COVID-19 Updates: May 13, 2020

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VIROLOGY

EPIDEMIOLOGY

INFECTION CONTROL

DIAGNOSIS

DISEASE

TREATMENT

QUESTIONS

1. Do you have any good clear info to share with parents regarding the new syndrome affecting children?

2. What are people doing about protections for staff and clients for foot exams for people with diabetes?

3. In regard to youth treatment centers, is a 10 day isolation on admission adequate or would you recommend testing?

4. With regards to screening front line asymptomatic essential staff, is this something that occupational health would oversee, and if we do not have occupational health, any recommendations? Are clinics covering the cost of testing or co-payments for their employees to have testing? Are clinics requiring screening testing for health care workers or just making it available for those interested?

Pediatric Multi-System Inflammatory Syndrome *Potentially Associated with COVID-19*

Fifteen cases compatible with multi-system inflammatory syndrome have been identified in children in New York City hospitals.

- Ages 2-15 years, hospitalized from April 17- May 1, 2020 with illnesses compatible with this syndrome (i.e., typical Kawasaki disease, incomplete Kawasaki disease, and/or shock)
- All patients had subjective or measured fever and more than half reported rash, abdominal pain, vomiting, or diarrhea
- Respiratory symptoms were reported in less than half of these patients. Polymerase chain reaction (PCR) testing for SARS-CoV-2 has been positive (4), negative (10), and initially indeterminate and then negative (1). Six patients with negative testing by PCR were positive by serology.
- More than half required blood pressure support and five required mechanical ventilation
- No fatalities have been reported

Early recognition and specialist referral are essential, including to critical care if warranted

New York Health Department: Health Alert Notice May 4, 2020

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Interpreting Diagnostic Tests for SARS-CoV-2

- **In most individuals with symptomatic COVID-19 infection, Nasopharyngeal viral RNA becomes detectable as early as day 1 of symptoms and peaks within the first week of symptom onset.**
  - This positivity starts to decline by week 3 and subsequently becomes undetectable.
  - Patients with severe infection my have higher and prolonged viral load shedding but does not necessarily indicate presence of viable virus
- **In a study of 9 patients, attempts to isolate the virus in culture were not successful beyond day 8 of illness onset, which correlates with the decline of infectivity beyond the first week**.
  - That is in part why the "symptom-based strategy" of the CDC indicates that health care workers can return to work
- **The timeline of PCR positivity is different in specimens other than nasopharyngeal swab.**
  - PCR positivity declines more slowly in sputum and may still be positive after nasopharyngeal swabs are negative.
  - PCR positivity in stool was observed in 55 of 96 (57%) infected patients and remained positive in stool beyond nasopharyngeal swab by a median of 4 to 11 days
- **RT-PCR positivity is highest in bronchoalveolar lavage specimens (93%), followed by sputum (72%), nasal swab (63%), and pharyngeal swab (32%)**
  - False-negative results mainly occurred due to inappropriate timing of sample collection in relation to illness onset and deficiency in sampling technique, especially of nasopharyngeal swabs
- **Specificity of most of the RT-PCR tests is 100%**
  - Occasional false-positive results may occur due to technical errors and reagent contamination.

