

# COVID-19 and Infection Prevention in Schools

---

Alvaro E. Galvis MD, PhD  
Pediatric Infectious Diseases Fellow PGY-5  
Children's Hospital of Orange County.

# Disclosures

---

- Neither I nor any member of my immediate family has a financial relationship or interest (currently or within the past 12 months) with any proprietary entity producing health care goods or services consumed by, or used on, patients related to the content of this CME activity.
- I do not intend to discuss an unapproved/investigative use of a commercial product/device.

# Objectives

---

- Describe the general trend of COVID-19 in children
- Know the various aspects of the Hierarchy of Controls in Infection Prevention .
- Give examples of infection prevention measures in the classroom.

# Overview

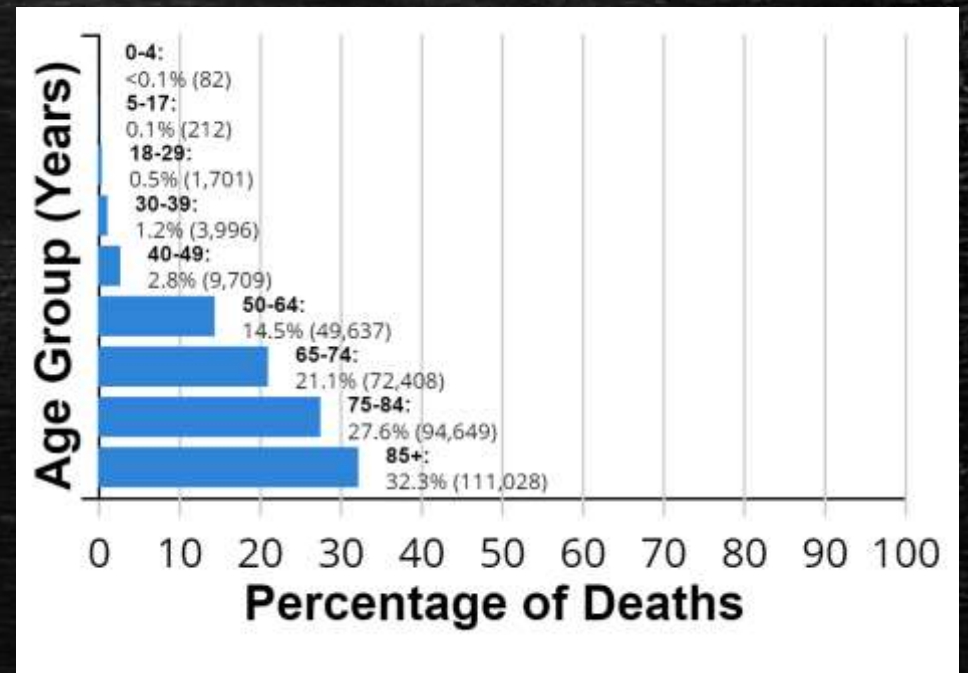
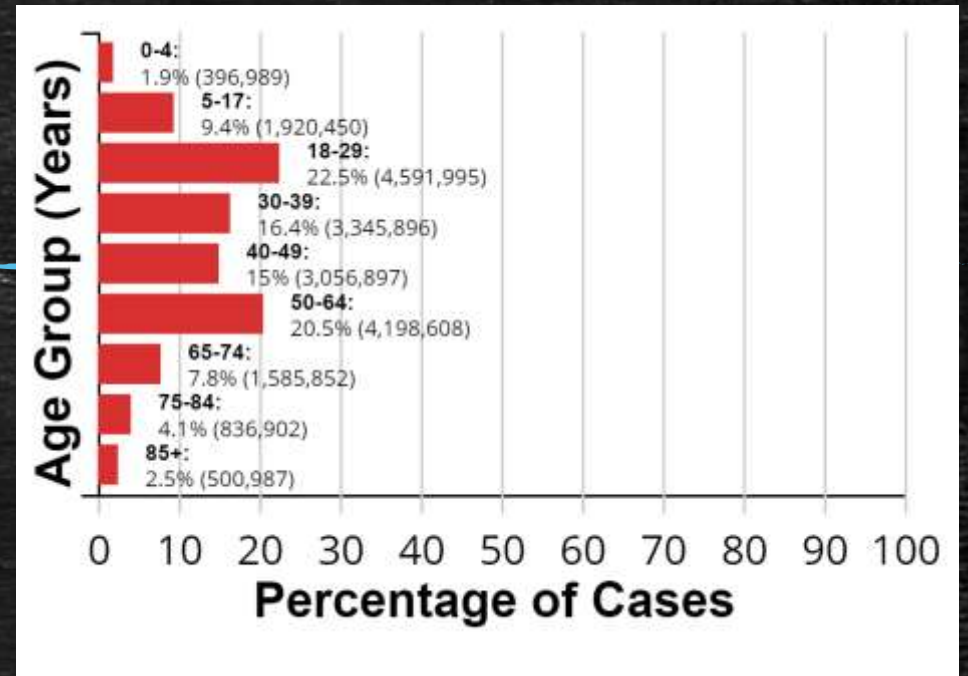
---

