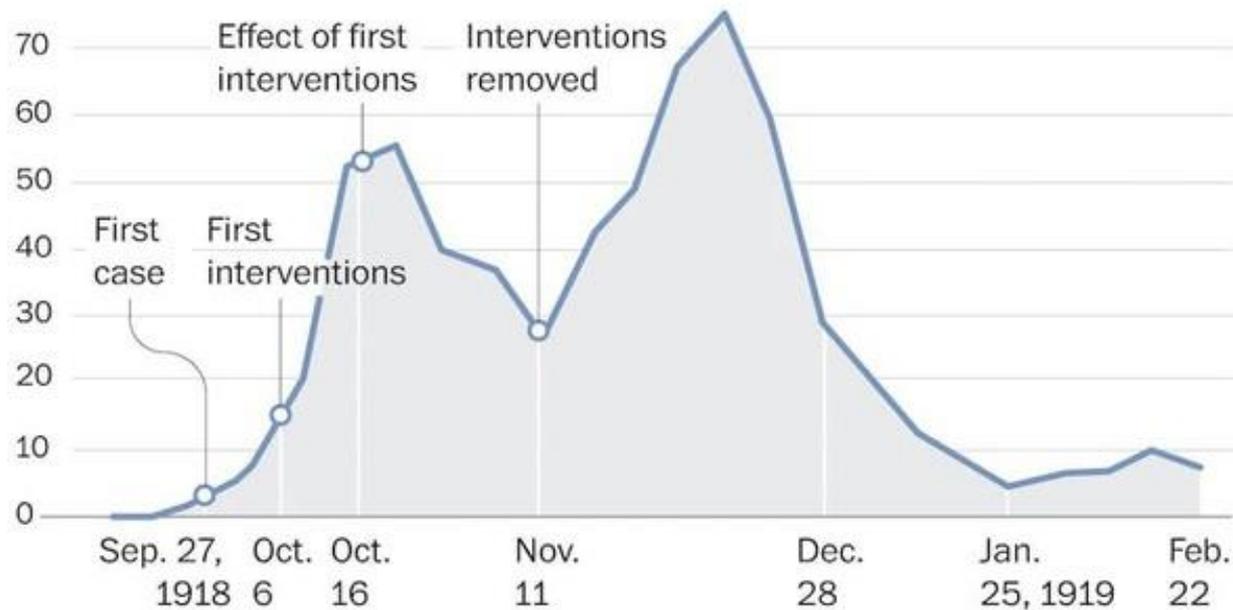
Source: Center for Infectious Disease Research and Policy at University of Minnesota

INSIDER



## Denver's 'double-humped' curve in 1918

Data in excess of deaths\* caused by the 1918 pandemic strain of influenza in Denver, per 100,000 population.



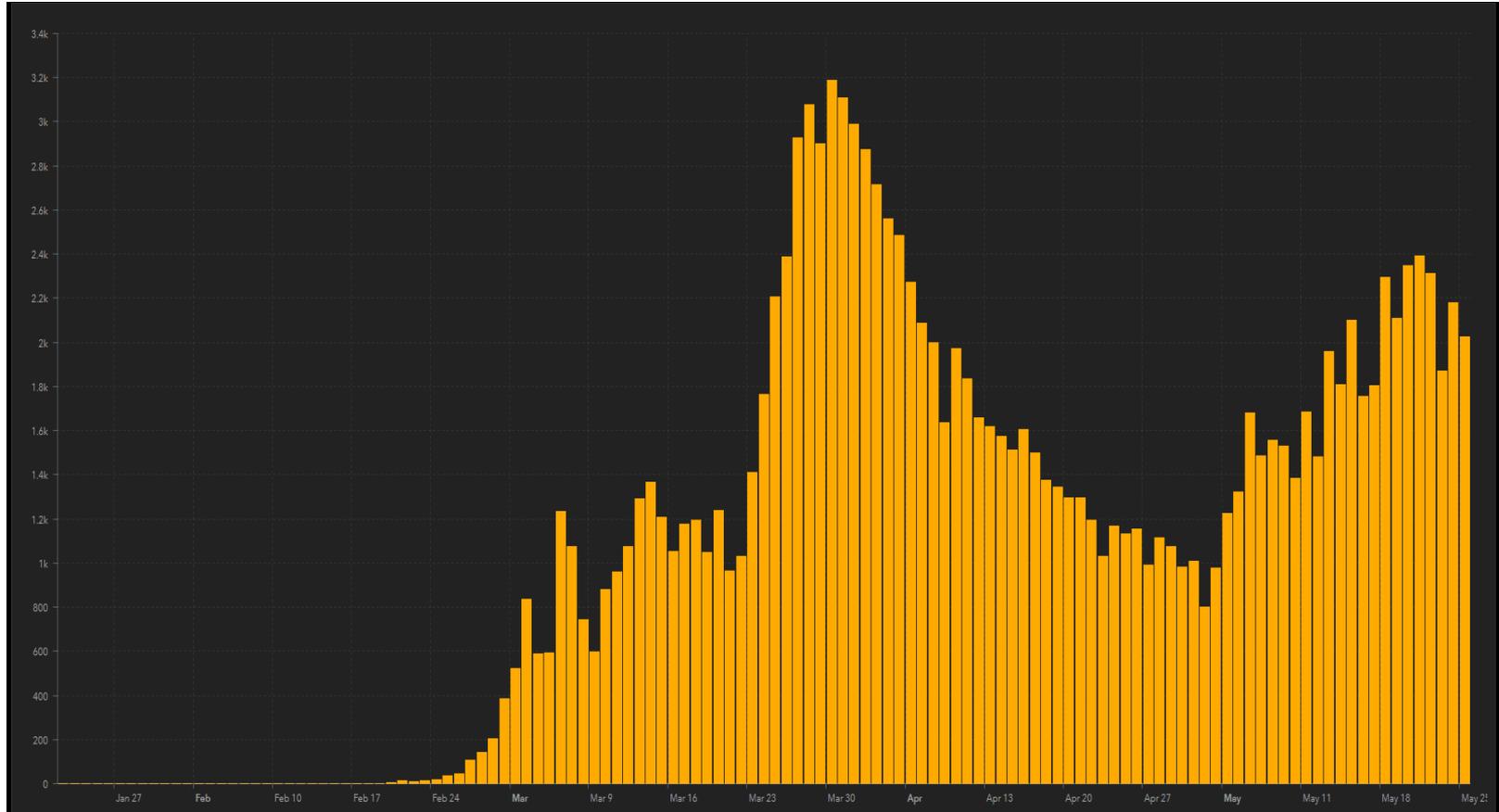
\*Number of deaths caused by the flu in 1918 exceeding the typical death rate from seasonal influenza in previous years.

