COVID-19 Update
July 7, 2021

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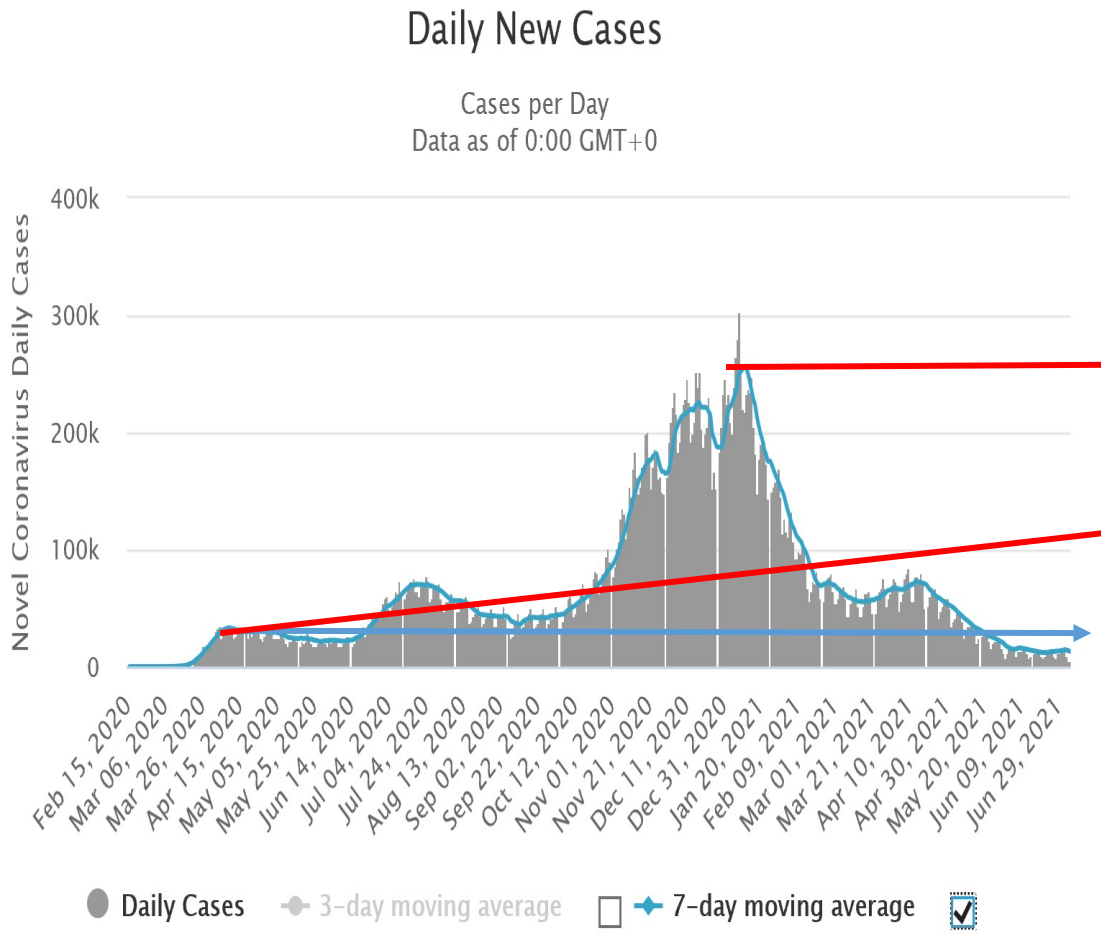
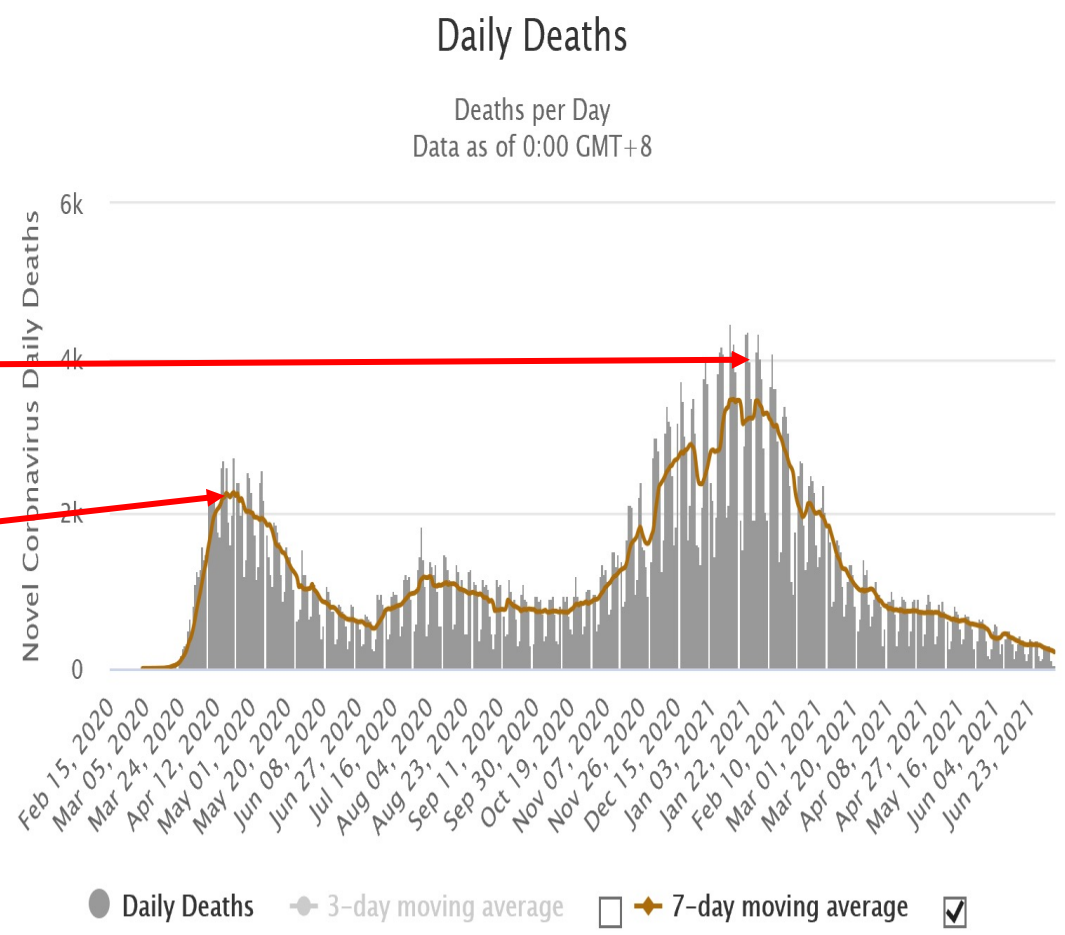
Daily New Cases in the United States



