Update on COVID-19 Diagnostic Testing
05-27-20

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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
NO... ONE... CLEANS LIKE GASTON, QUARANTINES LIKE GASTON, NO ONE STOPS SPREADING COVID-19 LIKE GASTON.

HE'S ESPECIALLY GOOD AT SELF ISOLATING. 3 CHEERS FOR "GOOD GUY" GASTON!
Jacksonville Beach reopened 26 minutes ago. This is a live picture.

Coronavirus likes this.
Global Impact

Johns Hopkins University Global Coronavirus Tracking:
https://gisanddata.maps.arcgis.com/apps/opsdashboard/index.html#bda7594740fd40299423467b48e9ecf6
COVID-19 in the US

Total Confirmed
1,684,173

Confirmed Cases by Province/State/Region:
- 349,838 confirmed New York US
- 196,681 confirmed Texas US
- 153,186 confirmed California US
- 122,692 confirmed Florida US
- 43,423 confirmed Georgia US
- 41,300 confirmed Connecticut US
- 33,187 confirmed Michigan US
- 30,346 confirmed Massachusetts US
- 25,778 confirmed Pennsylvania US
- 23,308 confirmed New Jersey US
- 20,367 confirmed Illinois US
- 15,119 confirmed Chicago US

Global Deaths
99,123
99,123 deaths US

US State Level
Deaths, Recovered
- 29,302 deaths, 64,443 recovered New York US
- 11,191 deaths, 39,884 recovered New Jersey US
- 6,473 deaths, 39,168 recovered Massachusetts US
- 5,686 deaths, 32,169 recovered Michigan US
- 5,163 deaths, 41,864 recovered Pennsylvania US
- 4,923 deaths, 38,644 recovered Illinois US
- 3,826 deaths, 32,169 recovered California US
- 3,769 deaths, 2,177 recovered Connecticut US

Last Updated at (M/DD/YYYY)
5/27/2020, 10:32:33 AM

Date sources: WHO, CDC, ECDC, NHC, HK, 1pointCom, Worldometers.info, the COVID Tracking Project, testing and
hospitalization data from The New York Times, COVID-19 Timeline and Data from the COVID-19 Task Force, The
White House, and WHO weekly country update reports.
Where are We on the Curve?

New York

Louisiana

South Dakota

Wisconsin
Wisconsin

<table>
<thead>
<tr>
<th>Status</th>
<th>Number (% of People as of 5/26/2020)</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative Test Results</td>
<td>200,874</td>
<td>Δ88,126</td>
</tr>
<tr>
<td>Positive Test Results</td>
<td>15,863</td>
<td>Δ5,252</td>
</tr>
<tr>
<td>Hospitalizations</td>
<td>2,362 (15%)</td>
<td>Δ485</td>
</tr>
<tr>
<td>Deaths</td>
<td>517</td>
<td>Δ99</td>
</tr>
</tbody>
</table>

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

COVID-19 cases

Jan. '20  July '20  Jan. '21  July '21  Jan. '22

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

INSIDER
Multiple Waves?

Possible coronavirus waves scenario 2: Fall peak

COVID-19 cases

Jan. '20  July '20  Jan. '21  July '21  Jan. '22

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

COVID-19 cases

Jan. '20  July '20  Jan. '21  July '21  Jan. '22

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


*Not all labs reporting

Survey Results

Wisconsin COVID-19 Molecular Testing Capacity

<table>
<thead>
<tr>
<th>Laboratories actively testing</th>
<th>Laboratories planning to test</th>
<th>Current state capacity (tests/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>32</td>
<td>14,253</td>
</tr>
</tbody>
</table>

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
Labs Across Wisconsin
Rising to the Challenge

Wisconsin COVID-19 Testing Laboratories

<table>
<thead>
<tr>
<th>Laboratories actively testing</th>
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<th>Current state capacity (tests/day)</th>
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<tbody>
<tr>
<td>55</td>
<td>32</td>
<td>14,253</td>
</tr>
</tbody>
</table>

COVID-19 Lab Participation Rate Over Time
Last updated 5/26/2020 1:30:59 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
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


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

5%

9

25%

20

24
## Effect of Dilution

<table>
<thead>
<tr>
<th>Specimen No.</th>
<th>Specimen Code</th>
<th>N1 (Ct)</th>
<th>N2 (Ct)</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Pooled</td>
<td>Original</td>
<td>Ct Difference</td>
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<tr>
<td>1</td>
<td>NE-254</td>
<td>35.49</td>
<td>32.18</td>
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<tr>
<td>2</td>
<td>NE-284</td>
<td>35.27</td>
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<td>3</td>
<td>NE-287</td>
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<td>30.25</td>
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<tr>
<td>4</td>
<td>NE-327</td>
<td>33.24</td>
<td>30.44</td>
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<td>5</td>
<td>NE-379</td>
<td>29.23</td>
<td>24.20</td>
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<td>6</td>
<td>NE-393</td>
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<td>7</td>
<td>NE-479</td>
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<td>8</td>
<td>NE-464</td>
<td>23.93</td>
<td>21.20</td>
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<tr>
<td>9</td>
<td>NE-616</td>
<td>33.80</td>
<td>31.17</td>
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<td>10</td>
<td>NE-784</td>
<td>33.84</td>
<td>32.79</td>
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<td>11</td>
<td>NE-796</td>
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<td>12</td>
<td>NE-822</td>
<td>31.57</td>
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<td>14</td>
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<td>NE-1437</td>
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<td>23</td>
<td>NE-1421</td>
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<td>35.46</td>
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<td>NE-1631</td>
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<td>25</td>
<td>NE-1683</td>
<td>35.52</td>
<td>33.63</td>
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</tbody>
</table>
## Mathematical Model

### Table 2

Comparison of Optimal Pool Size and Prevalence Rates on Test Efficiency

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

[https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7188150/](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

Some People Remain PCR Positive for a Long Time

- 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

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

Interpreting Diagnostic Tests

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

Before symptom onset

Detection unlikely

After symptom onset

PCR - Likely positive

PCR - Likely negative

Antibody detection

Increasing probability of detection

SARS-CoV-2 exposure

Week -2

Week 1

Week 2

Week 3

Week 4

Week 5

Week 6

Nasopharyngeal swab PCR

Bronchoalveolar lavage/sputum PCR

Virus isolation from respiratory tract

Stool PCR

IgM antibody

IgG antibody

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.

Detection only occurs if patients are followed up proactively from the time of exposure.

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
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
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!