- General principles and background of COVID-19 in children
- Orange County Specific data
- Hierarchy of Controls in Infection Prevention
- Specific school situations



# Background

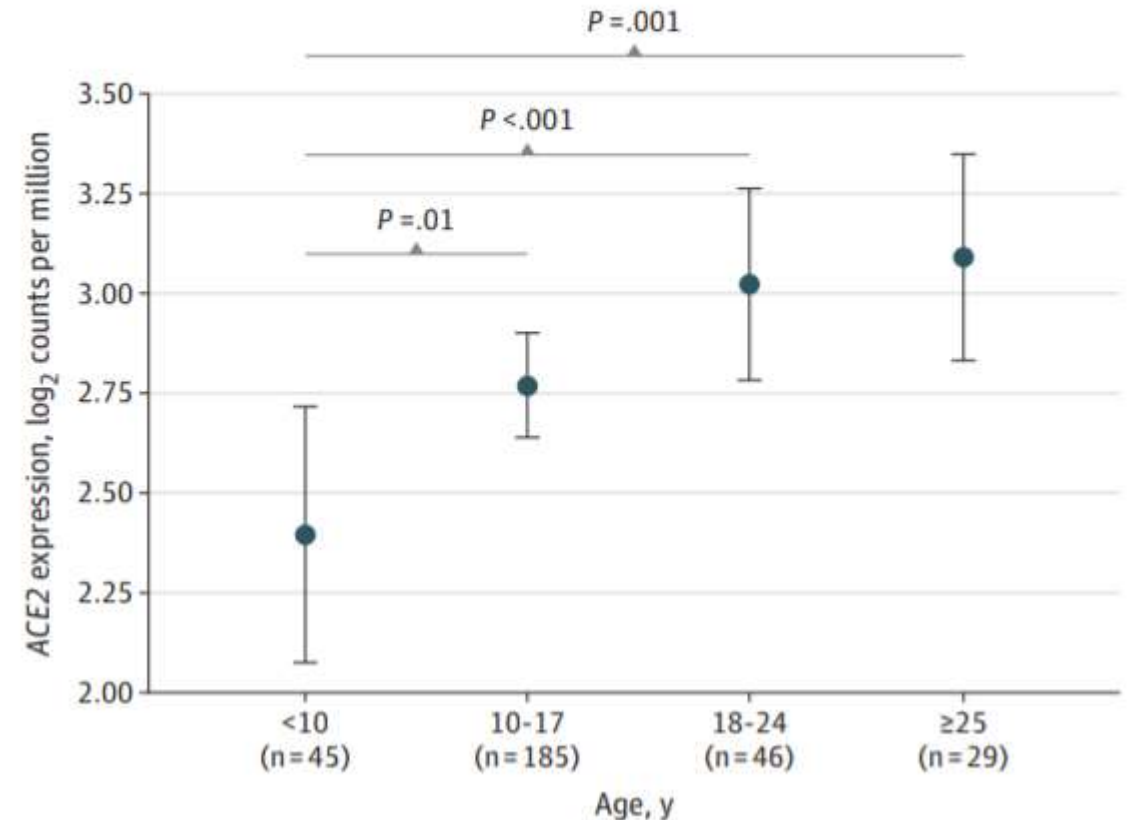
- Children can be infected with SARS-CoV-2, can get sick from COVID-19, and can spread the virus to others.
- However, less than 12% of COVID-19 cases in the United States have been among children and adolescents aged 5–17 years
- Children are less likely to develop severe illness or die from COVID-19. Nonetheless, 203 COVID-19 deaths among persons ages 0–18 have been reported to the National Center for Health Statistics through January 27, 2021



