# CDC/IDSA COVID-19 Clinician Call

March 13, 2021

## Welcome & Introduction

Dana Wollins, DrPH, MGC
Vice President, Clinical Affairs & Guidelines
IDSA

- 58th in a series of weekly calls, initiated by CDC as a forum for information sharing among frontline clinicians caring for patients with COVID-19
- The views and opinions expressed here are those of the presenters and do not necessarily reflect the official policy or position of the CDC or IDSA. Involvement of CDC and IDSA should not be viewed as endorsement of any entity or individual involved.
- This webinar is being recorded and can be found online at www.idsociety.org/cliniciancalls.

# TODAY'S TOPICS

- CDC Update on SARS-CoV-2 Variants
- Practical Strategies for SARS-CoV-2 Testing
- Testing in Long-Term Care Settings

# Today's Call

## CDC Update on SARS-CoV-2 Variants

**Vivien G. Dugan, PhD**
Centers for Disease Control and Prevention

## Practical Strategies for SARS-CoV-2 Testing

**Romney M. Humphries, PhD**
Vanderbilt University Medical Center

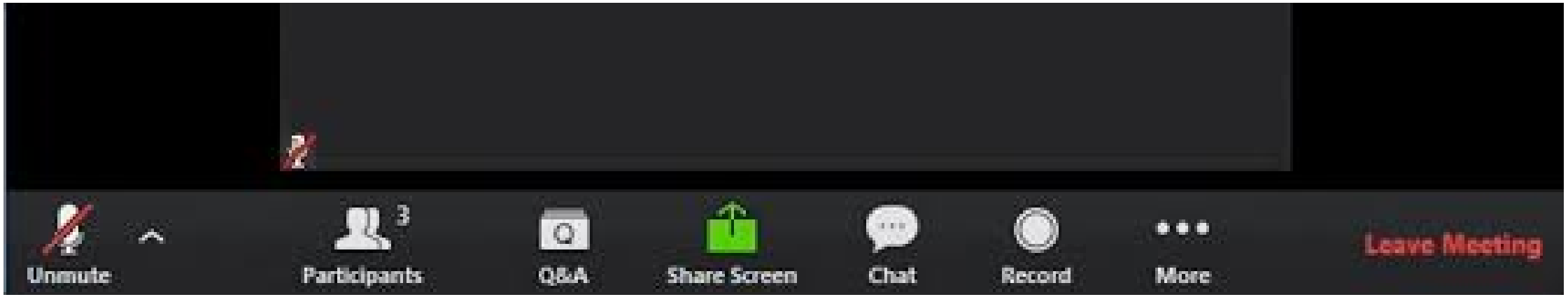
**Francesca Lee, MD**
University of Texas Southwestern

## Testing in Long-Term Care Settings

**Sujan Reddy, MD, MSc**
Centers for Disease Control and Prevention

Question?
Use the “Q&A” Button

Comment?
Use the “Chat” Button



# Update on SARS-CoV-2 Variants

**Vivien G. Dugan, PhD**
Lead, Surveillance and Emerging Variants Team
Laboratory and Testing Task Force
COVID-19 Emergency Response
Centers for Disease Control and Prevention

Deputy Director, Influenza Division
NCIRD, CDC

# Update on SARS-CoV-2 Variants

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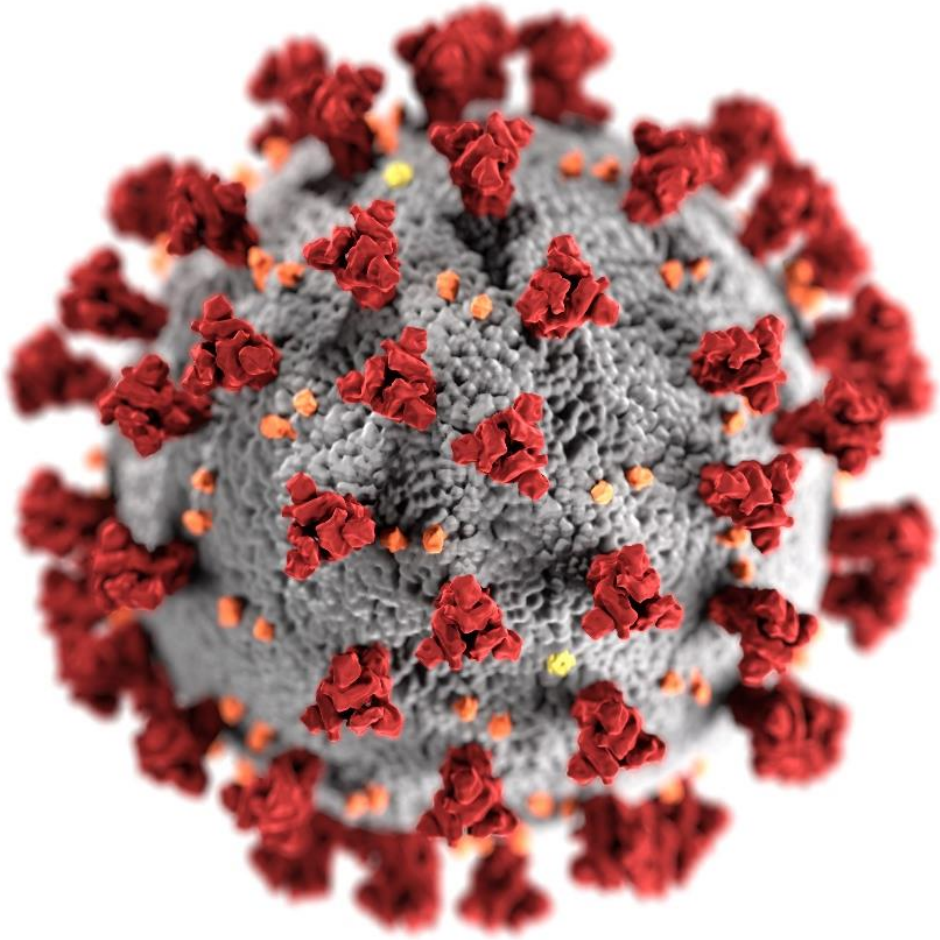


cdc.gov/coronavirus

# Disclaimer

- ***The opinions expressed in this presentation are those of the authors and do not necessarily reflect the official position or policy of CDC, HHS, or the U.S. government***