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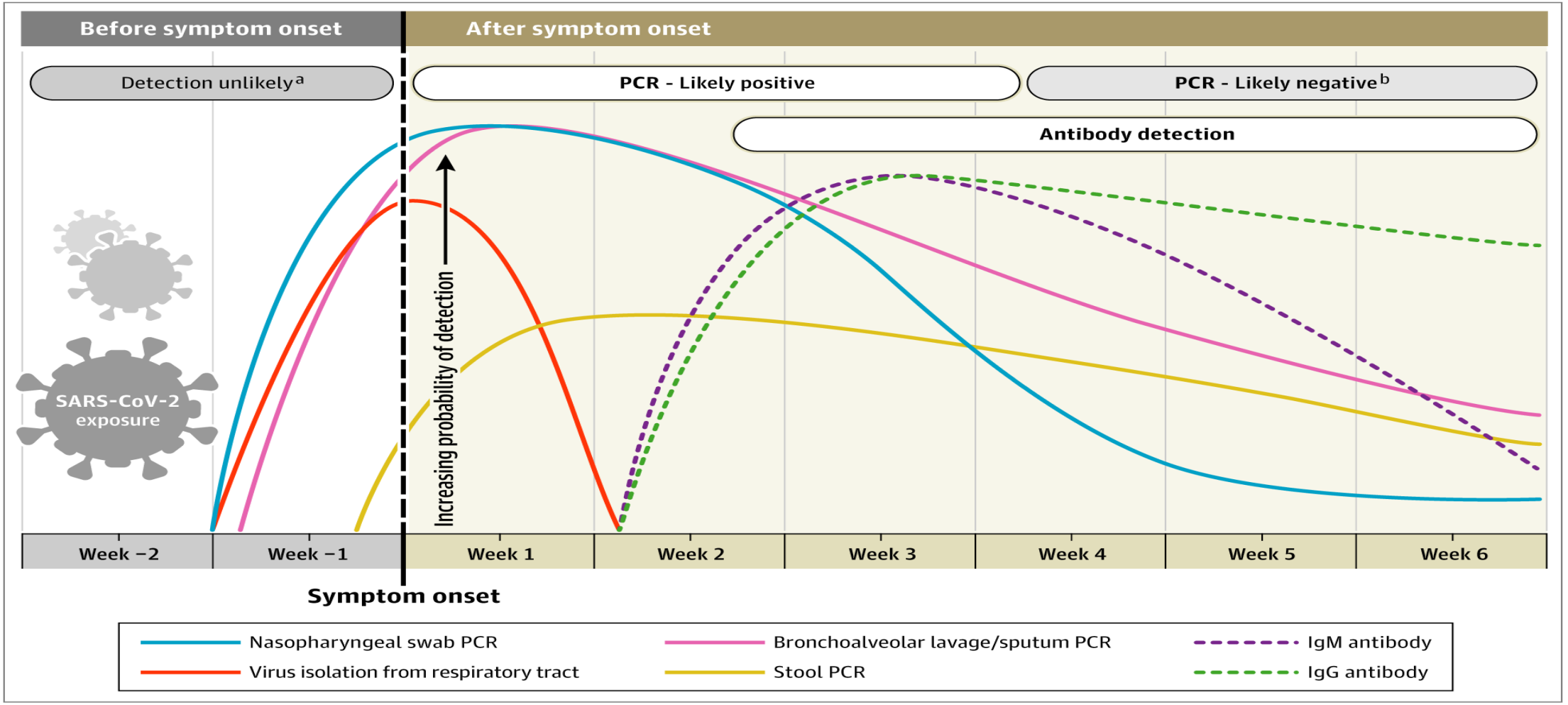

Estimated Variation Over Time in Diagnostic Tests for Detection of SARS-CoV-2 Infection Relative to Symptom Onset Estimated time intervals and rates of viral detection are based on data from several published reports. Because of variability in values among studies, estimated time intervals should be 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. [a]Detection only occurs if patients are followed up proactively from the time of exposure. [b]More likely to register a negative than a positive result by PCR of a nasopharyngeal swab.

Interpreting Diagnostic Tests for SARS-CoV-2

- Serology may be important for 1) patients who may present late, beyond the first 2 weeks of illness onset, 2) to understand the extent of COVID-19 in the community and 3) to identify individuals who are immune and potentially "protected" from reinfection
- **The most sensitive and earliest serological marker (second week after symptom onset) is total antibodies (Ab)**
  - IgM and IgG can be positive as early as the 4th day after symptom onset but higher levels can be detected in most patients by the 4^{th} week
- **Paired serum samples testing** with the initial PCR and the second 2 weeks later can increase diagnostic accuracy
- The majority of Ab are against Nucleo Capcid (NC) (the most abundant). **NC Ab would be the most sensitive**
- **Ab against the receptor-binding domain of S protein** would be **more specific** and are expected to be neutralizing.
- Many manufacturers of **PCT** do not reveal the nature of antigens used these **are purely qualitative in nature**
- The presence of **neutralizing Ab can only be confirmed** by a plaque reduction neutralization test
  - However**, high titers** of IgG Ab detected by ELISA have been shown to positively correlate with neutralizing Ab.
- The long-term persistence and duration of protection conferred by the neutralizing Ab remains unknown.