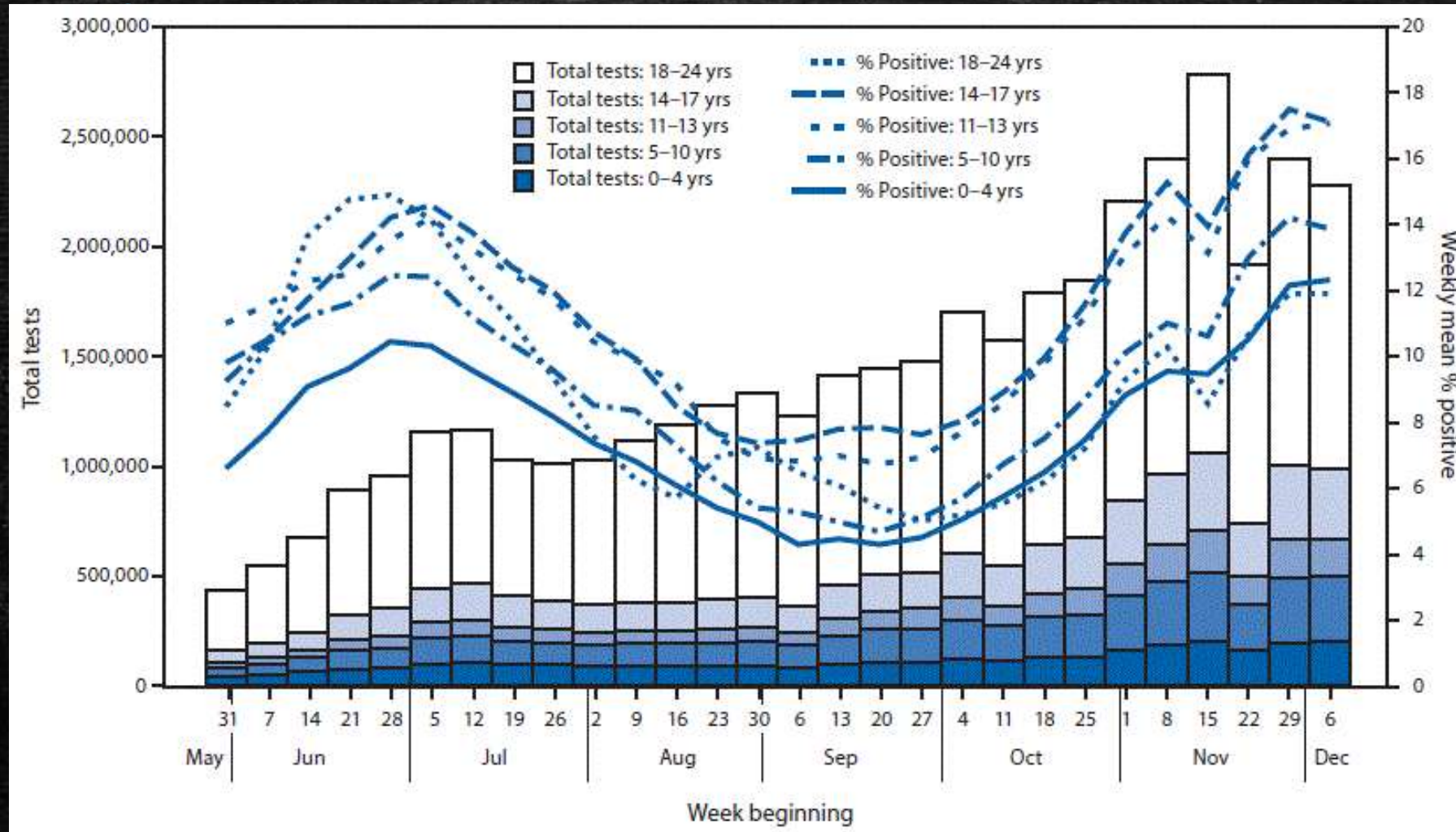
# Mechanism of decreased Infectivity in children

- Evidence suggest that the low infectivity in children corrects directly to the expression of ACE2 receptor.
- The questions of susceptibility and infectivity among children and adolescents require further study to explore potential explanations and mechanisms.
- Citation: Bunyavanich S, Do A, Vicencio A. Nasal Gene Expression of Angiotensin-Converting Enzyme 2 in Children and Adults. JAMA. 2020;323(23):2427–2429. doi:10.1001/jama.2020.8707