Daily New Deaths in the United States



6,528 new cases and **49 new deaths as of July 6,2021**
~ March 23, 2020

COVID-19 Transmission

Inhalation of very small, fine respiratory droplets

Inhalation of aerosol particles

- Deposition of respiratory droplets and aerosol particles on exposed mucous membranes in the mouth nose or eyes

Transmission less common through contact with contaminated surfaces

Transmission risk increases in enclosed spaces with poor ventilation and behaviors that include

- Exercise
- Singing
- Prolonged indoor exposure

Source: CDC

COVID-19: Prevention

Vaccination

Wearing of asks/cloth face coverings

Maintain physical distance 6 feet

Avoid crowds and congregate settings

Outdoors better than indoors

Frequent handwashing

Source: CDC

COVID-19 Transmission

Around 1/3 of patients never develop symptoms

Of individuals tested with a PCR test for SARS-COV-2,

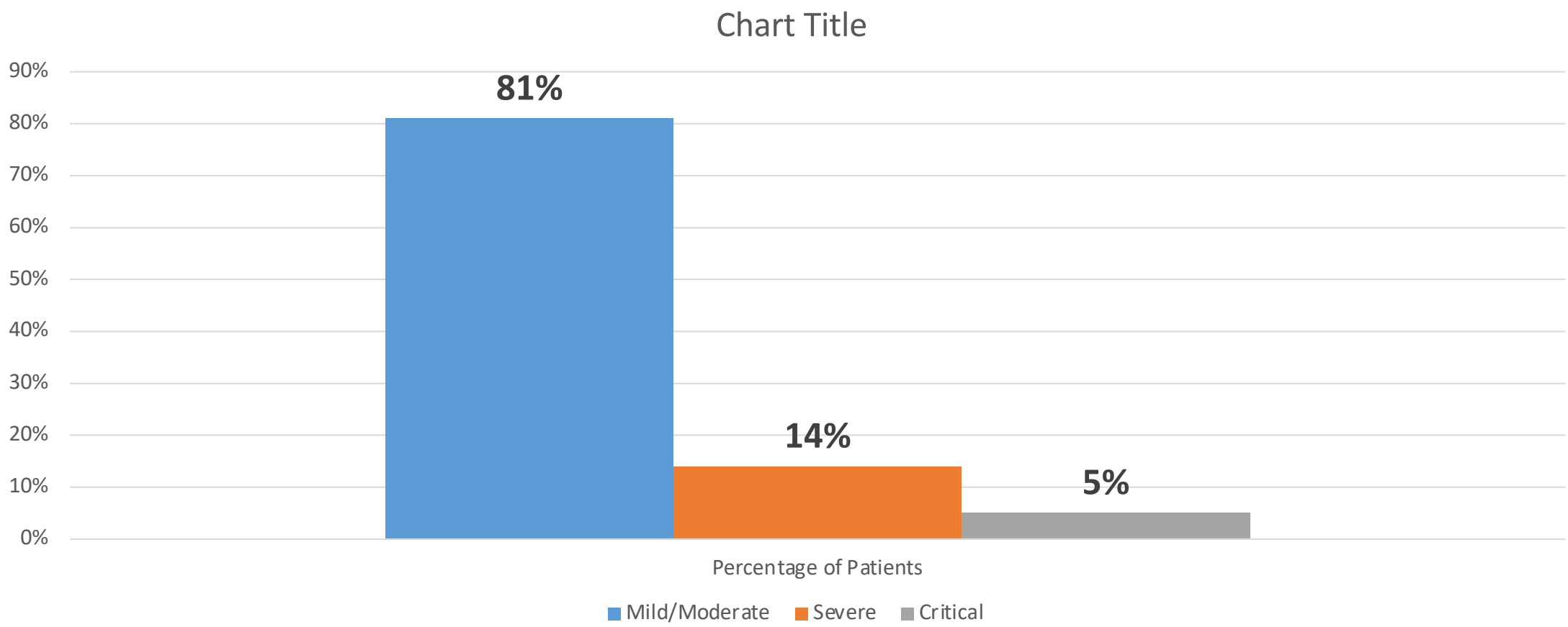
- 75% of individuals with a positive test who are asymptomatic at the time of testing will remain asymptomatic

59% of SARS-COV-2 results from asymptomatic infection

- 35% from pre-symptomatic individuals
- 24% from individuals who never develop symptoms

JAMA Netw Open. 2021;4(1):e2035057. Oran D, Topol E. Ann Int Med, Sept 1 2020

Spectrum of Disease Among 44,672 Individual with confirmed COVID-19 in China



Z Wu & JM McCoogan, JANA 323:1239, 2020

COVID-19: Risk Factors for Progression to Severe Disease

Age

Comorbid conditions

Source: CDC

COVID-19: Risk Factors for Progression to Severe Disease

- Diabetes
- CVC disease
- HTN
- Obesity
- Chronic Kidney Disease
- Chronic Liver Disease
- Cancer
- Chronic lung diseases, including COPD abnd asthma, if it’s moderate to severe
- HIV infection
- Immunocompromised state (weakened immune system)
- Overweight and obesity
- Pregnancy
- Sickle cell disease or thalassemia
- Smoking, current or former
- Solid organ or blood stem cell transplant
- Stroke or cerebrovascular disease
- Substance use disorders
- Dementia or other neurological conditions
- Down syndrome