Source: Howard Markel

THE WASHINGTON POST

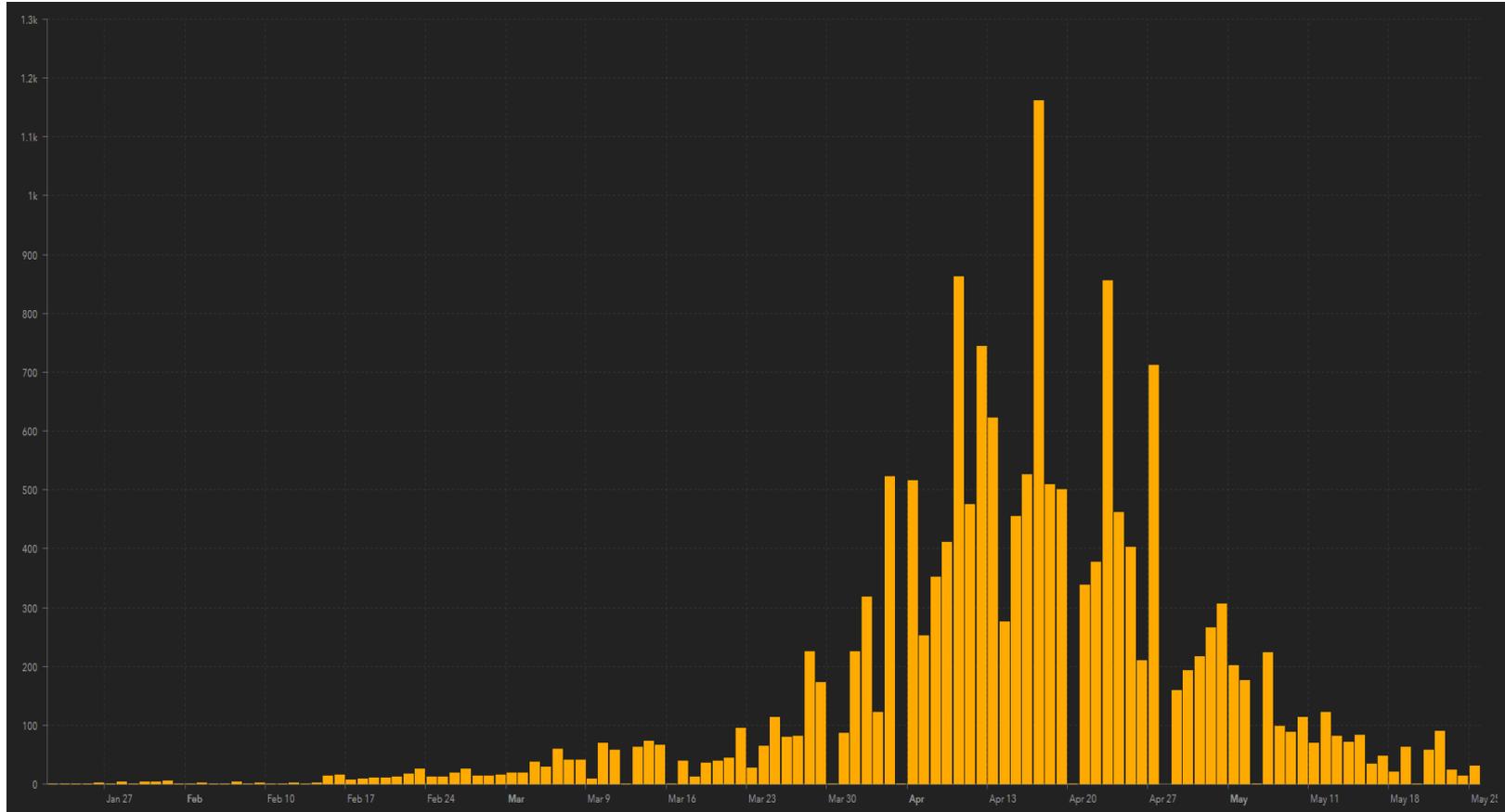


# Daily Cases- Iran



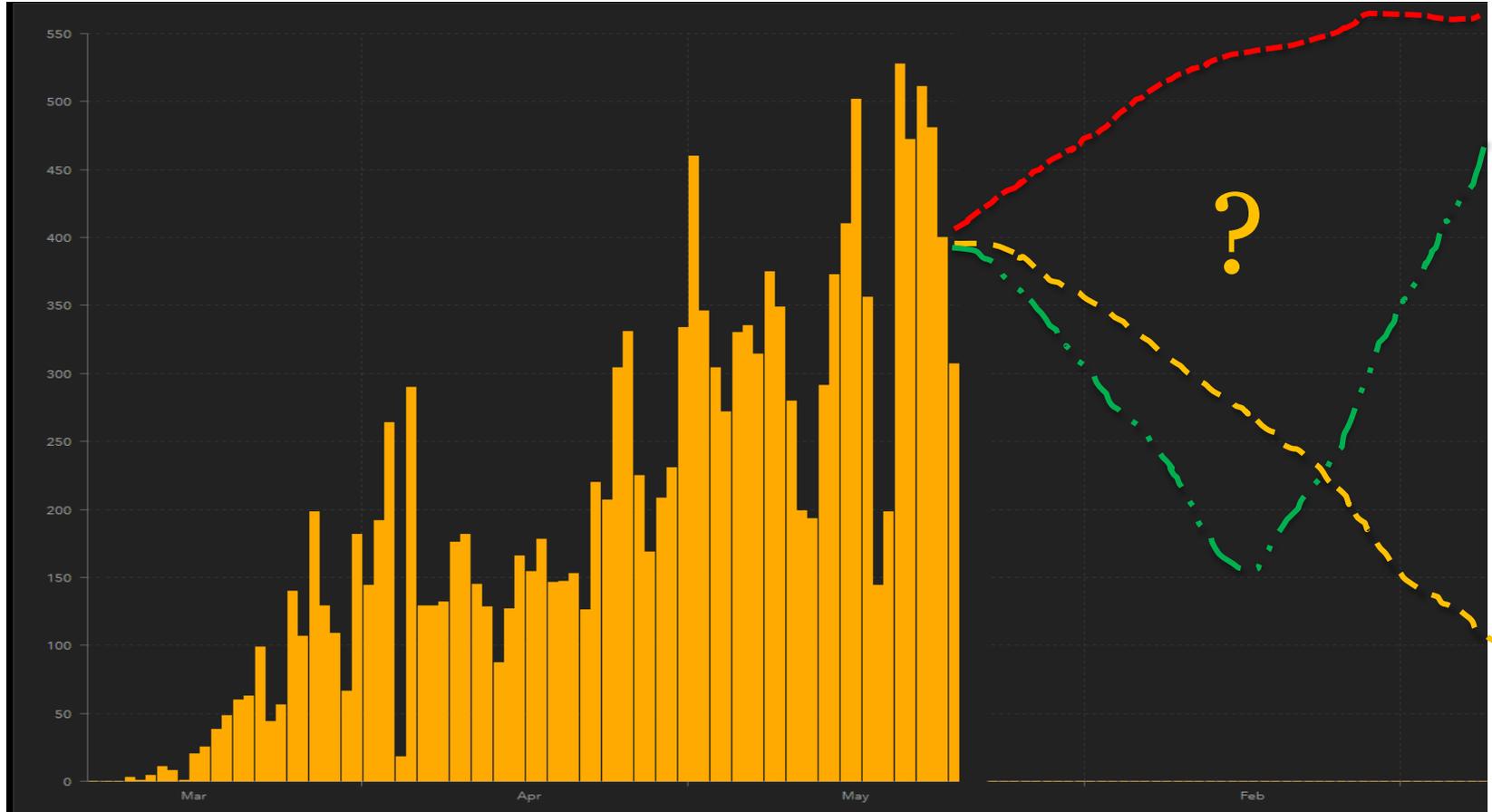


# Daily Cases- Japan





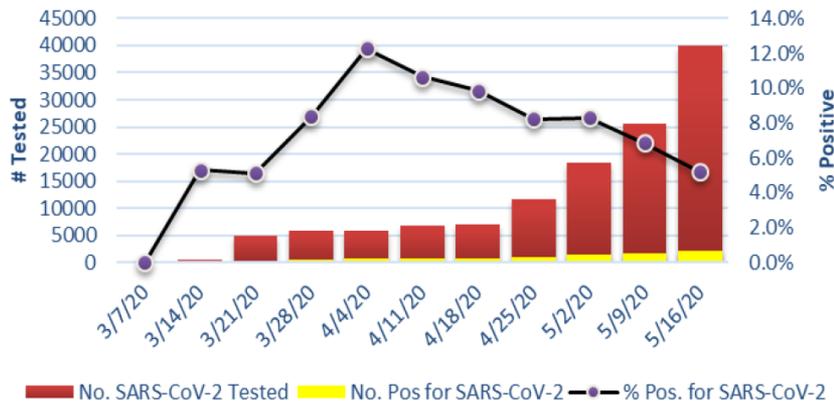
# Daily Cases- WI



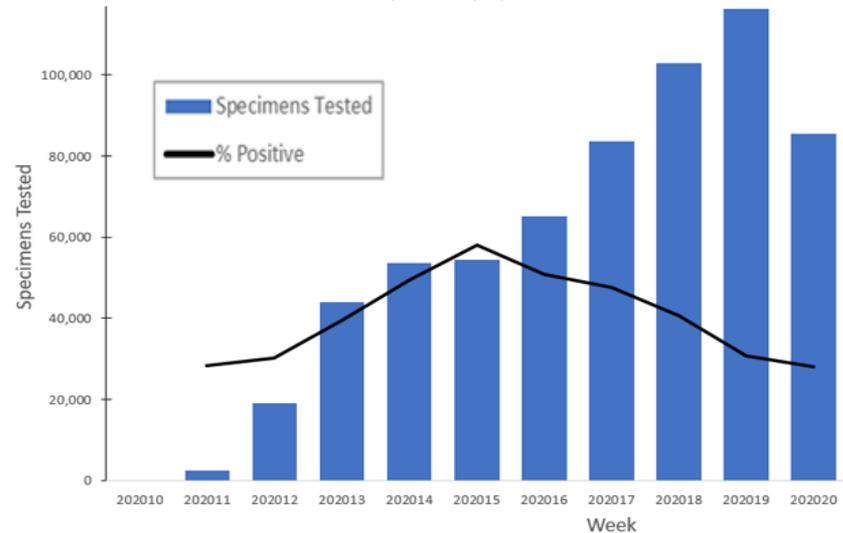


# COVID-19 Testing

### % Positive SARS-CoV-2 by PCR (Wisconsin), Week Ending May 16, 2020



U.S. Clinical Laboratories Reporting to the National Respiratory and Enteric Virus Surveillance System: Number of Specimens Tested and Percent Positive for SARS-CoV-2  
March 8, 2020 - May 16, 2020



