Ask Dr. Arwady

March 17, 2022

Guest: Dr. Isaac Ghinai
TWO YEARS. ONE CHICAGO.

We are committed to fighting the pandemic and protecting all Chicagoans through vaccination.
Chicago COVID-19 Community Transmission and Risk Matrix

<table>
<thead>
<tr>
<th>COVID-19 CASES DIAGNOSED PER DAY</th>
<th>VERY HIGH TRANSMISSION</th>
<th>HIGH TRANSMISSION</th>
<th>SUBSTANTIAL TRANSMISSION</th>
<th>LOWER TRANSMISSION</th>
<th>LOW TRANSMISSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicago residents - 7-day rolling daily average</td>
<td>800+</td>
<td>400 - 799</td>
<td>200 - 399</td>
<td>20 - 199</td>
<td>&lt;=20</td>
</tr>
<tr>
<td><strong>Current:</strong> 142</td>
<td><strong>Decreasing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>COVID-19 TEST POSITIVITY</th>
<th>VERY HIGH TRANSMISSION</th>
<th>HIGH TRANSMISSION</th>
<th>SUBSTANTIAL TRANSMISSION</th>
<th>LOWER TRANSMISSION</th>
<th>LOW TRANSMISSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicago residents - 7-day rolling daily average</td>
<td>10%+</td>
<td>6.6 - 9.9%</td>
<td>5.0 - 6.5%</td>
<td>2 - 4.9%</td>
<td>&lt;=2%</td>
</tr>
<tr>
<td><strong>Current:</strong> 0.7%</td>
<td><strong>Decreasing</strong></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

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<thead>
<tr>
<th>HOSPITAL BEDS (NON-ICU) OCCUPIED BY COVID PATIENTS</th>
<th>VERY HIGH TRANSMISSION</th>
<th>HIGH TRANSMISSION</th>
<th>SUBSTANTIAL TRANSMISSION</th>
<th>LOWER TRANSMISSION</th>
<th>LOW TRANSMISSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicago hospitals - 7-day rolling daily average</td>
<td>1250+</td>
<td>750 - 1249</td>
<td>250 - 749</td>
<td>100 - 249</td>
<td>-100</td>
</tr>
<tr>
<td><strong>Current:</strong> 142</td>
<td><strong>Decreasing</strong></td>
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<th>ICU BEDS OCCUPIED BY COVID PATIENTS</th>
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<tbody>
<tr>
<td>Chicago hospitals - 7-day rolling daily average</td>
<td>400+</td>
<td>300 - 399</td>
<td>100 - 299</td>
<td>20 - 99</td>
<td>&lt;=20</td>
</tr>
<tr>
<td><strong>Current:</strong> 26</td>
<td><strong>Decreasing</strong></td>
<td></td>
<td></td>
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</tbody>
</table>

Source: Chicago Department of Public Health, data current as of March 17, 2022. These metrics represent general community COVID transmission and should not be applied to individual settings that have mitigation practices in place.
WHAT’S A COVID-19 COMMUNITY LEVEL?

- It’s a new tool to help communities decide what prevention measures to take based on the latest data
- Every community in the United States is classified as:

**Low**
Limited impact on healthcare system, low levels of severe illness

**Medium**
Some impact on healthcare system, more people with severe illness

**High**
High potential for healthcare system strain; high level of severe illness

[cdc.gov/coronavirus]
U.S. COVID-19 Community Levels by County Map
As of March 10, 2022

Illinois COVID-19 Community Levels by County Map
As of March 10, 2022
What prevention steps should you take based on your COVID-19 Community Level?

| Low          | • Stay up to date* with COVID-19 vaccines  
               | • Get tested if you have symptoms         |
|--------------|------------------------------------------|
| Medium       | • If you have at high risk for severe illness, talk to your healthcare provider about whether you need to wear a mask and take other precautions  
               | • Stay up to date* with COVID-19 vaccines  
               | • Get tested if you have symptoms         |
| High         | • Wear a mask indoors in public          
               | • Stay up to date* with COVID-19 vaccines  
               | • Get tested if you have symptoms         
               | • Additional precautions may be needed for people at high risk for severe disease |

*Up to date means a person has received all recommended COVID-19 vaccines, including any booster dose(s) when eligible.
82% of age-eligible Chicagoans (5 years+) have had a first dose.
There are 46 Chicago zip codes with at least 70% of their 5+ population with at least one dose of the COVID-19 vaccine.
• There are 37 Chicago zip codes with at least **80%** of their 5+ population with at least one dose of the COVID-19 vaccine
Chicago Vaccination Milestones by Zip Code

- There are 13 Chicago zip codes that will at least 90% of their 5+ population with at least one dose of the COVID-19 vaccine.