Source: CDC

COVID-19 EUA Treatment Guidelines

Antivirals

- **Remdesevir**
- **Anti SARAS-COV-2 Monoclonal antibodies**
  - Casirivimab + Imdevimab (RegCOV), Bamlanivimab + estesevimab, Sotrovimab
- **Convalescent plasma**

Immune Modulators

- Dexamethasone
- Tocilizumab (with dexamethasone)
- Baricitinib (with remdesivir)

Treatment of concomitant conditions

- Thromboembolic disease
- Bacterial and fungal coinfections

IDSA/NIH Guidelines

COVID-19 Vaccines

Clinical Trials

- Pfizer/BioNTech Vaccine: 95% efficacy (~ 44,000 participants)
  Moderna: 94.1% (~30,000 participants)
  Johnson & Johnson: 72% efficacy in the US and 85% efficacy vs server disease

Still highly effective against most circulating variants

Real world effectiveness comparable to clinical trials

- Estimated Adjusted effectiveness, >7 days after the second dose, Jan 24 to April3, 2021

SARS-CoV-2 Infection	95.3%
Asymptomatic SARS-CoV-2 Infection	91.5%
Symptomatic COVID-19	97.0%
COVID-19 related hospitalizations	97.2%
Severe or critical COVID-19 related hospitalization	97.5%
COVID-19 related death	96.7%

Haas E et al. Lancet, May 5, 2021

Post-COVID-19

Residual organ system dysfunction directly explainable by organ system damage

- ARDS, AKI, CHF etc

Complications that prolong after acute COVID-19 or start immediately after Acute COVID-19

- Pulmonary embolism / Organizing pneumonaBacterial / fungal pneumonia
- Persistent taste and smell abnormalities
- Fatigue

Signs and symptoms not completely explainable by readily apparent pathogenic processes

- Fatigue
- Unexplained dyspnea or chest pain
- Neuropsychiatric symptoms (Depression, Anxiety, sleep disorders, “brain fog”)
- “Autoimmune manifestations”
- Dysautonomia (bradycardia/tachycardia syndrome, temperature dysregulation)

George PM, et al. Thorax 2020;0:1–8. doi:10.1136/thoraxjnl-2020-215314

COVID-19 Variants

These variants seem to spread more easily and quickly, which may lead to:

- More cases of COVID-19
- More hospitalizations and potentially more deaths
- More strain on healthcare resources

Studies suggest that the current authorized vaccines work on the circulating variants

They are classified as:

- Variants of interest
- Variants of concern
- Variants of high consequence

Source: CDC

Variants of Concern in the United States

B.1.1.7 (Alpha): This variant was first detected in the United States in Dec 2020. It was initially detected in the United Kingdom.

- ~50% increased transmission
- Potential increased severity based on hospitalizations and case fatality rates
- No impact on susceptibility to EUA monoclonal antibody treatments
- Minimal impact on neutralization by convalescent and post-vaccination sera

B.1.351 (Beta): This variant was first detected in the United States at the end of Jan 2021. It was initially detected in South Africa in Dec 2020.

- 50% increased transmission
- Significantly reduced susceptibility to the combination of bamlanivimab and etesevimab treatment but other EUA monoclonal antibody treatments are available
- Reduced neutralization by convalescent and post-vaccination sera

Source: CDC

Variants of Concern in the United States

P.1 (Gamma): This variant was first detected in the United States in Jan 2021. P.1 was initially identified in travelers from Brazil, who were tested during routine screening at an airport in Japan.