Figure. Nasal Gene Expression of ACE2 in Different Age Groups



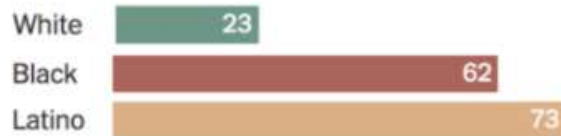
Younger children (<10 years of age) may be less likely to be infected than adolescents



# COVID and Race/Ethnicity

## CHILDREN OF COLOR ARE EXPERIENCING A GREATER NEGATIVE IMPACT FROM COVID-19

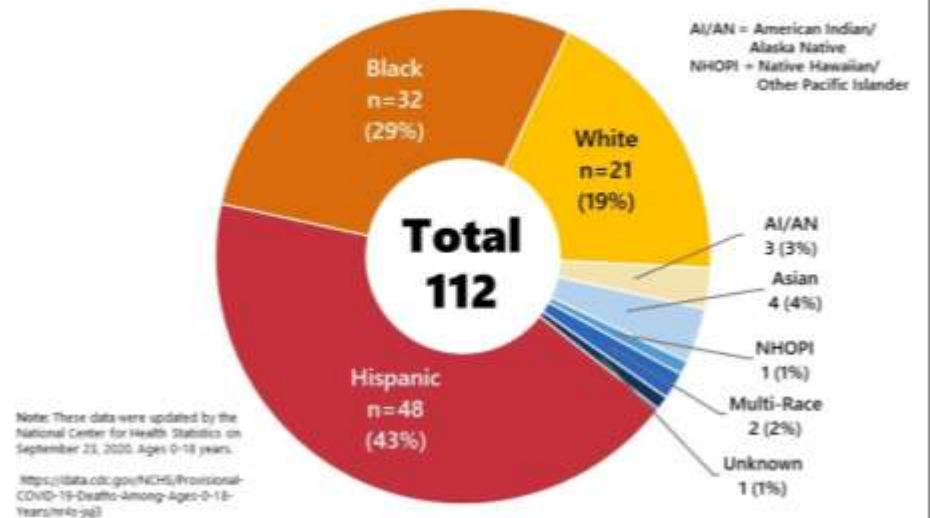
### Coronavirus cases per 10,000 people



"Latino and African-American residents of the United States have been three times as likely to become infected as their white neighbors...And Black and Latino people have been nearly twice as likely to die from the virus as white people...(NYT 2020)"