60645 (Rogers Park and West Ridge)
60613 (Lake View, North Center, Lincoln Square, Uptown)
60629 (Ashburn, Chicago Lawn, Clearing, Gage Park, Garfield Ridge, West Elsdon, West Lawn)

Chi.gov/coviddash
Every home in the U.S. is eligible to order 2 sets of 4 free at-home tests.

If you already ordered your first set, order a second today.
Average daily COVID-19 cases per 100,000 population

463 Million Cases
6 Million Deaths

11 Billion Vaccine Doses Administered

5.01 Billion People Vaccinated
(65.3% of population)

Presented by the New York Times 03/17/2022; Sources: Local governments; The Center for Systems Science and Engineering at Johns Hopkins University; National Health Commission of the People’s Republic of China; World Health Organization.
Average daily COVID-19 cases per 100,000 population

79.5 Million Cumulative Cases
967,450 Cumulative Deaths

Presented by the New York Times 03/17/2022; Sources: Local governments; The Center for Systems Science and Engineering at Johns Hopkins University

Vaccinations

<table>
<thead>
<tr>
<th>All ages</th>
<th>AT LEAST ONE DOSE</th>
<th>FULLY VACCINATED</th>
</tr>
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<tbody>
<tr>
<td>77%</td>
<td>65%</td>
<td></td>
</tr>
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<table>
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<tr>
<th>5 and up</th>
<th>AT LEAST ONE DOSE</th>
<th>FULLY VACCINATED</th>
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<td>82%</td>
<td>69%</td>
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<th>65 and up</th>
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<td>95%</td>
<td>89%</td>
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National currently:
9 diagnosed daily cases per 100,000 people

Illinois currently:
9 diagnosed daily cases per 100,000 people

Chicago currently:
5 diagnosed daily cases per 100,000 people
Laboratory-based surveillance:
Monitoring SARS-CoV-2 in wastewater and looking for variants

Dr. Isaac Ghinai
Medical Director, Laboratory-Based Surveillance
Data as of March 16, 2022
Contents

• Background
• Variants of SARS-CoV-2
• Monitoring wastewater for SARS-CoV-2
• Background

• Variants of SARS-CoV-2

• Monitoring wastewater for SARS-CoV-2
Chicago has low levels of COVID-19 transmission

**CASES**
- 135 (Current daily avg)
- 144 (-6%) (Prior week)
- 580,454 (Cumulative)
- 5.0 (Daily rate per 100,000)

**HOSPITALIZATIONS**
- 10 (Current daily avg)
- 16 (-36%) (Prior week)
- 41,434 (Cumulative)
- 0.4 (Daily rate per 100,000)

**DEATHS**
- 1.57 (Current daily avg)
- 2.57 (-39%) (Prior week)
- 7,598 (Cumulative)
- 0.1 (Daily rate per 100,000)

**VACCINATIONS ADMINISTERED**
- 1,910 (Current daily avg)
- 4,694,933 (Cumulative)
- 69.7% (Completed series)
- 77.0% (At least one dose)

**TESTS PERFORMED**
- 22,228 (Current daily avg)
- 24,149 (-8%) (Prior week)
- 10,335,739 (Cumulative)

**POSITIVITY RATE**
- 0.7% (Current daily avg)
- 0.8% (Prior week)
But we may have more surges in the future
Other places are currently seeing a surge

Europe:
Netherlands
Other places are currently seeing a surge

Europe:
Switzerland
Other places are currently seeing a surge

Europe:
Germany
Other places are currently seeing a surge

Europe:
UK
Other places are currently seeing a surge

Europe: Austria

Daily new confirmed COVID-19 cases per million people
7-day rolling average. Due to limited testing, the number of confirmed cases is lower than the true number of infections.

Source: Johns Hopkins University CSSE COVID-19 Data
Other places are currently seeing a surge

Asia:
South Korea
Other places are currently seeing a surge

Asia:
China
Other places are currently seeing a surge

New Zealand

Daily new confirmed COVID-19 cases per million people
7-day rolling average. Due to limited testing, the number of confirmed cases is lower than the true number of infections.

Source: Johns Hopkins University CSSE COVID-19 Data
Surges are usually driven by several factors:

- New variants
- Changing behavior
- Immunity

Simplified from: https://twitter.com/EricTopol/status/1503782013463015427
Where vaccination is high, deaths are low

Cases are translating into deaths at much higher rates in Hong Kong than in peer countries with strong elderly vaccination coverage.

Daily cases per 100,000 people, and daily deaths per 2 million.