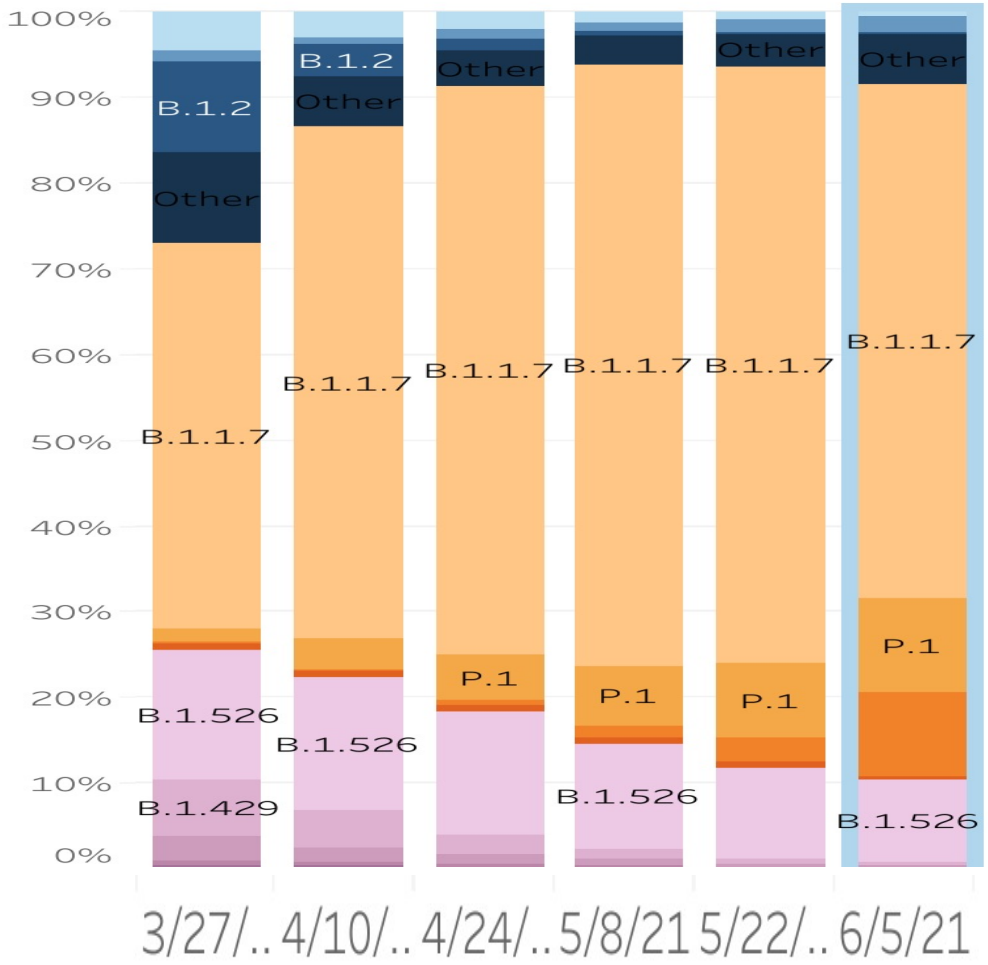
- Significantly reduced susceptibility to the combination of bamlanivimab and etesevimab but other EUA monoclonal antibody treatments are available
- Reduced neutralization by convalescent and post-vaccination sera