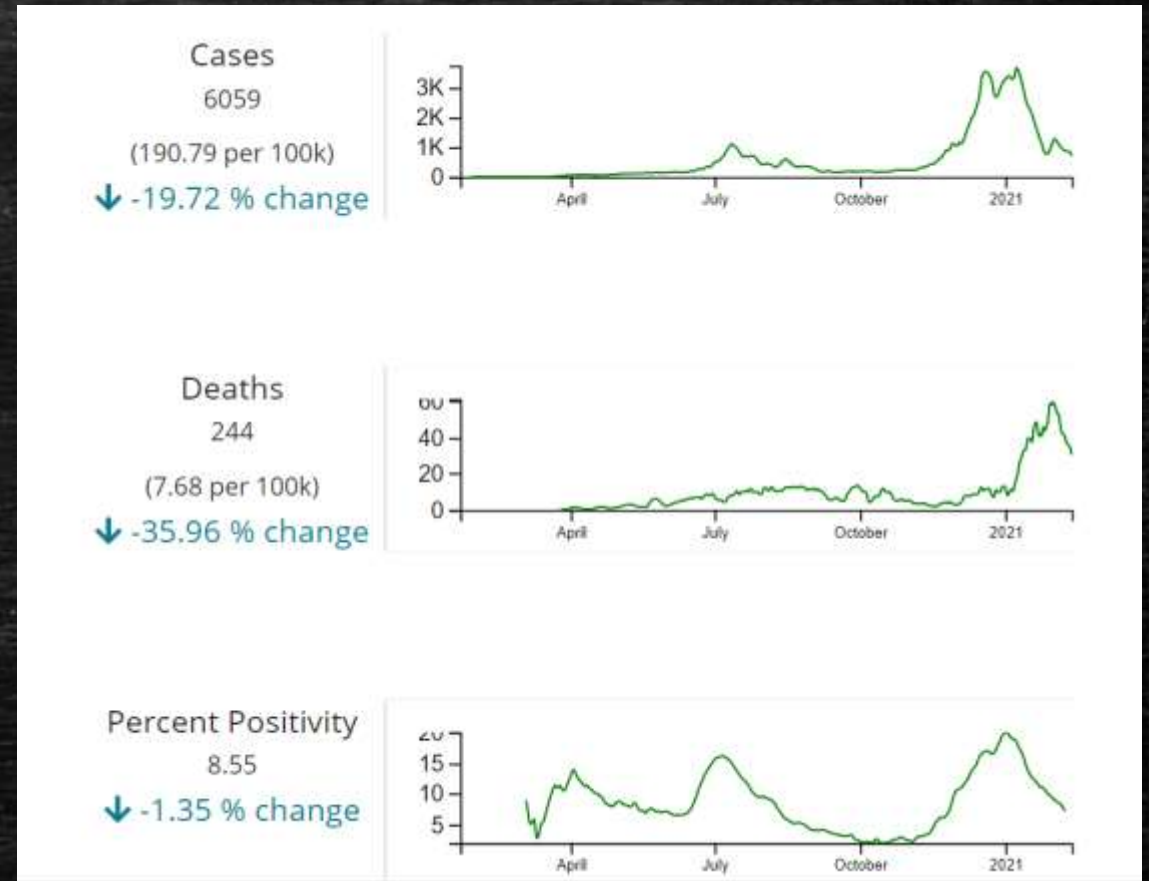


Figure 1.  
COVID-19 Child Deaths by Race and Hispanic Ethnicity  
United States, February 1 to September 19, 2020



# Schools and SARS-CoV-2 transmission

- Based on the data available, the CDC reports that in-person learning in schools has not been associated with substantial community transmission.
- Increases in case incidence among school-aged children and school reopenings do not appear to pre-date increases in community transmission.
- For schools to provide in-person learning, associations between levels of community transmission and risk of transmission in school should be considered. If community transmission is high, students and staff are more likely to come to school while infectious, and COVID-19 can spread more easily in schools