<http://www.surveymoz.com/s3/389222/Wisconsin-Laboratory-Surveillance-Reporting>

<https://www.cdc.gov/coronavirus/2019-ncov/covid-data/covidview/index.html>

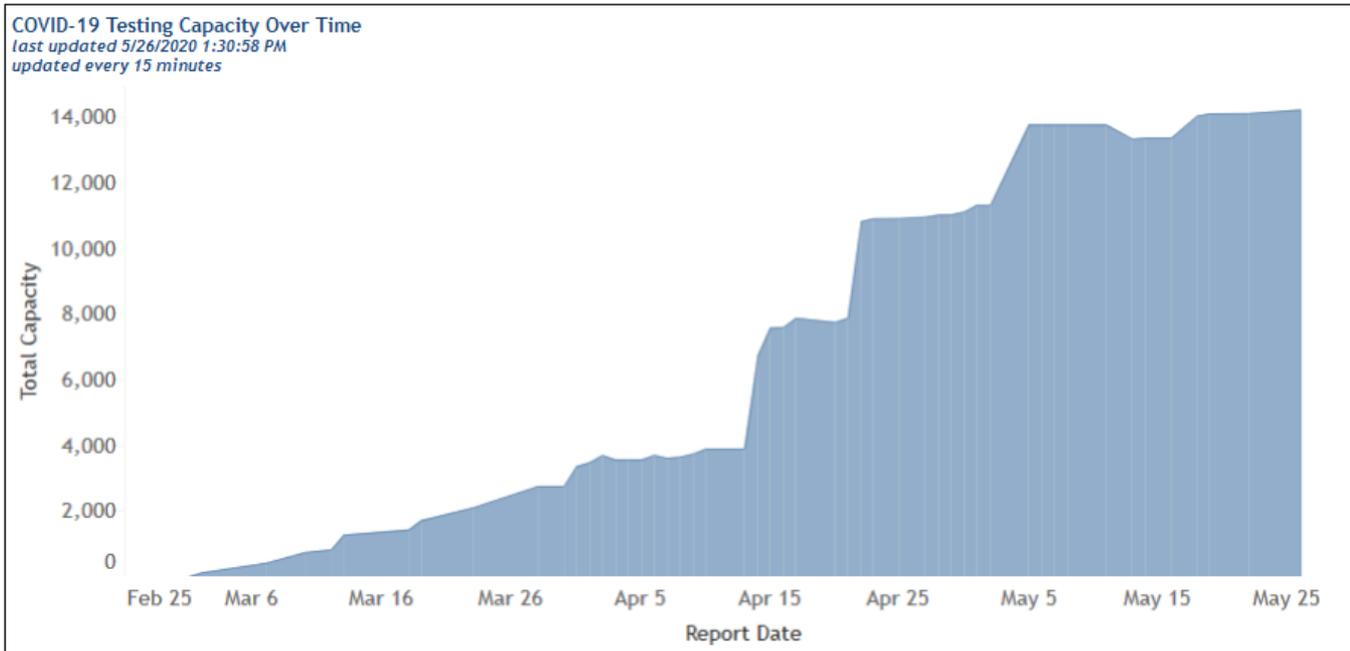
\*Not all labs reporting



# Survey Results

## Wisconsin COVID-19 Molecular Testing Capacity

Laboratories actively testing <b>55</b>	Laboratories planning to test <b>32</b>	Current state capacity (tests/day) <i>Last Updated: 5/26/2020 1:31:00 PM</i> <b>14,253</b>
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Data collected by voluntary reporting from public, private, and commercial laboratories in Wisconsin. All data are estimates and do not reflect actual number of tests performed in the state. Capacity is dependent on availability of test supplies and adequate staffing

[https://bi.wisconsin.gov/t/COVID19\\_Analytics/views/LabDashboards/PublicDashboard?:origin=card\\_share\\_link&:embed=y&:isGuestRedirectFromVizportal=y](https://bi.wisconsin.gov/t/COVID19_Analytics/views/LabDashboards/PublicDashboard?:origin=card_share_link&:embed=y&:isGuestRedirectFromVizportal=y)

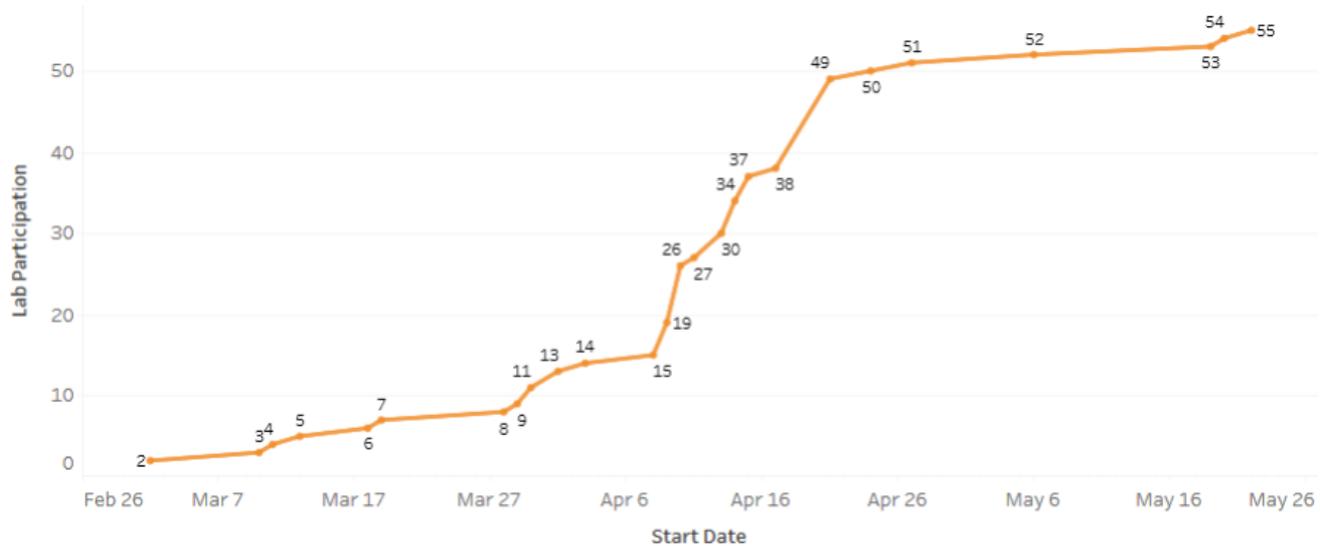


# Labs Across Wisconsin Rising to the Challenge

## Wisconsin COVID-19 Testing Laboratories

<p>Laboratories actively testing</p> <p style="font-size: 2em; text-align: center;">55</p>	<p>Laboratories planning to test</p> <p style="font-size: 2em; text-align: center;">32</p>	<p>Current state capacity (tests/day) <i>Last Updated: 5/26/2020 1:31:00 PM</i></p> <p style="font-size: 2em; text-align: center;">14,253</p>
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COVID-19 Lab Participation Rate Over Time  
*last updated 5/26/2020 1:30:58 PM*  
*updated every 15 minutes*