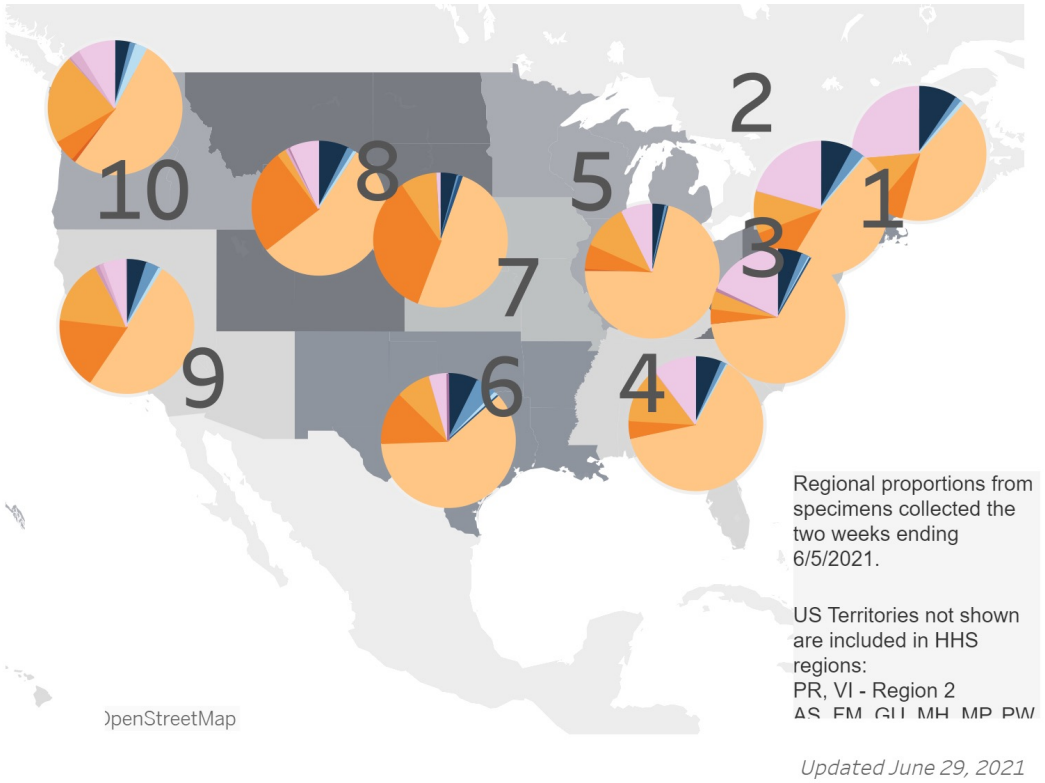
B.1.617.2 (Delta): This variant was first detected in the United States in Mar 2021. It was initially identified in India in Dec 2020.

- Increased transmissibility
- Potential reduction in neutralization by some EUA monoclonal antibody treatments
- Potential reduction in neutralization by post-vaccination sera