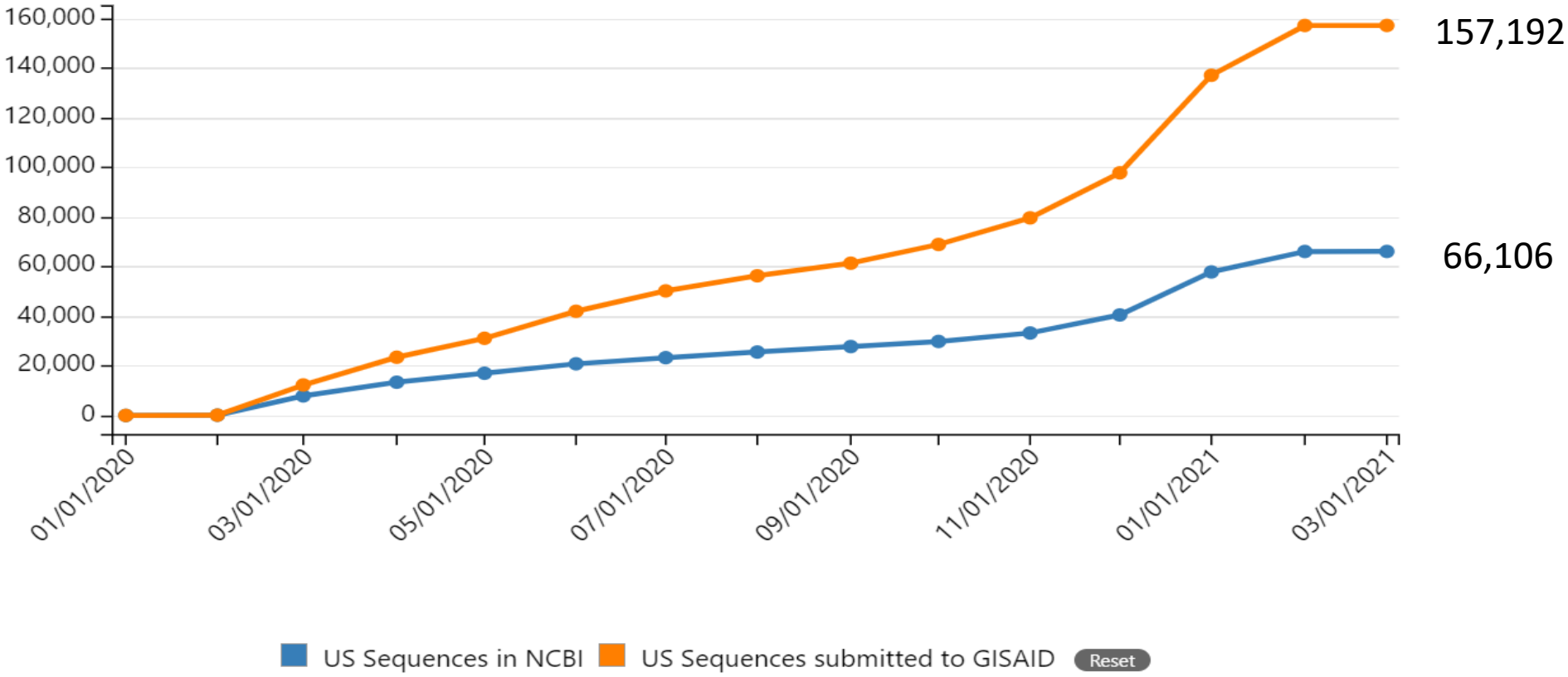
# National SARS-CoV-2 Genomic Surveillance

- In the United States, CDC tracks and analyzes emerging SARS-CoV-2 variants through genomic surveillance
  - Leading the National SARS-CoV-2 Strain Surveillance (NS3) system
  - Partnering with commercial diagnostic laboratories
  - Partnering with universities
  - Supporting state, territorial, local and tribal health departments
  - Leading the SARS-CoV-2 Sequencing for Public Health Emergencies Response, Epidemiology, and Surveillance (SPHERES) Consortium

Surveillance for SARS-CoV-2 Variants | CDC

# U.S. Sequences Available in Public Repositories

As of March 1, 2021




157,192

66,106

This line chart captures the cumulative number of published SARS-CoV-2 sequences by collection date from laboratories in states and territories across the US from January 2020 to the present. The blue line represents US sequences available in NCBI, the National Center for Biotechnology Information, and the orange represents sequences available in GISAID, a global initiative that maintains a repository of virus sequence data.

National SARS-CoV-2 Genomic Surveillance Dashboard | CDC

# SARS-CoV-2 Variants

- Viruses constantly change through mutation, so new variants are expected
  - SARS-CoV-2 has low mutation rate, compared with influenza A viruses and HIV
- Multiple SARS-CoV-2 variants circulating globally
  - After emerging, some disappear; others persist
- CDC and others are studying these variants to understand whether they:
  - Spread more easily from person to person
  - Cause milder or more severe disease in people
  - Detected by available diagnostic tests
  - Respond to therapeutics currently used to treat people for COVID-19
  - Change effectiveness of COVID-19 vaccines

About Variants of the Virus that Causes COVID-19 | CDC

# Criteria for Defining Variants (including Variant of Interest and Variant of Concern)

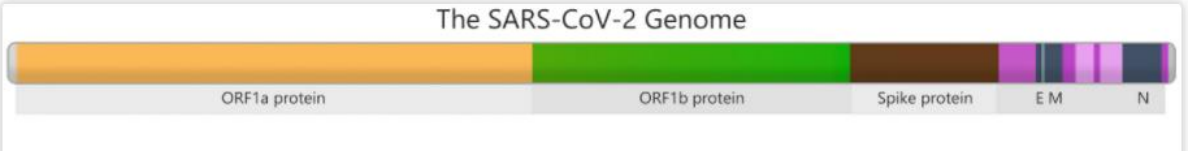
- Various organizations are developing working definitions including the W.H.O.
- United States government classification being reviewed as part of interagency activities
- Key criteria
  - Evidence of immune escape (vaccine or natural infection)
  - Convergent evolution
  - Impact on diagnostics
  - Impact on therapeutics
  - Evidence of increased transmissibility
  - Evidence of increased disease severity

About Variants of the Virus that Causes COVID-19 | CDC

COVID-19 Weekly Epidemiological Update (who.int)

20210223_weekly_epi_update_28.pdf (who.int)

# Current Variants of Concern

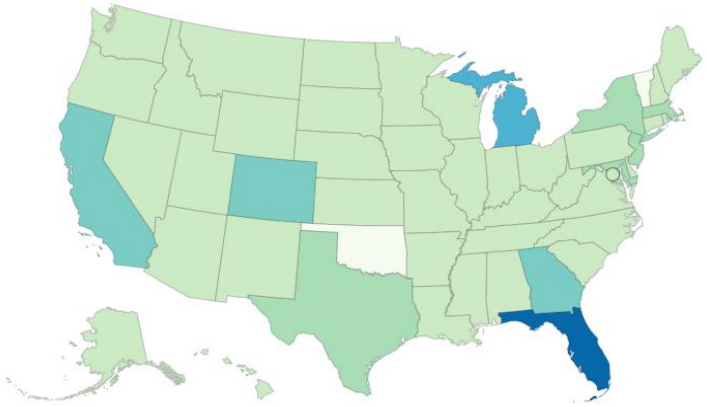



| Variant designation | First identification | | Characteristic mutations (protein: mutation) |
|---|---|---|---|
| | Location | Date | |
| **B.1.1.7** (20I/501Y.V1) | United Kingdom | Sep 2020 | ORF1ab: T1001I, A1708D, I2230T, del3675–3677 SGF |
| | | | S: del69–70 HV, del144 Y, N501Y, A570D, D614G, P681H, T761I, S982A, D1118H |
| | | | ORF8: Q27stop, R52I, Y73C |
| | | | N: D3L, S235F |
| **B.1.351** (20H/501Y.V2) | South Africa | Oct 2020 | ORF1ab: K1655N |
| | | | E: P71L |
| | | | N: T205I |
| | | | S:K417N, E484K, N501Y, D614G, A701V |
| **P.1** (20J/501Y.V3) | Brazil and Japan | Jan 2021 | ORF1ab: F681L, I760T, S1188L, K1795Q, del3675–3677 SGF, E5662D |
| | | | S: L18F, T20N, P26S, D138Y, R190S, K417T, E484K, N501Y, D614G, H655Y, T1027I |
| | | | ORF3a: C174G |
| | | | ORF8: E92K |
| | | | ORF9: Q77E |
| | | | ORF14: V49L |
| | | | N: P80R |

Emergence of SARS-CoV-2 B.1.1.7 Lineage — United States, December 29, 2020–January 12, 2021 | MMWR (cdc.gov)