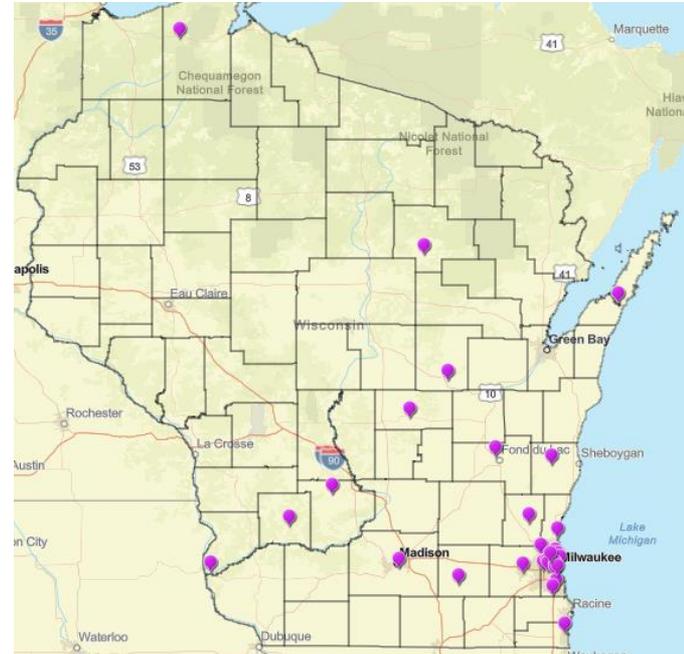
Data collected by voluntary reporting from public, private, and commercial laboratories in Wisconsin. All data are estimates and do not reflect actual number of tests performed in the state. Capacity is dependent on availability of test supplies and adequate staffing

[https://bi.wisconsin.gov/t/COVID19\\_Analytics/views/LabDashboards/PublicDashboardLabs?:isGuestRedirectFromVizportal=y&embed=y](https://bi.wisconsin.gov/t/COVID19_Analytics/views/LabDashboards/PublicDashboardLabs?:isGuestRedirectFromVizportal=y&embed=y)



# Community Test Sites

- Many locations across the state
- If your healthcare system would like to be on the map go to the website to fill out a short survey



<https://www.dhs.wisconsin.gov/covid-19/testing.htm>



# Testing Criteria at WSLH

- Public Health Investigations as directed by state or local public health
- Hospitalized patient with COVID-19 symptoms
- Patient with COVID-19 symptoms for whom rapid diagnosis is needed to inform infection control practices (e.g. labor and delivery, dialysis, aerosol-generating procedures, etc.)
- Resident of a long-term care facility with COVID-19 symptoms
- Resident in a jail, prison, or other congregate setting with COVID-19 symptoms
- Health care worker or first Responder (e.g. fire, EMS, police) with COVID-19 symptoms
- Essential staff in high consequence congregate settings (e.g. prisons or jails) with COVID-19 symptoms
- Utility workers (water, sewer, gas, electric, power, distribution of raw materials, oil and biofuel refining) with COVID-19 symptoms
- **Underserved populations with poor access to testing (e.g., underinsured, patients at Federally Qualified Health Centers, homeless patients, migrant workers, etc.) with COVID-19 symptoms**
- Post-mortem testing for a person with COVID-19 symptoms prior to death who died of unknown causes AND where results would influence infection control interventions at a facility or inform a public health response



# PIF no Longer Required

- All selection criteria still apply
- PIF no longer needs to be submitted with a specimen
- Still submit a Rec Form with each specimen
  - Write in “COVID”



# Local Collection Kits

Stable stored at room temp for  
**7 weeks**  
and counting!



# No Pneumatic Tube

[https://www.cdc.gov/csels/dls/locs/2020/transport\\_recommendations\\_for\\_covid-19\\_specimens.html](https://www.cdc.gov/csels/dls/locs/2020/transport_recommendations_for_covid-19_specimens.html)

Per CDC (4/6/20),

Because of the potential for exposure to infectious aerosols or droplets, it is not recommended to transport respiratory specimens from patients with suspected or confirmed Coronavirus Disease (COVID-19) through the pneumatic tube system (PTS).