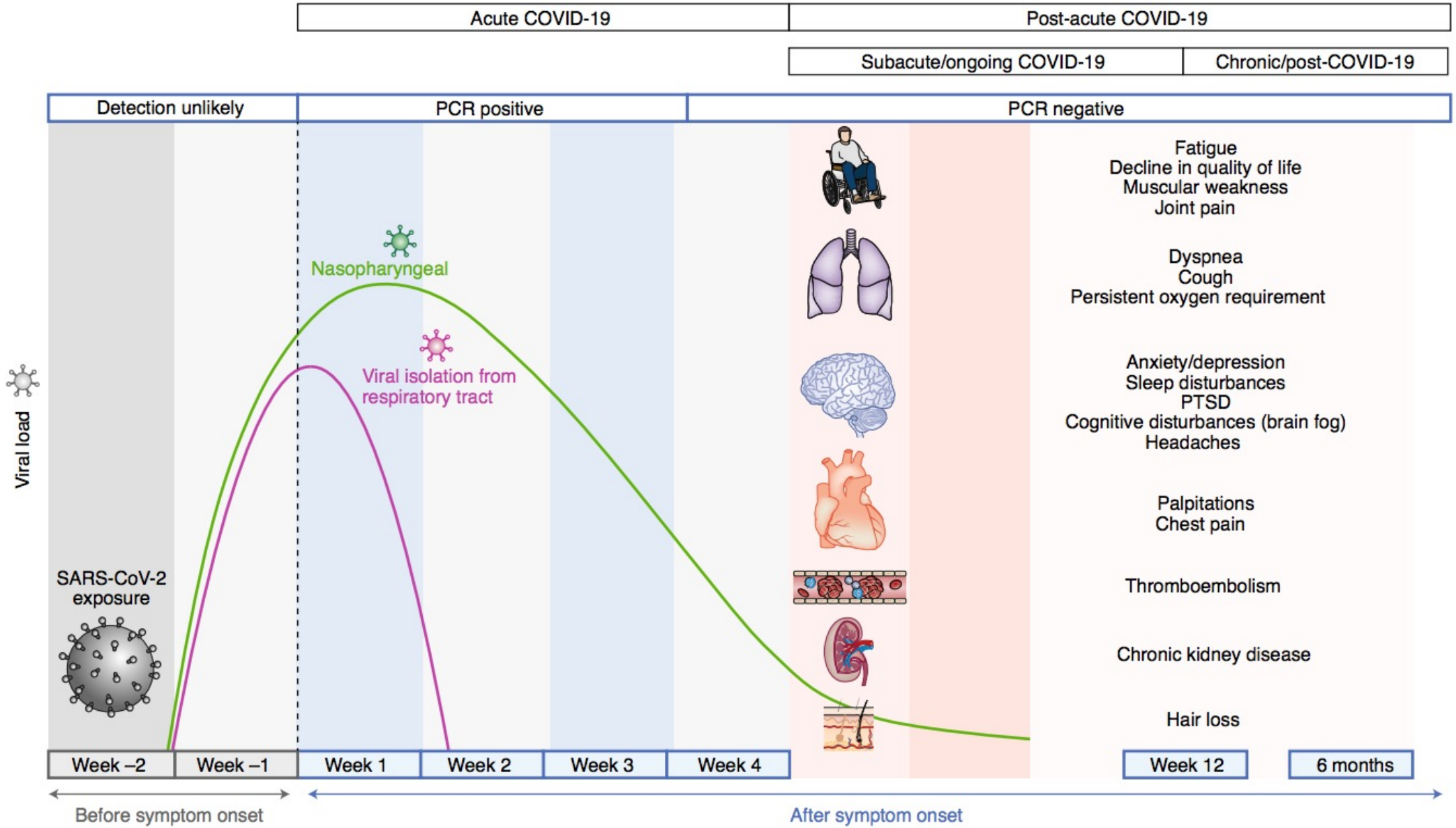
Source: CDC

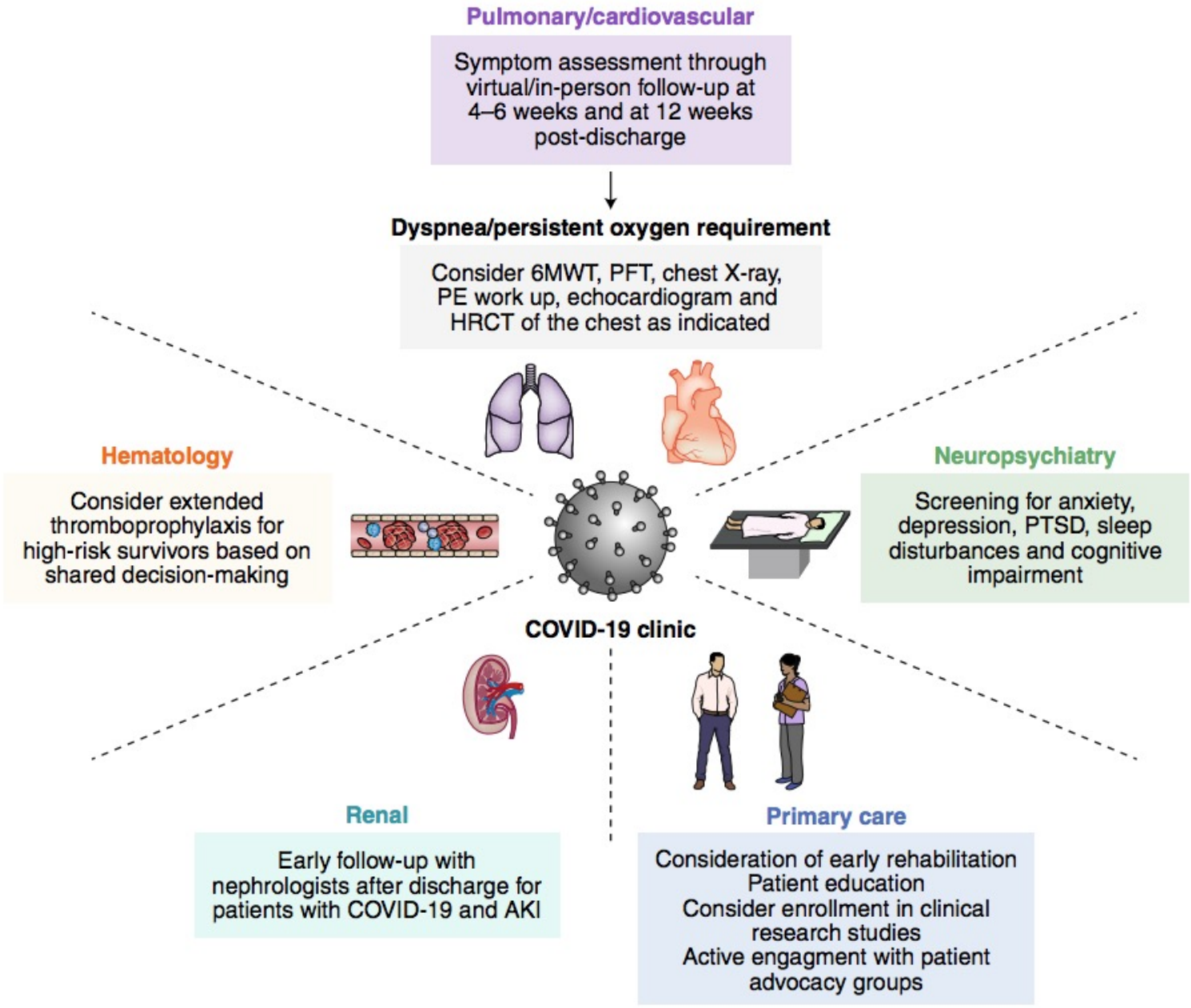
COVID-19 Variants in the United States





Source: CDC


Acute COVID-19
Post-acute COVID-19
Subacute/ongoing COVID-19
Chronic/post-COVID-19
Detection unlikely
PCR positive
PCR negative
Viral load
Nasopharyngeal
Viral isolation from respiratory tract
SARS-CoV-2 exposure
Fatigue
Decline in quality of life
Muscular weakness
Joint pain
Dyspnea
Cough
Persistent oxygen requirement
Anxiety/depression
Sleep disturbances
PTSD
Cognitive disturbances (brain fog)
Headaches
Palpitations
Chest pain
Thromboembolism
Chronic kidney disease
Hair loss
Week –2
Week –1
Week 1
Week 2
Week 3
Week 4
Week 12
6 months
Before symptom onset
After symptom onset



Nature Medicine | VOL 27 | April 2021 | 601–615 | www.nature.com/naturemedicine

TERMINOLOGY AND STAGES OF RECOVERY

Acute COVID-19:

- Symptoms of COVID-19 for up to 4 weeks following the onset of illness

Ongoing symptomatic COVID-19:

- Symptoms of COVID-19 from 4 to 12 weeks following the onset of illness

Post-COVID-19:

- Symptoms that develop during or after COVID-19, continue for ≥ 12 weeks, not explained by an alternative diagnosis