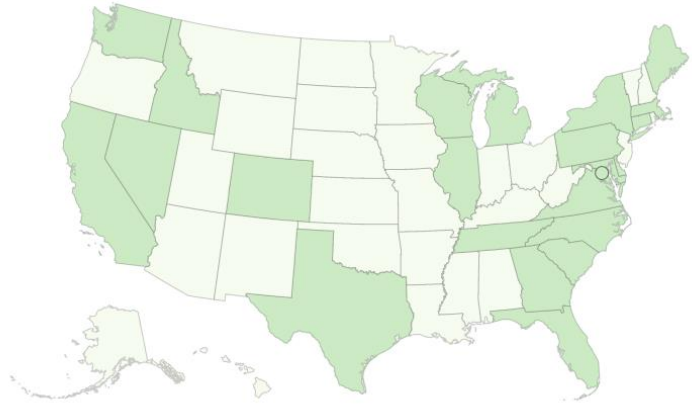
# U.S. COVID-19 Cases Caused by Variants

B.1.1.7 variant



Territories AS GU MH FM MP PW PR VI

B.1.351 variant



Territories AS GU MH FM MP PW PR VI

P.1 variant

Territories AS GU MH FM MP PW PR VI

| Total US Cases | B.1.1.7 | | B.1.351 | | P.1 | |
|---|---|---|---|---|---|---|
| | Total B.1.1.7 | US Jurisdictions | Total B.1.351 | US Jurisdictions | Total P.1 | US Jurisdictions |
| 3826 | 3701 | 50 | 108 | 23 | 17 | 10 |

Number of Cases

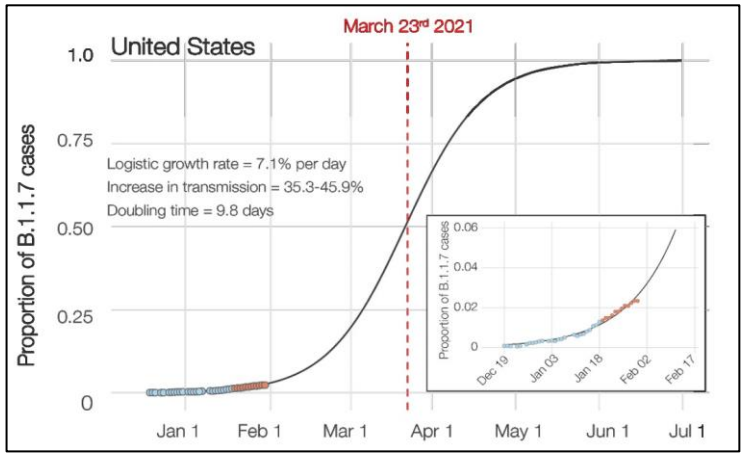
- 0 to 0
- 1 to 100
- 101 to 200
- 201 to 300
- 501 to 600
- 601 to 700

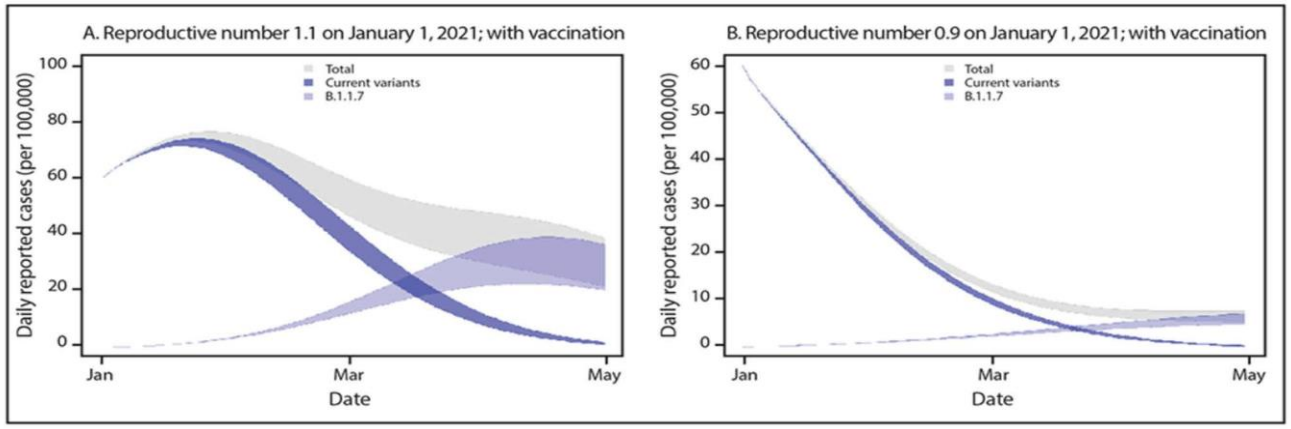
Numbers reflect the number of jurisdictions with > 1 case that have been reported to CDC as of March 11, 2021 and may be higher than what is shown on the US COVID-19 Cases Caused by Variants webpage. Numbers will be updated on Sunday, Tuesday and Thursday by 7pm and final case counts may be higher.

US COVID-19 Cases Caused by Variants | CDC

# B.1.1.7 Trajectory in the United States

- First identified in Dec. 2020, but likely arrived in Nov. 2020
  - Multiple introductions
- Geographically widespread
  - Reported in nearly all states
- Two models suggest B.1.1.7 may predominate by March 2021
  - One suggests high vaccine coverage will blunt impact of higher transmissibility



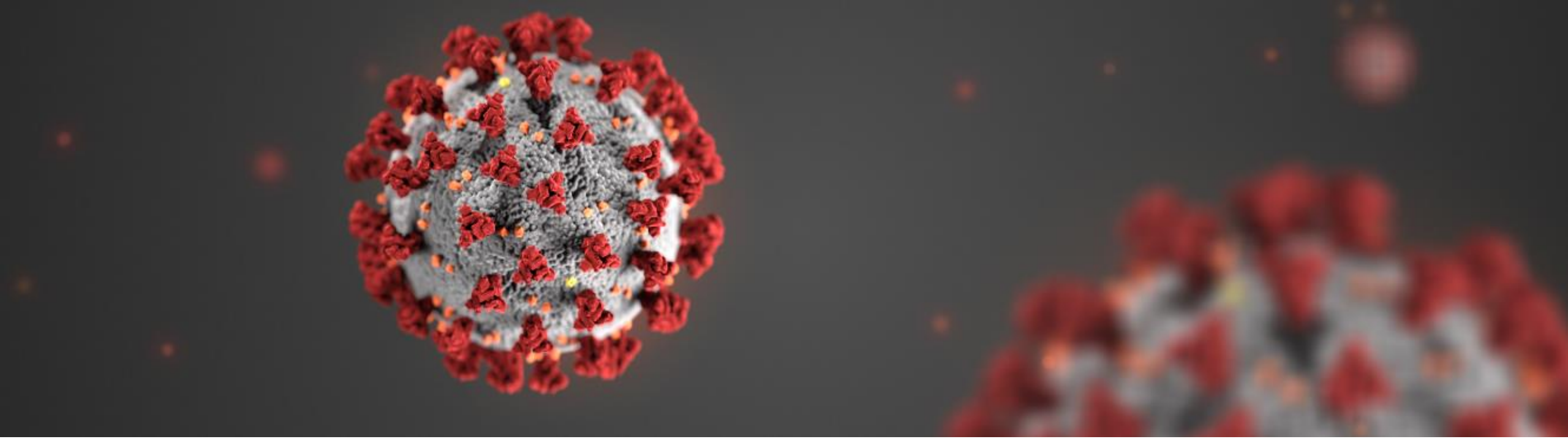




https://www.cdc.gov/coronavirus/2019-ncov/more/science-and-research/scientific-brief-emerging-variants.html

**Figure sources:** Washington et al. medRxiv preprint (Feb 7 2021): https://www.medrxiv.org/content/10.1101/2021.02.06.21251159v1
Galloway et al. MMWR 2021;70:95–99. https://www.cdc.gov/mmwr/volumes/70/wr/mm7003e2.htm?s_cid=mm7003e2_w