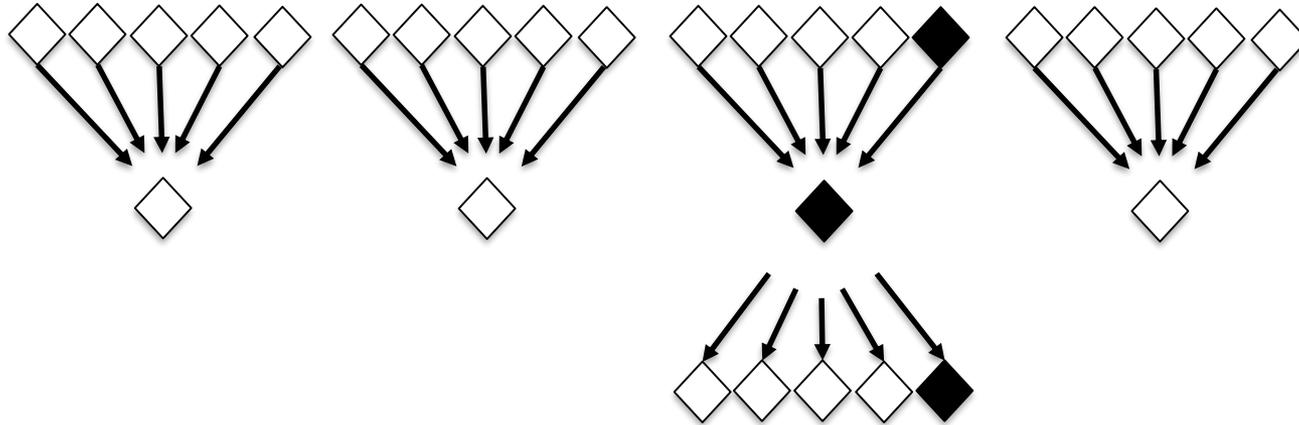




# Pooling Strategy 1

Prevalence

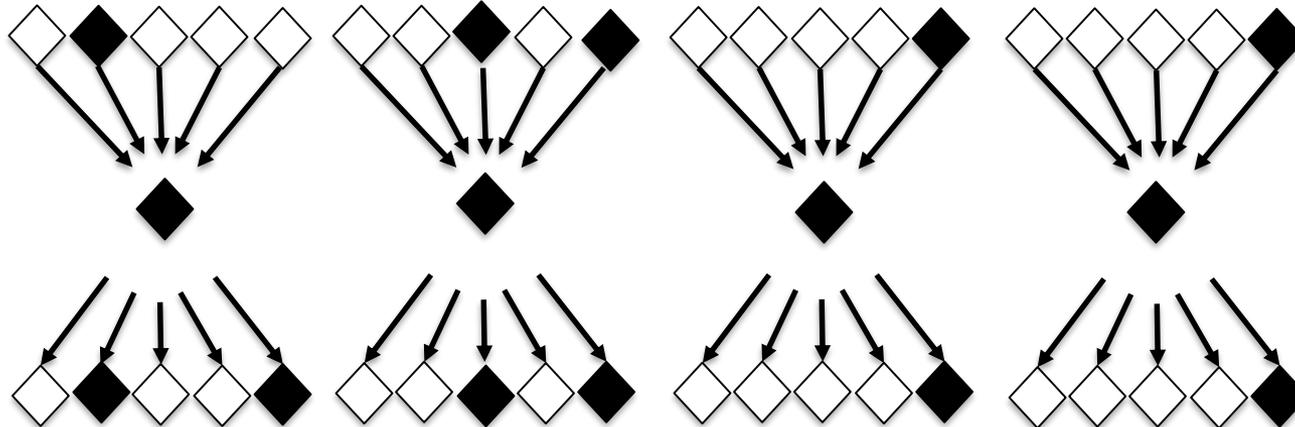
5%



20

9

25%



20

24



# Effect of Dilution

Specimen No.	Specimen Code	N1 (Ct)			N2 (Ct)		
		Pooled	Original	Ct Difference	Pooled	Original	Ct Difference
1	NE-254	35.49	32.18	3.31	35.13	33.22	1.91
2	NE-284	35.27	33.33	1.94	36.50	34.23	2.27
3	NE-287	33.90	30.25	3.65	33.92	31.69	2.23
4	NE-327	33.24	30.44	2.80	32.56	30.52	2.04
5	NE-379	29.23	24.20	<b>5.03</b>	28.52	24.08	4.44
6	NE-393	35.50	34.00	1.50	36.72	35.33	1.39
7	NE-479	20.57	18.23	2.34	19.18	17.33	1.85
8	NE-464	23.93	21.20	2.73	23.07	20.95	2.12
9	NE-616	33.80	31.17	2.63	33.61	31.27	2.34
10	NE-784	33.84	32.79	1.05	34.17	32.34	1.83
11	NE-796	24.63	23.07	1.56	25.04	23.62	1.42
12	NE-822	31.57	29.71	1.86	33.29	30.06	3.23
13	NE-863	33.40	29.69	3.71	32.10	30.64	1.46
14	NE-875	23.12	21.08	2.04	23.79	21.32	2.47
15	NE-886	22.65	19.34	3.31	22.01	20.33	1.68
16	NE-892	24.65	21.40	3.25	24.68	22.83	1.85
17	NE-901	32.48	30.19	2.29	32.92	32.92	0.00
18	NE-907	27.70	25.01	2.69	27.91	26.34	1.57
19	NE-912	27.91	24.55	3.36	28.90	25.06	3.84
20	NE-914	33.71	30.66	3.05	33.72	31.66	2.06
21	NE-1319	36.13	32.31	3.82	36.81	33.40	3.41
22	NE-1437	36.04	34.72	1.32	37.57	33.12	4.45
23	NE-1421	37.97	35.46	2.51	39.10	36.20	2.90
24	NE-1631	39.86	36.74	3.12	39.97	37.09	2.88
25	NE-1683	35.52	33.63	1.89	37.78	37.43	0.35



# Mathematical Model

Table 2

Comparison of Optimal Pool Size and Prevalence Rates on Test Efficiency<sup>a</sup>

<b>Prevalence Rate (%)</b>	<b>Optimal Specimen Pool Size</b>	<b>Reduction in the Expected No. of Tests (%)</b>	<b>Expected Increase in Testing Efficiency (%)</b>
1	11	80	400
3	6	67	200
5	5	57	133
7	4	50	100
10	4	41	69
15	3	28	39

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7188150/>



# Pooling Specimen

- Optimal pool size is 3-5
- Increased risk of errors with additional handling of specimen
- Not recommended for 10%+ prevalence
- Not currently approved under an EUA
- LIMS reporting may not work
- May miss very low positives by dilution



# ID Now Under Investigation

## **Coronavirus (COVID-19) Update: FDA Informs Public About Possible Accuracy Concerns with Abbott ID NOW Point-of-Care Test**

“The FDA has received 15 adverse event reports about the Abbott ID NOW device”

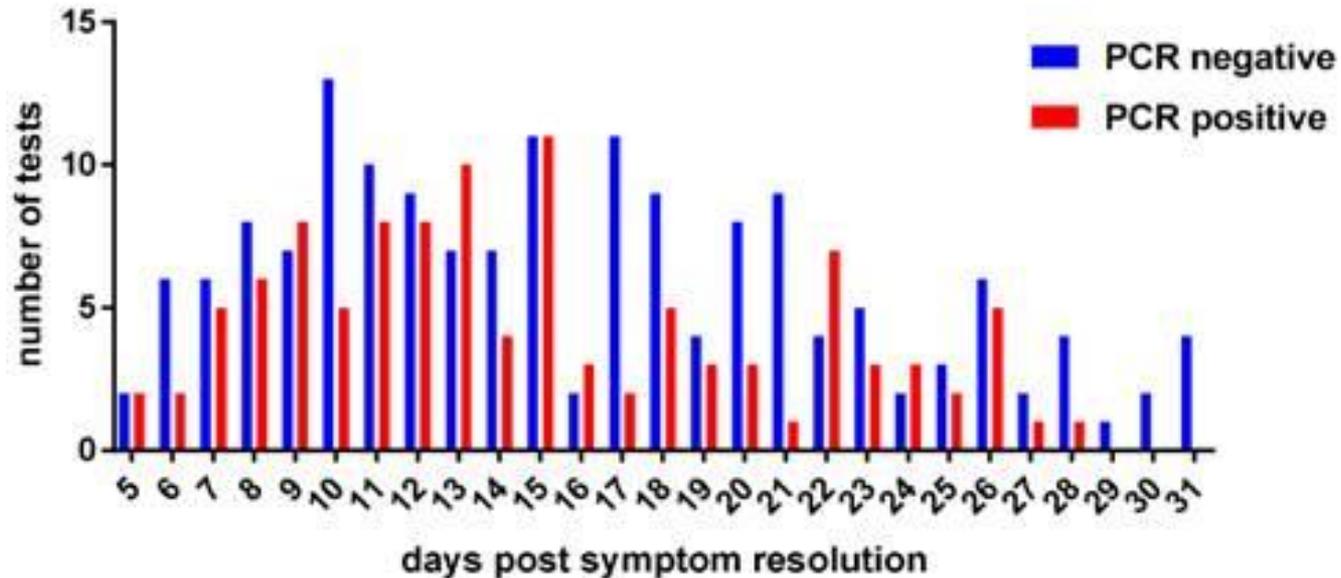
**We may see a recommendation to confirm all negative results by a second method**