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Ab: Antibodies. PCT: Point of Care Testing

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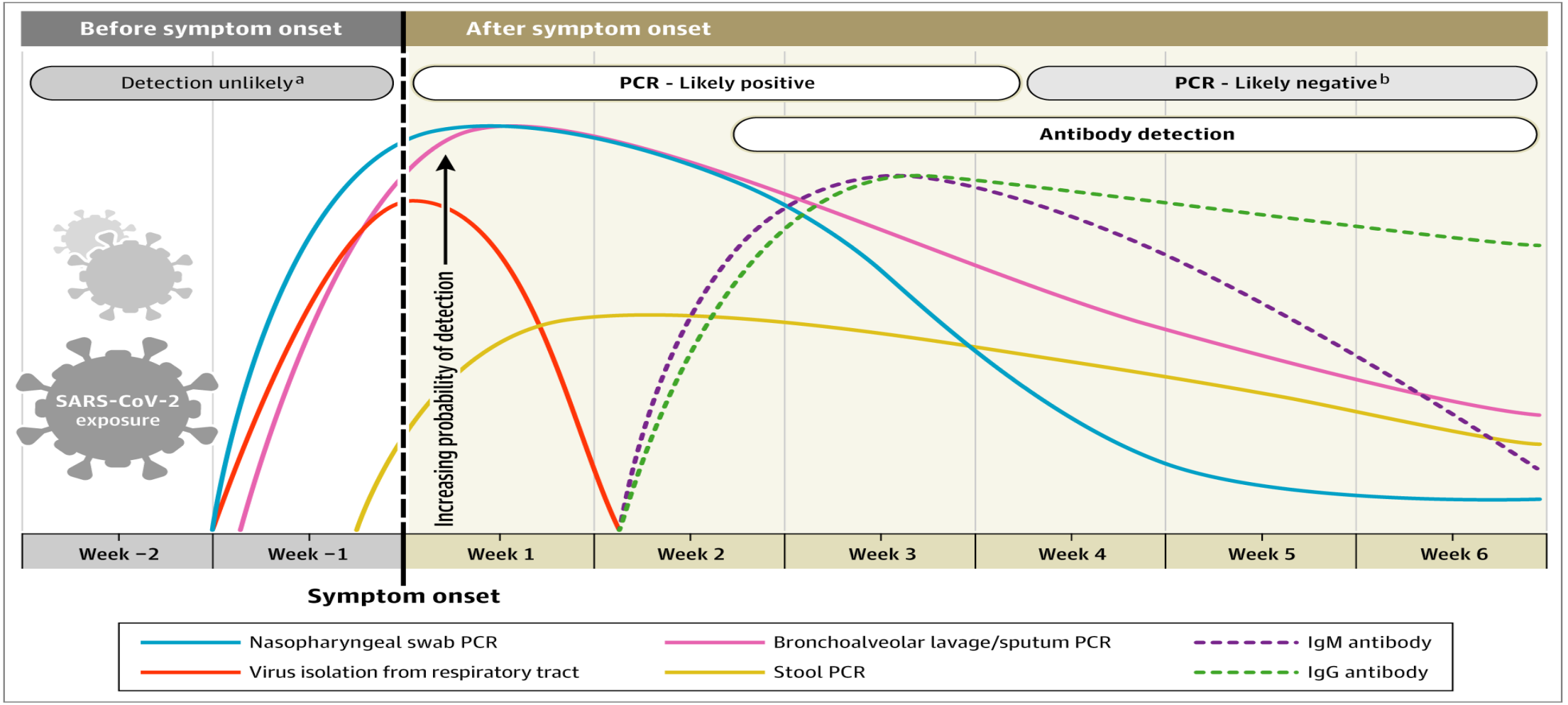