# Key Public Health Messages

- Data suggest some variants may have increased transmissibility, increased severity, immune evasion
- Epidemiology indicates SARS-CoV-2 variants are spreading globally
- Current mitigation strategies work
  - Masking, social distancing, handwashing, quarantine, public health policies
- Variants demonstrate the need to emphasize these measures
  - Current epidemiologic data moving in the right (downward) direction
- Importance of vaccination and monitoring impact
  - General protection for the population against SARS-CoV-2
  - Impact of variants on vaccine escape still being characterized, even with decreased effectiveness, may still provide partial protection
  - Need robust epidemiology and virologic surveillance system to determine if vaccine updates needed



For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

# Practical Strategies for SARS-CoV-2 Testing:

*Scenario-Based Guidance for SARS-CoV-2 Testing in Symptomatic & Asymptomatic Patients*

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Clinical Microbiology Laboratory Director
Professor of Pathology, Microbiology & Immunology
Vanderbilt University Medical Center

**Francesca Lee, MD**
Clinical Microbiology Laboratory Director
Associate Professor, Pathology & Internal Medicine
University of Texas Southwestern

# Disclosures

**Romney M. Humphries, PhD:** Consultant, ThermoFisher, Accelerate Diagnostics, Pattern, Next Gen Dx

**Francesca Lee, MD:** Nothing to disclose

# To Test, Perchance to Diagnose: Practical Strategies for SARS-CoV-2 Testing

Romney M. Humphries, Marwan M. Azar, Angela M. Caliendo, Andrew Chou, Robert C. Colgrove, Valeria Fabre, Christine C. Ginocchio, Kimberly E. Hanson, Mary K. Hayden, Dylan R. Pillai, Nira R. Pollock, Francesca M. Lee

For the Infectious Diseases Society of America

ACCEPTED MANUSCRIPT EDITOR'S CHOICE

## To Test, Perchance to Diagnose: Practical Strategies for SARS-CoV-2 Testing

Romney M Humphries ✉, Marwan M Azar, Angela M Caliendo, Andrew Chou, Robert C Colgrove, Valeria Fabre, Christine C Ginocchio, Kimberly E Hanson, Mary K Hayden, Dylan R Pillai ... Show more

*Open Forum Infectious Diseases*, ofab095, https://doi.org/10.1093/ofid/ofab095
**Published:** 02 March 2021 **Article history** ▾



**Abstract**

Testing for SARS-CoV-2 in symptomatic and asymptomatic patients is an important component of the multifaceted approach of managing the COVID-19 pandemic. Determining how to best define testing strategies for different populations and incorporating these into broader infection prevention programs can be complex. Many circumstances are not addressed by federal, local or professional guidelines. This commentary describes various scenarios where testing of symptomatic or asymptomatic individuals for SARS-CoV-2 virus (antigen or RNA) can be of potential benefit. Consideration to pre-test probability, risks of testing (impact of false-positive or false-negative results),

Open Forum Infectious Diseases
https://doi.org/10.1093/ofid/ofab095

# IDSA Diagnostics Committee

Composition: Infectious Diseases Clinicians, Clinical Microbiologists, Infectious Diseases Pharmacists

Chair: Mary Hayden, MD, FIDSA

Purpose: To advance public policies and federal investments to promote and protect appropriate access to infectious diseases diagnostics and spur development of new diagnostics where unmet need exists

# Objectives for the commentary

- There is no “one size fits all” approach to diagnostics for SARS CoV-2.
- Testing choices depend on the populations being tested, prevalence of disease at time of testing, the goals of testing, frequency of testing, test method, and types of specimens collected.
- Provides practical framework by which to approach commonly encountered testing scenarios
- The article is a commentary, not a guideline.

# Quick primer on testing options

| Method | Test detects | IDSA Guideline |
|---|---|---|
| Nucleic acid amplification tests (NAATs)<br>• AKA “molecular” tests<br>• Rapid, point of care or laboratory-based | Viral RNA | IDSA Guidelines on Diagnosis of COVID 19: Molecular Diagnostic Testing<br>Hanson et al. 2020. |
| Antigen Tests<br>• Most are rapid tests | Viral Proteins | In development |
| Serological Tests | Antibodies against the virus | IDSA Guidelines on the Diagnosis of COVID-19: Serologic Testing<br>Hanson et al. 2020. |

https://www.idsociety.org/covid-19-real-time-learning-network/clinical-guidelines-and-guidance/clinical-practice-guidelines/

# Analytical vs Clinical Test Performance

## Analytical

"what is the smallest amount of virus that is detectable"

### Intrinsic factors:

- SARS-CoV-2 targets (viral genes or proteins)
- Analytical sensitivity (based on, for example, nucleic acid extraction and amplification efficiency)
- Analytical specificity
- Genetic mutations in SARS-CoV-2 targets

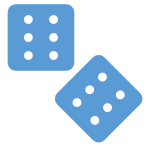
### Extrinsic factors:

- Patient population
  - symptomatic vs asymptomatic, high vs low risk, children vs adults
- Disease severity
- Timing of sample collection relative to exposure or symptom onset
- Sample type
- Sample quality

**We understand these in general.**

## Clinical

"what proportion of infected patients will I detect and how many that aren't really infected with be positive?"



**Positive predictive value (PPV) and negative predictive value (NPV)**

**Prevalence of disease in the population being tested.**

High prevalence setting = higher PPV

- Individuals who test positive are more likely to truly have disease

Low prevalence setting = lower PPV

- Individuals who test positive have increasing chances of being a false positive

**This is more complex.**

# Key Considerations when testing

- What is the goal of testing?
- What will you do with the results (positive and negative)
- What approach will you take?
  - Test method
  - Frequency
  - Location of testing
  - Specimen types
  - Etc.

# Testing scenarios

## Testing of symptomatic patients

- Testing individuals with new onset of symptoms and confirmed past COVID-19 infection

## Testing asymptomatic individuals

- after a single high-risk exposure
- in settings with high risk of transmission
- In K-12 school settings
- in non-healthcare essential workplaces

## Testing asymptomatic travelers

## Home self-testing using point of care rapid antigen tests

## Testing asymptomatic contacts of contacts

# New Onset COVID-19 symptoms, recent confirmed infection

| |
|---|
| **Goals of testing: Determine if individual has recurrence of COVID-19 or re-infection** |
| **Pre-test probability:** Low |
| **Testing strategy:** Test individual using a NAAT. Evaluation of the Ct value may be considered in very selected cases but there are major limitations to this approach |
| **Positive result:** Consider clinical scenario carefully and repeat testing.<br>**Negative result:** Patient negative for SARS-CoV-2 detection, consider alternative causes of symptoms, if clinically relevant. |

# Testing of patients with new onset of symptoms and confirmed past COVID-19 infection

- Mr. Jones was diagnosed with SARS CoV-2 95 days ago.
  - He now has low grade fever, cough.
  - SARS CoV-2 NAAT is positive.
- Clinician request to release the Ct value

- NAAT tests positive up to 83 days from diagnosis
- NAAT tests that are not PCR-based won't have a Ct value
- RT-PCR assays
  - Are NOT quantitative – "rough" estimates
  - No standardized calibration
  - Can produce variable values, for the same specimen, even when tested by the same institution and same platform

There is no "right" answer
Ct values rarely helpful, with MANY caveats
IDSA commentary on Ct value to be published early next week, on the COVID-19 Real-Time Learning Network website

# Testing asymptomatic individuals after a single high-risk exposure

**Goals of testing:**
Identify COVID-19 cases.
Reduce time of quarantine post exposure

**Pre-test probability:** Moderate-High

**Testing strategy:** Test exposed individual on day 5- 7 of quarantine, using Ag RDT or NAAT

**Positive result:** Quarantine according to local guidance.
**Negative result:** Quarantine may end on day 7, provided individual remains asymptomatic and acceptable by local guidance.