<https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-fda-informs-public-about-possible-accuracy-concerns-abbott-id-now-point>



# Some People Remain PCR Positive for a Long Time

PCR+ and PCR- samples post symptom resolution

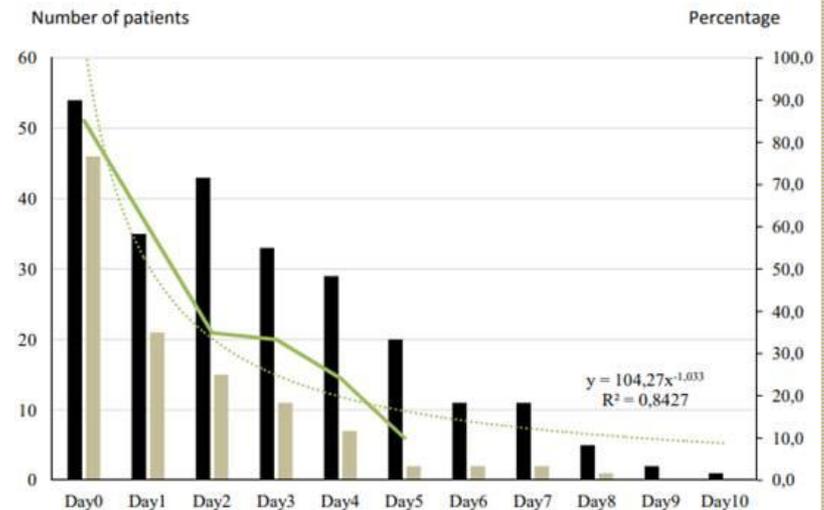


- Some reports of PCR positives 50 days post symptom onset



# How Long are People Infective?

- 54 patients with confirmed COVID-19.
- A rapid fall of nasopharyngeal viral load
- Virus cultures from patient respiratory samples were negative in 97.5% patients at Day 5



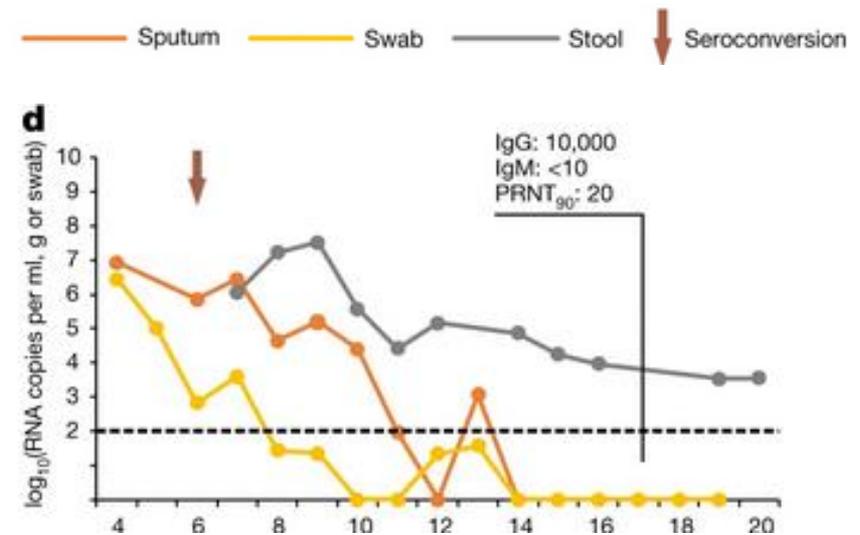
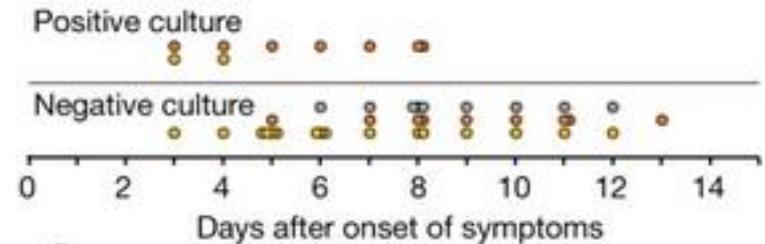
Tan bars= culture positive

<https://www.ncbi.nlm.nih.gov/pubmed/32289548>



# Lower Respiratory Specimen better Late in Infection

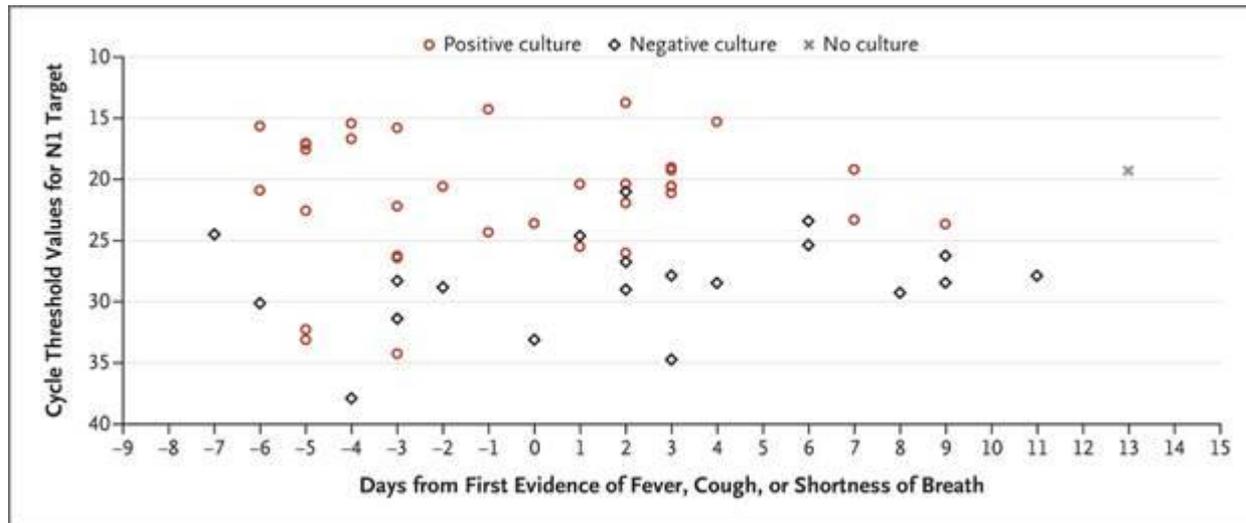
- No Culture positives after 8 days from symptom onset
- Sputum PCR positive later than NP or OP
- Late (5+ day) culture positives were in sputum only