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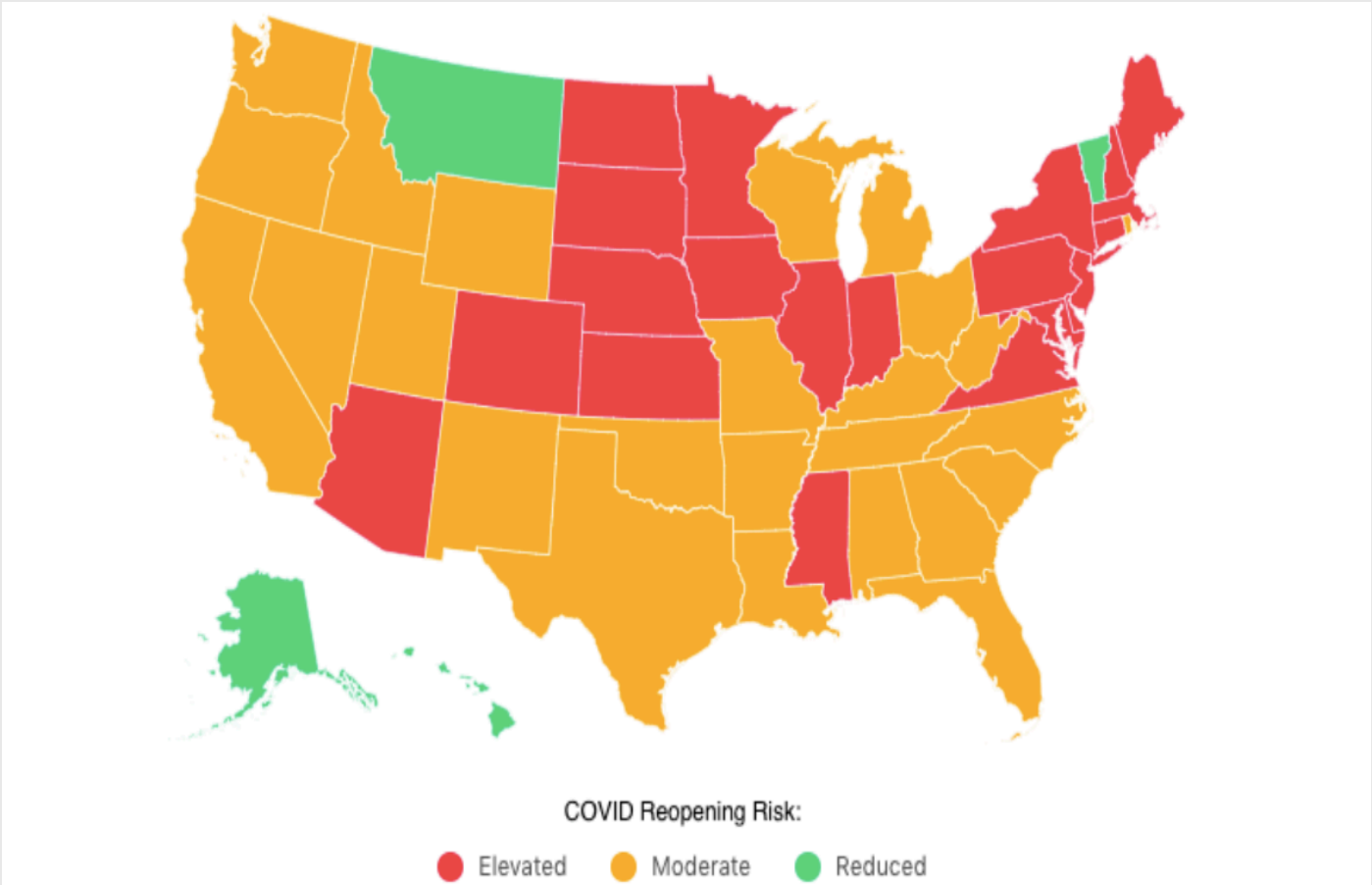
COVID Virus a Genetic Cousin of Scaly Mammal Coronavirus

- SARS-CoV-2, shares high sequence identity to SARS-CoV and a bat coronavirus RaTG132.
  - While bats may be the reservoir host for various coronaviruses, whether SARS-CoV-2 has other hosts remains ambiguous.
- One coronavirus isolated from a Malayan pangolin showed high level identity with SARS-COV-2
  - 100%, 98.6%, 97.8% and 90.7% amino acid identity with SARS-CoV-2 in the E, M, N and S genes, respectively.
  - The the receptor-binding domain within the S protein of the Pangolin-CoV is virtually identical to that of SARS-CoV-2,
- **SARS-CoV-2 might have originated from the recombination of a Pangolin-CoV-like virus with a Bat-CoV-RaTG13-like virus.**
  - The Pangolin-CoV was detected in 17 of 25 Malayan pangolins analyzed, in which all were symptomatic.
  - Circulating antibodies against Pangolin-CoV reacted with the S protein of SARS-CoV-2.
- The isolation of a coronavirus highly related to SARS-CoV-2 in pangolins suggests that they have the potential to act as the intermediate host of SARS-CoV-2.

The newly identified coronavirus in the most-trafficked mammal could represent a future threat to public health if wildlife trade is not effectively controlled

Xiao K, Zhai J,Feng Y et al. Isolation of SARS-CoV-2-related coronavirus from Malayan pangolins Nature May 7, 2020



U.S. Vitals (covidly.com)

- **Cases: 1,386,632 (+13,442 / 24h)**
- **Deaths: 82,369 (+1,249 / 24h)**
- **Tests: 9,603,195**

Covid ActNow

Resources

- https://www1.nyc.gov/assets/doh/downloads/pdf/han/alert/2020/covid-19-pediatric-multi-system-inflammatory-syndrome.pdf
- https://www.idsociety.org/contentassets/9ba35522e0964d51a47ae3b22e59fb47/idsa-recommendations-for-reducing-covid-19-distancing_16apr2020_final-.pdf