# Testing asymptomatic travelers

**Primary goals of testing:**
Reduce risk of SARS-CoV-2 transmission during travel and at destination
Reduce period of quarantine after arrival at destination
A negative test result may be required for entry to a country or locality.

**Pre-test probability of infection:** low - moderate

**Testing strategy:**

- Test within 1-3 days of departure.
- May test upon arrival, 3-5 days after arrival AND quarantine for 7 days at destination, even if test negative.
- If no testing upon arrival, quarantine for 10 days.

**Positive result:** If test positive before departure, delay travel and self-isolate. If test positive at destination, self-isolate until local criteria for release from isolation are met.
**Negative result:** If test negative before departure, follow standard infection prevention measures (e.g., masking, physical distancing). If test negative after arrival, quarantine for period specified by destination rules (i.e., 7 days) and follow standard infection prevention measures (e.g., masking, physical distancing).

# Home self-testing using point of care rapid antigen tests

| |
|---|
| **Primary goals of testing:**<br>Identification of asymptomatic COVID-19 infections, enable more convenient testing of symptomatic individuals |
| **Pre-test probability:** low (asymptomatic) - high (symptomatic) |
| **Testing strategy:** None defined to date |
| **Positive result:** Consider confirmation by NAAT<br>**Negative result:** Confirmation by NAAT, if symptomatic |

# Things we don’t know

How to best diagnose re-infection vs recrudescent infection vs persistent viral shedding

Impact of variant strains on analytical test performance

Impact of vaccinations on testing strategies for asymptomatic, exposed individuals

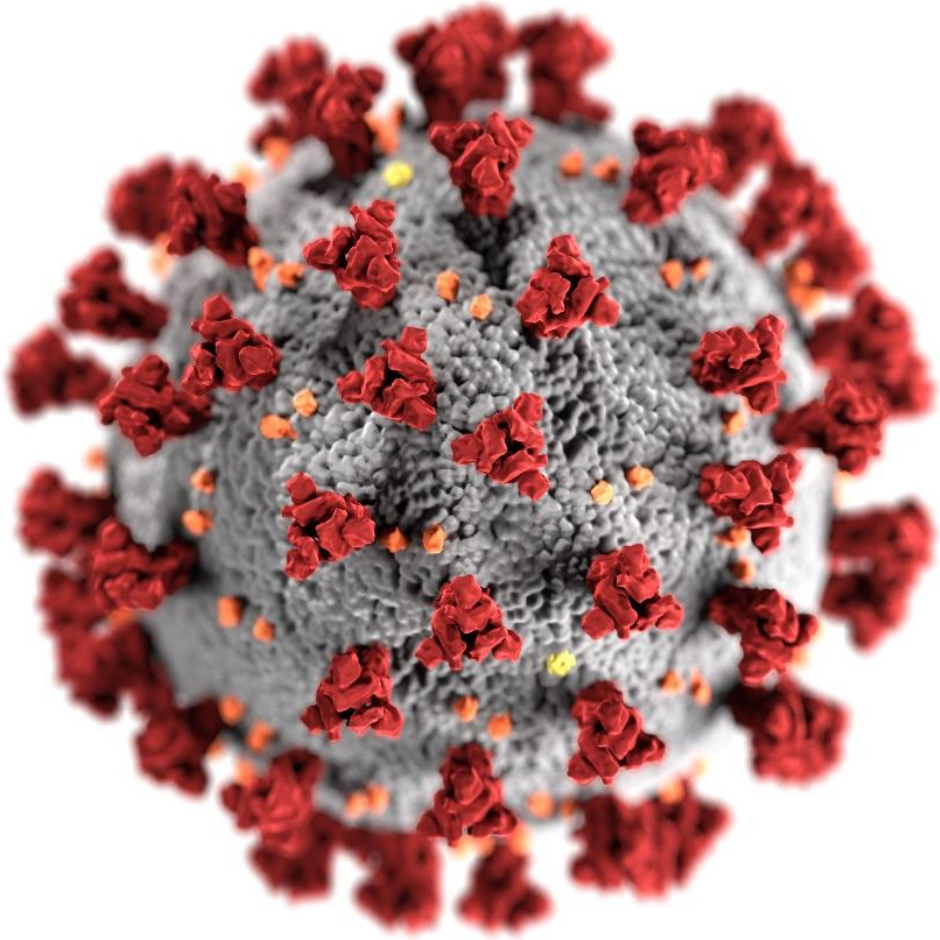
Testing should still be done! Interpretation of results may be complex.

# SARS-CoV-2 Testing in Long-Term Care Settings

**Sujan Reddy, MD, MSc**
Medical Director
Prevention Epicenters Program
Division of Healthcare Quality Promotion
Centers for Disease Control and Prevention