- These stages reflect symptomatic recovery and are **not** related to active viral infection and infectivity.

https://www.nice.org.uk/guidance/ng188

Ongoing symptomatic COVID-19
(From diagnosis or hospital discharge until week 12)

Identify early the most serious and potentially life-limiting complications

- Organizing Pneumonia
- Pulmonary fibrosis
- Pulmonary thromboembolism
- Pulmonary Hypertension
- Bacterial/fungal Infectious complications (Pneumonia)

Tests

- Chest CT w or wo contrast
- Pulmonary function tests
- 6 min walk or similar
- EKG/Echocardiogram

What are you looking for in the Chest CT?

- Organizing Pneumonia
- Pulmonary fibrosis
- Pulmonary thromboembolism
- Bacterial/fungal Infectious complications (Pneumonia)

Post COVID-19 (> 12 weeks)
Patient Workup by Primary Care

Fatigue

- Rule out secondary causes such us hypo/hyperthyroidism, CHF, OSA, myopathy
  - Thyroid panel , BNP, sleep study, total CK
- Consider physical therapy

Dyspnea

- Comprehensive physical exam, Chest X ray, EKG, BNP, D-dimer

Evaluate depression and anxiety

Do not perform autoimmune workup without a clinical diagnosis in mind

Evaluate for diagnosed or undiagnosed premorbid conditions

Support the patient in this journey

THANK YOU

Questions?