<https://www.nature.com/articles/s41586-020-2196-x>



# Presymptomatic Shedding



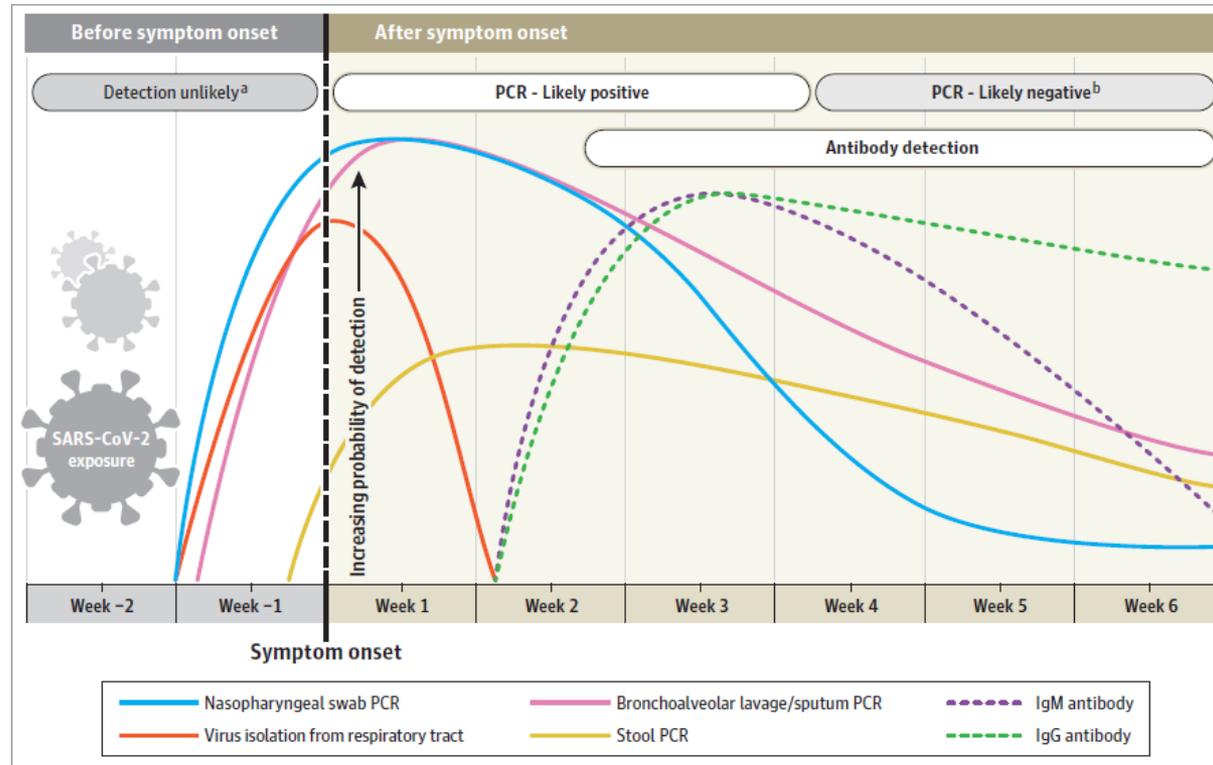
- Last culture positive was 9 days post symptom onset
- Many people were infectious prior to symptom onset

<https://www.nejm.org/doi/full/10.1056/NEJMoa2008457>



# Interpreting Diagnostic Tests

Figure. Estimated Variation Over Time in Diagnostic Tests for Detection of SARS-CoV-2 Infection Relative to Symptom Onset



Estimated time intervals and rates of viral detection are based on data from several published reports. Because of variability in values among studies, estimated time intervals should be considered approximations and the probability of detection of SARS-CoV-2 infection is presented qualitatively. SARS-CoV-2 indicates severe acute respiratory syndrome coronavirus 2; PCR, polymerase chain reaction.

<sup>a</sup> Detection only occurs if patients are followed up proactively from the time of exposure.

<sup>b</sup> More likely to register a negative than a positive result by PCR of a nasopharyngeal swab.

<https://jamanetwork.com/journals/jama/fullarticle/2765837>



# WCLN

- HHS impressed by the data available in our survey results.
- And, our ability to quickly communicate with all the clinical labs
- We have accomplished something great in a short amount of time and this network makes us stronger



# Reporting COVID-19 Results

## NAAT Testing:

- WEDSS - Report **all** COVID-19 test results (positives and negatives) via ELR or WLR
- WCLN Surveillance Data - Report weekly the total number of positives and total number tested.
  - Combine numbers of COVID-19 testing performed in-house with numbers of COVID-19 testing performed at out-of-state reference lab



# Reporting COVID-19 Results

## Antibody Testing:

- WEDSS - Report **only positive** COVID-19 test results via ELR or WLR
- WCLN Surveillance Data - Report weekly the total number of positives and total number tested.
  - Combine numbers of COVID-19 testing performed in-house with numbers of COVID-19 testing performed at out-of-state reference lab



# WDHS Health Alerts

## COVID-19: Health Alert Network (HAN)

- Wisconsin's Health Alert Network (HAN) enables public health staff, tribal governments, health care providers, emergency workers, and others to exchange reliable information as the situation evolves.

<https://www.dhs.wisconsin.gov/covid-19/han.htm>

- COVID-19 Health Alert #12:
  - CDC is interested in investigating possible cases of SARS-CoV-2 reinfection, defined as new clinical or laboratory evidence of COVID-19 after a documented period of recovery.
  - Clinicians who are aware of cases meeting criteria for possible re-infection are invited to submit de-identified patient information to the CDC using a survey tool developed by the [Infectious Disease Society of America](#).



# Moving to Monthly COVID-19 Webinar

We hope you will join us for our  
next *COVID-19 Updates* webinar  
on Wednesday 6/24/20  
from noon to 1:00 PM



Please Type Your Questions in the  
Question Box!