# SARS-CoV-2 Testing in Long Term Care Facilities

Sujan Reddy, MD, MSc
Division of Healthcare Quality Promotion
3/13/21

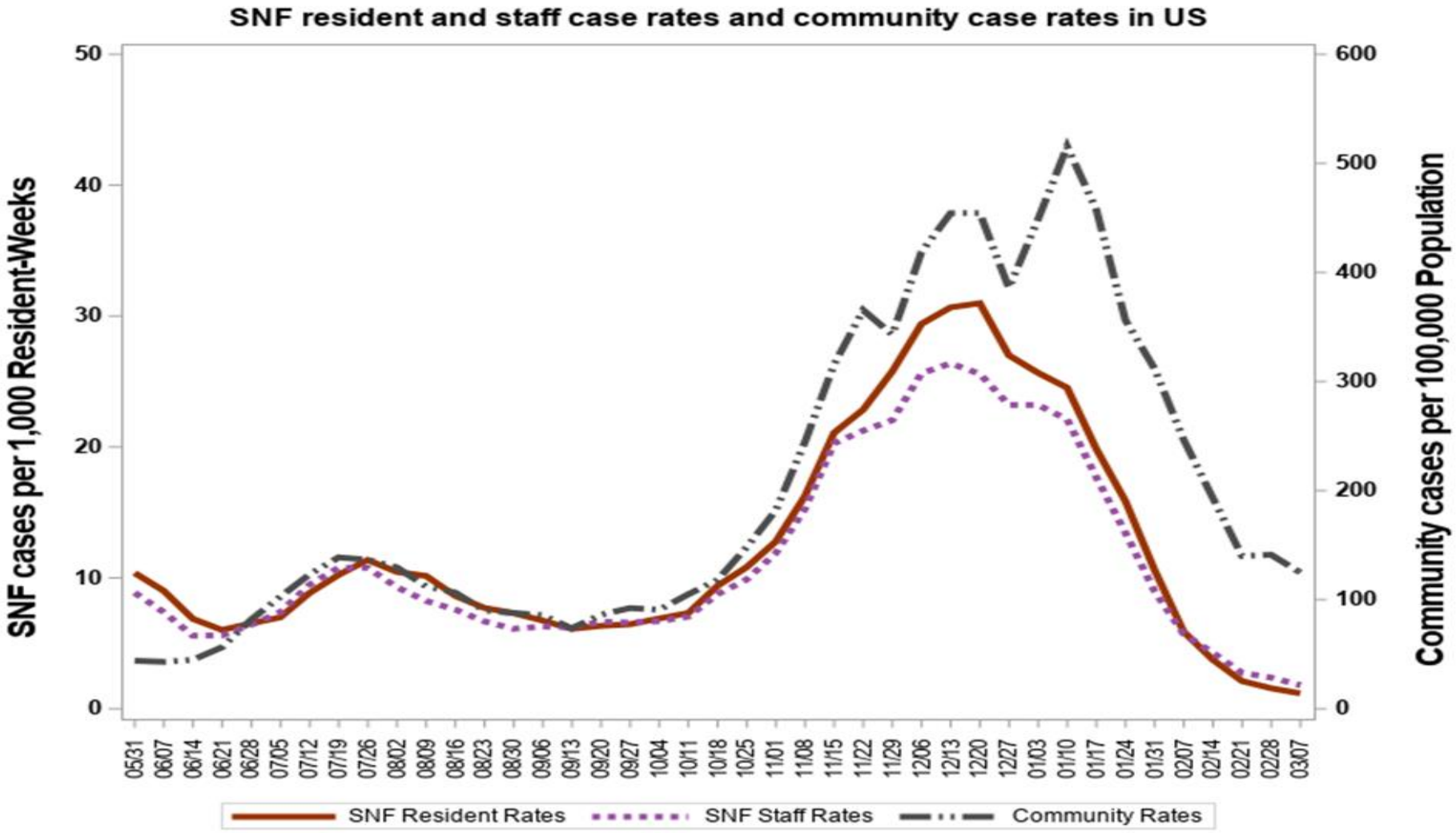


cdc.gov/coronavirus

# Disclaimer

- ***Nothing to disclose.***

# Community and Long-term Care Case-Rates, U.S.




National Healthcare Safety Network

# Current Recommendations For Testing In Nursing Homes

- **Symptomatic testing**:
  - Test all symptomatic residents and staff

- **Outbreak testing (contacts and possible contacts):**
  - Immediately test all residents and staff, then serially test every 3-7 days until no new cases for 14 days

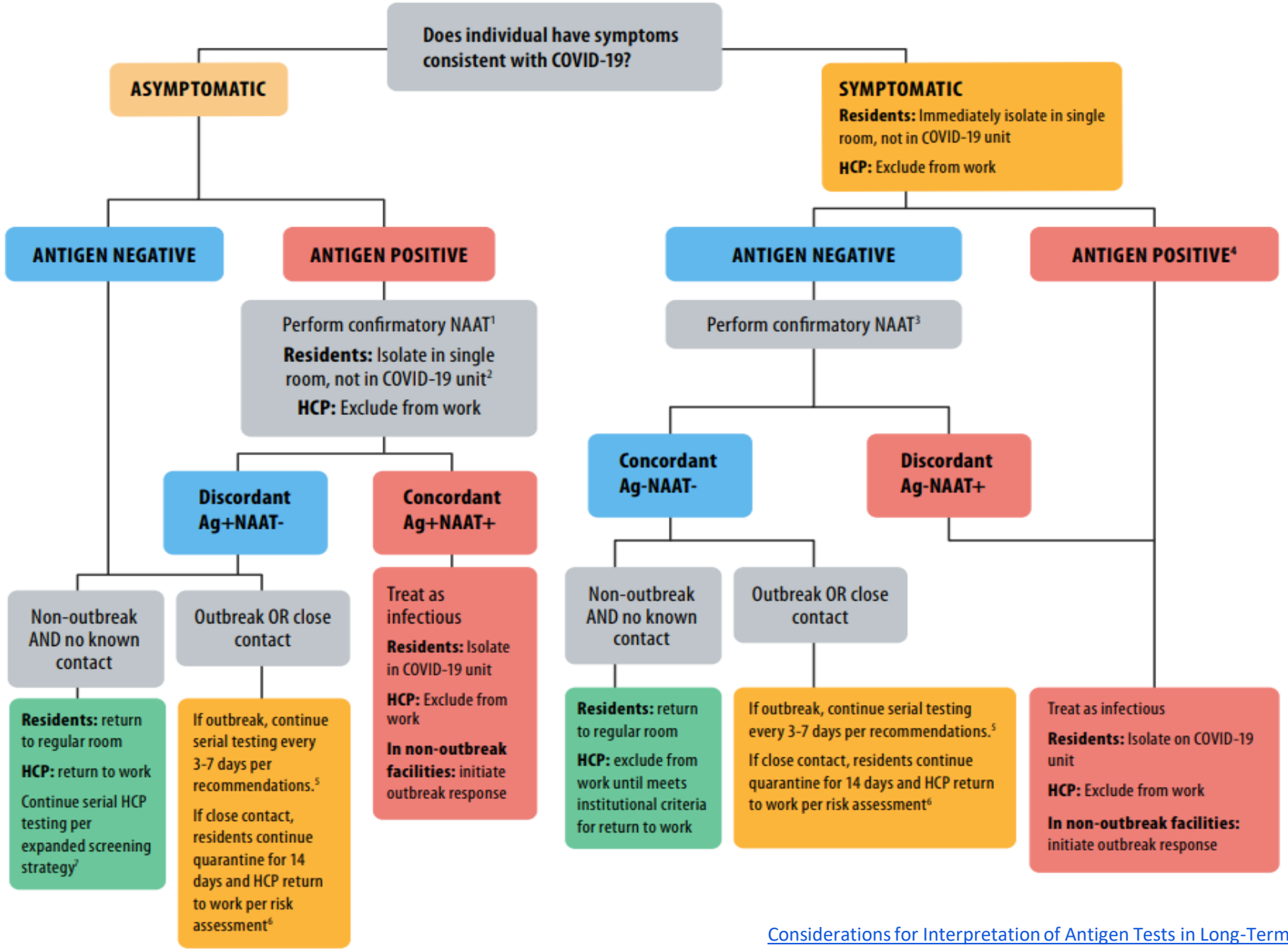
- **Non-outbreak testing:**
  - **Serial staff screening**: test asymptomatic staff at frequency determined by county positivity

Testing Guidelines for Nursing Homes | CDC

# High volume of testing in LTCFs

- Over 2 million tests per week in LTCFs
  - For every occupied bed, 2.1 to 2.8 tests are performed/week in staff or residents
  - Approximately two thirds of facilities report receiving test results in ≤2 days
- Point of care (POC) testing expands testing capacity
  - ~50% of all LTCF tests are POC tests
    - 99% of POC tests are used in asymptomatic individuals
  - Percent of POC tests that are positive is low
    - 2% of all POC tests are positive
    - 38% of POC tests in symptomatic individuals are positive
  - Estimate 2% of all POC tests are recommended for confirmatory testing
    - Confirm symptomatic antigen negative individuals
    - Confirm asymptomatic antigen positive individuals

# CONSIDERATIONS FOR INTERPRETATION OF ANTIGEN TESTS IN LONG-TERM CARE FACILITIES




Considerations for Interpretation of Antigen Tests in Long-Term Care Facilities (cdc.gov)