Source: FT analysis of data from Johns Hopkins CSSE. Cases shifted forward to account for lag between infection and death.

SARS-CoV-2 variants have also driven surges

Data from the CDC’s National SARS-CoV-2 Strain Surveillance System (NS3) projected onto Chicago cases.
Contents

- Background
- Variants of SARS-CoV-2
- Monitoring wastewater for SARS-CoV-2
Genomic surveillance in Chicago
Genomic surveillance in Chicago
Many hospitals submit specimens to RIPHL.
Most of Chicago is well-represented.
RIPHL is not the only specialized laboratory
Chicago is part of national surveillance efforts

Such as the National SARS-CoV-2 Strain Surveillance System (NS3)

SARS-CoV-2 Variant Surveillance, Midwest Region.

Omicron BA.2 doubling about every 7 days; may see predominance by late March

- Omicron B.1.1 (79.5%)
- Omicron BA.2 (20.5%)
- Delta (0.0%)
- Other (0.0%)
Variants in Chicago sequenced at RIPHL

Ending dates for 2022 MMWR weeks:
- 1 = 1/8
- 2 = 1/15
- 3 = 1/22
- 4 = 1/29
- 5 = 2/5
- 6 = 2/12
- 7 = 2/19
- 8 = 2/26
Studies have shown that **BA.2 has a growth advantage over BA.1**...

This difference in transmissibility appears to be much smaller than, for example, the difference between BA.1 and Delta.

...Initial data from population-level reinfection studies suggest that **infection with BA.1 provides strong protection against reinfection with BA.2**, at least for the limited period for which data are available.
Omicron sub-lineages sequenced at RIPHL

Ending dates for 2022 MMWR weeks 1 = 1/8; 2 = 1/15; 3 = 1/22; 4 = 1/29; 5 = 2/5; 6 = 2/12, 7 = 2/19; 8 = 2/26
Omicron sub-lineages identified at RIPHL through PCR

Ending dates for 2022 MMWR weeks 1 = 1/8; 2 = 1/15; 3 = 1/22; 4 = 1/29; 5 = 2/5; 6 = 2/12, 7 = 2/19; 8 = 2/26; 9 = 3/5; 10 = 3/12
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• Variants of SARS-CoV-2

• Monitoring wastewater for SARS-CoV-2
Wastewater monitoring system
We monitor Chicago at three different scales:

**Wastewater treatment plants**
(~1 million people)

**Neighborhood sewers**
(~3,000-300,000 people)

SARS-CoV-2 in wastewater tracks case counts

Trends become ‘noisier’ at small scales

Norwood Park & Jefferson Park (population: 52,306)
The CDC is displaying Chicago wastewater

https://covid.cdc.gov/covid-data-tracker/#wastewater-surveillance
Sometimes, no virus at all can be detected
The CDC is displaying local wastewater

https://covid.cdc.gov/covid-data-tracker/#wastewater-surveillance
At this wastewater treatment plant, the red dot (large % increase) is because of detecting small amounts of SARS-CoV-2 after several samples with no detectable virus – it doesn’t necessarily mean a concerning increase right now.
There are other nice national dashboards

Covid-19 Wastewater Monitoring in the U.S.

This chart shows the SARS-CoV-2 virus concentration present in samples of wastewater taken from across the United States. The level of virus in wastewater is a leading indicator, meaning it precedes the change in clinical case counts or hospitalizations.

Most recent data: March 09, 2022

Sources: Wastewater data from Biobot Analytics, Inc.; Clinical data from USAFacts
We also monitor wastewater in some facilities and are even planning to monitor for other pathogens.
And we can identify variants

O’Hare Airport International Terminal (wastewater)

RIPHL (clinical samples from hospitals)
Using wastewater for public health is new(ish)

In Chicago, we are working to refine:

**Where** to sample

**How** to sample

**How** to test
Using wastewater for public health is new(ish)

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Using wastewater for public health is new(ish)

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The SARS-CoV-2 Genome

<table>
<thead>
<tr>
<th>ORF1a protein</th>
<th>ORF1b protein</th>
<th>Spike protein</th>
<th>E</th>
<th>M</th>
<th>N</th>
</tr>
</thead>
</table>
We never look at wastewater in isolation.
• Chicago currently has low levels of COVID-19 transmission

• Changing behavior, variants and immunity may cause changes in transmission levels at some point

• Our laboratory-based surveillance systems can help to detect changes in transmission levels
Need a vaccine or a booster? Have questions?

visit CHI.GOV/COVIDVAX

or call 312-746-4835

CDPH PROTECT CHICAGO