# Outbreak testing will remain important

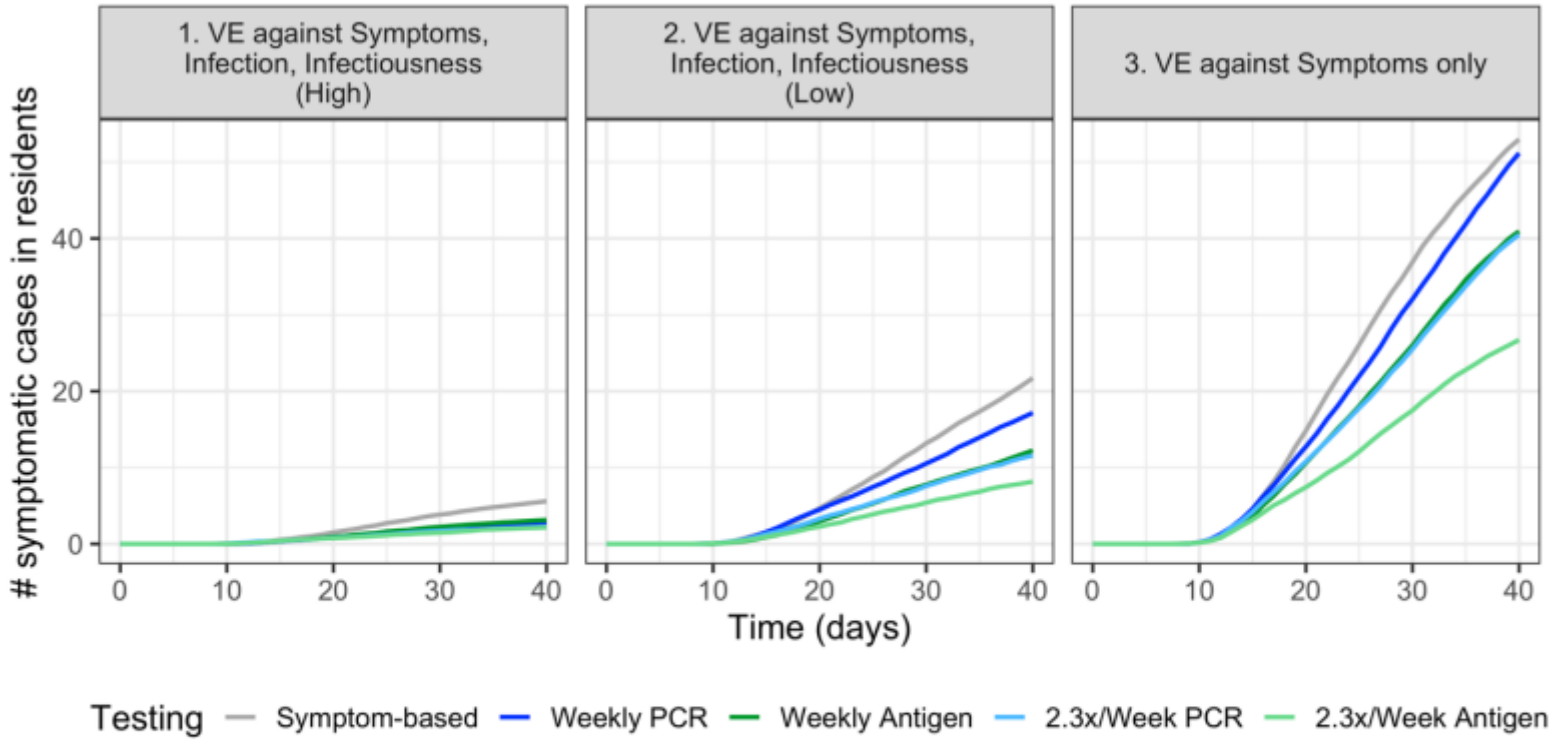
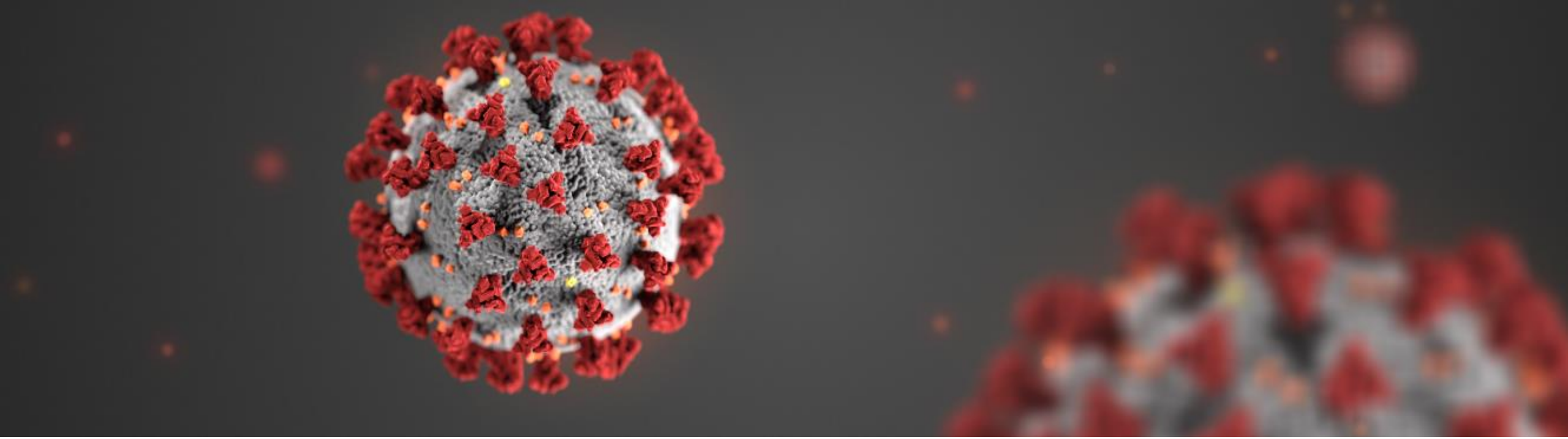



*Figure 3. The differences between testing strategies vary across vaccine efficacy scenarios. When the vaccine has low or no efficacy against infections and infectiousness (Scenarios 2 and 3), frequent screening testing is important for reducing total symptomatic cases in residents. Due to faster turnaround time, antigen testing results in lower incidence than PCR testing at the same frequency.*

Mathematical modeling to inform vaccination strategies and testing approaches for COVID-19 in nursing homes (medrxiv.org)

# Implementation considerations for test-based strategies in nursing homes

- Infection prevention and control resources and implementation remains critical
- Significant human resources are needed to collect specimens, process tests (especially for POC) and report test results. Staff need adequate training for each.
- High volume screening will identify false positives
  - False positives can lead to skepticism of test results and prevention approach
- POC testing substantially increases test capacity with optimal turnaround time, even with confirmatory testing
  - Facilitates frequent serial testing
  - Need ready access to confirmatory testing
  - Need clear plans for what to do while confirmatory testing is pending
  - Mechanism for reporting results is important (National Healthcare Safety Network)



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TTY: 1-888-232-6348 www.cdc.gov

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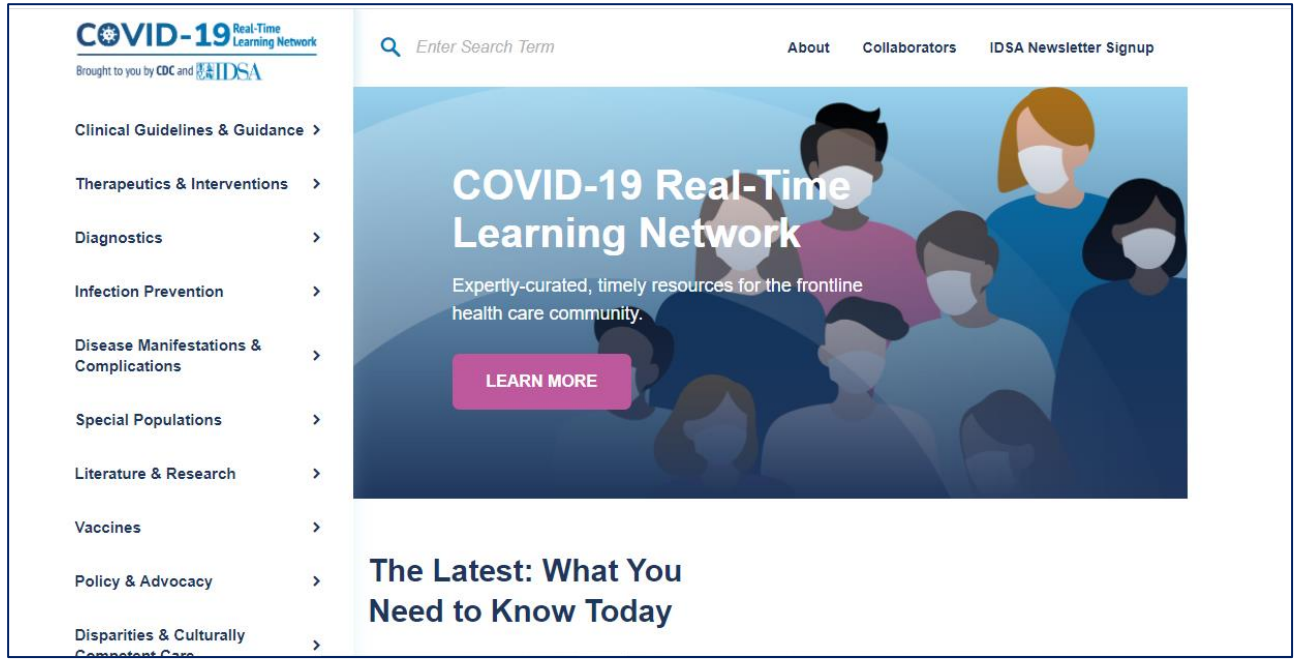
# Links from Today's call

- **Slide 7-** Surveillance for SARS-CoV-2 Variants | CDC: https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/variant-surveillance.html
- **Slide 8-** National SARS-CoV-2 Genomic Surveillance Dashboard | CDC: https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/variant-surveillance/genomic-surveillance-dashboard.html
- **Slide 9-** About Variants of the Virus that Causes COVID-19 | CDC: https://www.cdc.gov/coronavirus/2019-ncov/transmission/variant.html
- **Slide 10-** Weekly Epidemiological Update: https://www.who.int/publications/m/item/covid-19-weekly-epidemiological-update
- **Slide 10-** Emergence of SARS-CoV-2 B.1.1.7 Lineage: https://www.cdc.gov/mmwr/volumes/70/wr/mm7003e2.htm?s_cid=mm7003e2_w
- **Slide 12-** US COVID-19 Cases Caused by Variants | CDC: https://www.cdc.gov/coronavirus/2019-ncov/transmission/variant-cases.html
- **Slide 13-** Science Brief: Emerging SARS-CoV-2 Variants: https://www.cdc.gov/coronavirus/2019-ncov/more/science-and-research/scientific-brief-emerging-variants.html
- **Slide 19-** To Test, Perchance to Diagnose: Practical Strategies for SARS-CoV-2 Testing: Open Forum Infectious Diseases https://doi.org/10.1093/ofid/ofab095
- **Slide 22-** IDSA Guidelines on the Diagnosis of COVID-19: https://www.idsociety.org/covid-19-real-time-learning-network/clinical-guidelines-and-guidance/clinical-practice-guidelines/
- **Slide 36-** Testing Guidelines for Nursing Homes | CDC: https://www.cdc.gov/coronavirus/2019-ncov/hcp/nursing-homes-testing.html
- **Slide 39-** Mathematical Modeling to Inform Vaccination Strategies and Testing Approaches for COVID-19 in Nursing Homes: https://www.medrxiv.org/content/10.1101/2021.02.26.21252483v1.full.pdf

# COVID-19 Real-Time Learning Network

Brought to you by CDC and IDSA

*An online community bringing together information and opportunities for discussion on latest research, guidelines, tools and resources from a variety of medical subspecialties around the world.*




## Specialty Society Collaborators

American Academy of Family Physicians
American Academy of Pediatrics
American College of Emergency Physicians
American College of Physicians
American Geriatrics Society
American Thoracic Society
Pediatric Infectious Diseases Society
Society for Critical Care Medicine
Society for Healthcare Epidemiology of America
Society of Hospital Medicine
Society of Infectious Diseases Pharmacists

www.COVID19LearningNetwork.org
@RealTimeCOVID19
#RealTimeCOVID19

# CDC-IDSA Partnership: Clinical Management Call Support

FOR WHOM?

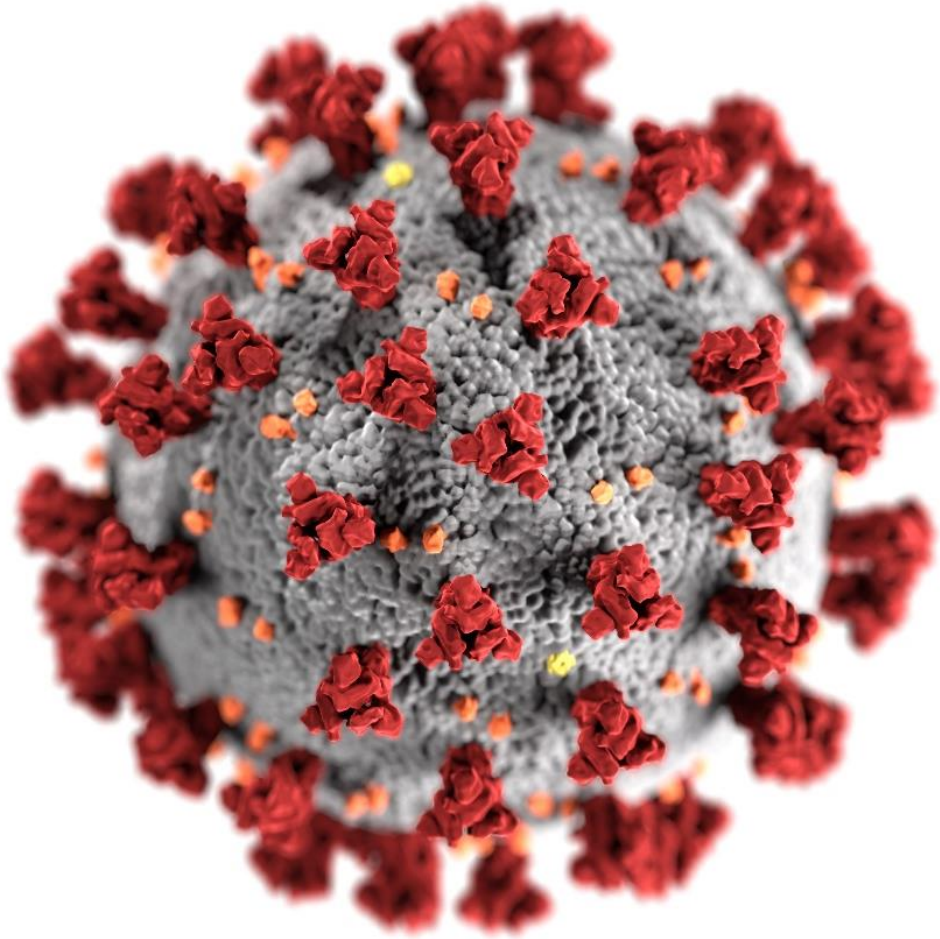
- Clinicians who have questions about the clinical management of COVID-19

WHAT?

- Calls from clinicians will be triaged by CDC to a group of IDSA volunteer clinicians for peer-to-peer support

HOW?

- Clinicians may call the main CDC information line at 800-CDC-INFO (800-232-4636)
- To submit your question in writing, go to www.cdc.gov/cdc-info and click on Contact Form



IDSA
Infectious Diseases Society of America

**cdc.gov/coronavirus**

Continue the conversation on Twitter

@RealTimeCOVID19
#RealTimeCOVID19

We want to hear from you! Please complete the post-call survey.

Next Call: **Saturday, March 20th**

A recording of this call will be posted at **www.idsociety.org/cliniciancalls**

*-- library of all past calls now available --*

## Contact Us:

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