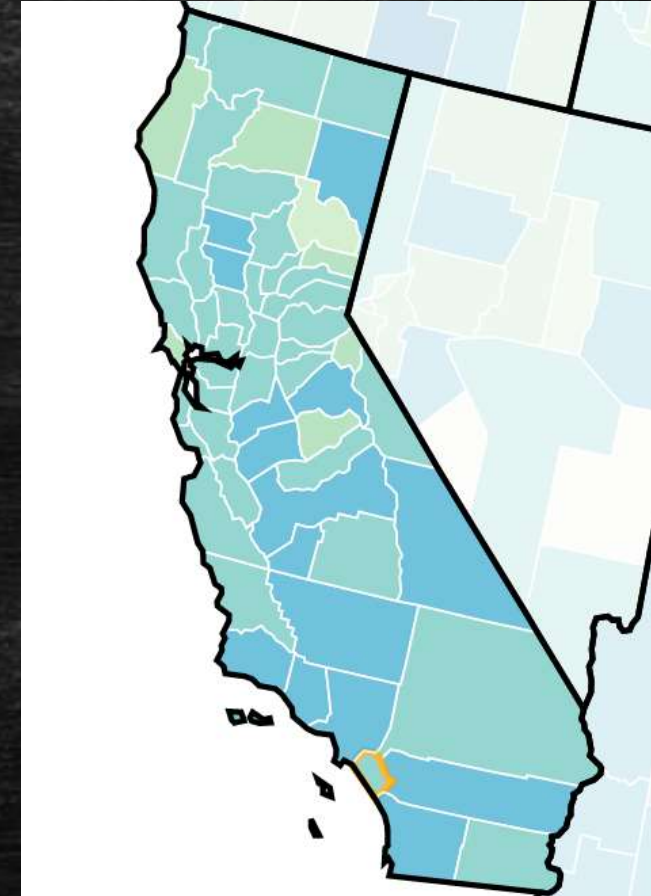
Orange County Numbers

# Orange County's level of transmission and CDC Guidelines for schools

## Level of Community Transmission

| Low Transmission <sup>1</sup><br>Blue   | Moderate Transmission<br>Yellow   | Substantial Transmission<br>Orange   | High Transmission<br>Red   |
|---|---|--|--|
| <b>All schools:</b> Universal and correct use of masks is required; implementing other key mitigation strategies: handwashing and respiratory etiquette; cleaning and maintaining healthy facilities; contact tracing and diagnostic testing <sup>2</sup> in combination with quarantine and isolation. |   |  |  |
| K-12 schools open for full in-person instruction<br>Physical distancing of 6 feet or more to the greatest extent possible <sup>3</sup>  |   | Elementary schools in hybrid mode <sup>4</sup> ; physical distancing of 6 feet or more required  |  |
|   |   | Middle and high schools in hybrid learning mode or reduced attendance<br>Physical distancing of 6 feet or more is required                   | Middle and high schools in virtual only instruction unless they can strictly implement all mitigation strategies, and have few cases; schools that are already open for in-person instruction can remain open, but only if they strictly implement mitigation strategies and have few cases <sup>5</sup> |
| Sports and extracurricular activities with masks required; physical distancing of 6 feet or more to the greatest extent possible <sup>6</sup>   | Sports and extracurricular activities with masks and physical distancing of 6 feet or more required | Sports and extracurricular activities occur only if they can be held outdoors, with masks and physical distancing of 6 feet or more required | Sports and extracurricular activities virtual only   |

<sup>1</sup>Levels of community transmission defined as total new cases per 100,000 persons in the past 7 days (low, 0-9; moderate, 10-49; substantial, 50-99; high, ≥100) and percentage of positive tests in the past 7 days (low, <5%; moderate, 5-7.9%; substantial, 8-9.9%; high, ≥10%).<sup>2</sup>Levels of community transmission defined as total new cases per 100,000 persons in the past 7 days (low, 0-9; moderate, 10-49; substantial, 50-99; high, ≥100) and percentage of positive tests in the past 7 days (low, <5%; moderate, 5-7.9%; substantial, 8-9.9%; high, ≥10%).



# Considerations for K-12 Schools

---

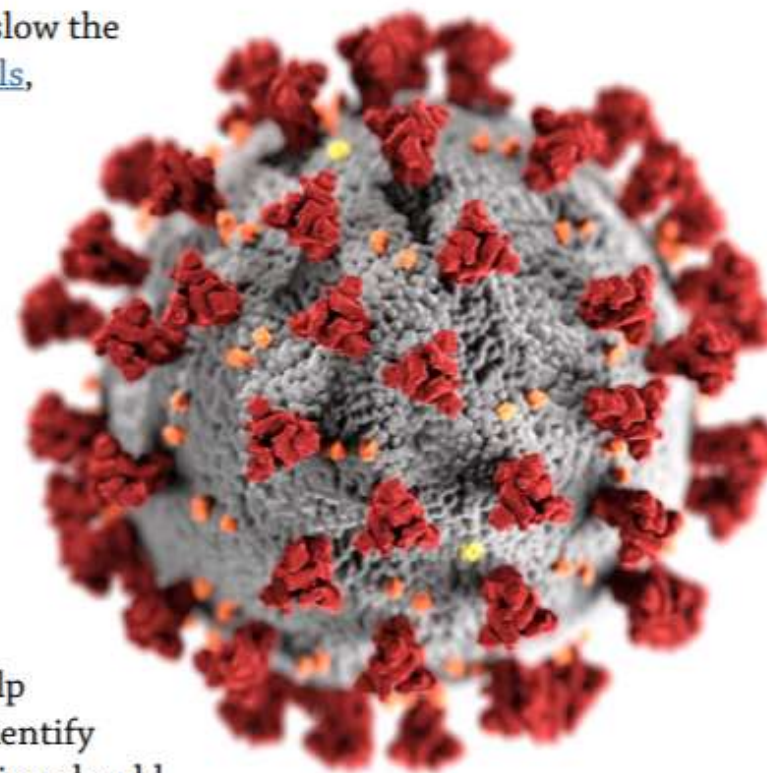
- School must have a comprehensive plan that addresses the following:
- Promoting behaviors that reduce COVID-19's spread
- Maintaining healthy environments
- Maintaining healthy operations
- Preparing for when someone gets sick

## CDC Readiness and Planning Tool to Prevent the Spread of COVID-19 in K-12 Schools

CDC offers the following readiness and planning tool to share ways school administrators can help protect students, staff, and communities, and slow the spread of COVID-19. This tool aligns with the [Considerations for Schools](#), and includes the following:

- General Readiness Assessment
- Daily/Weekly Readiness Assessment
- Preparing for if Someone Gets Sick
- Special Considerations and Resources

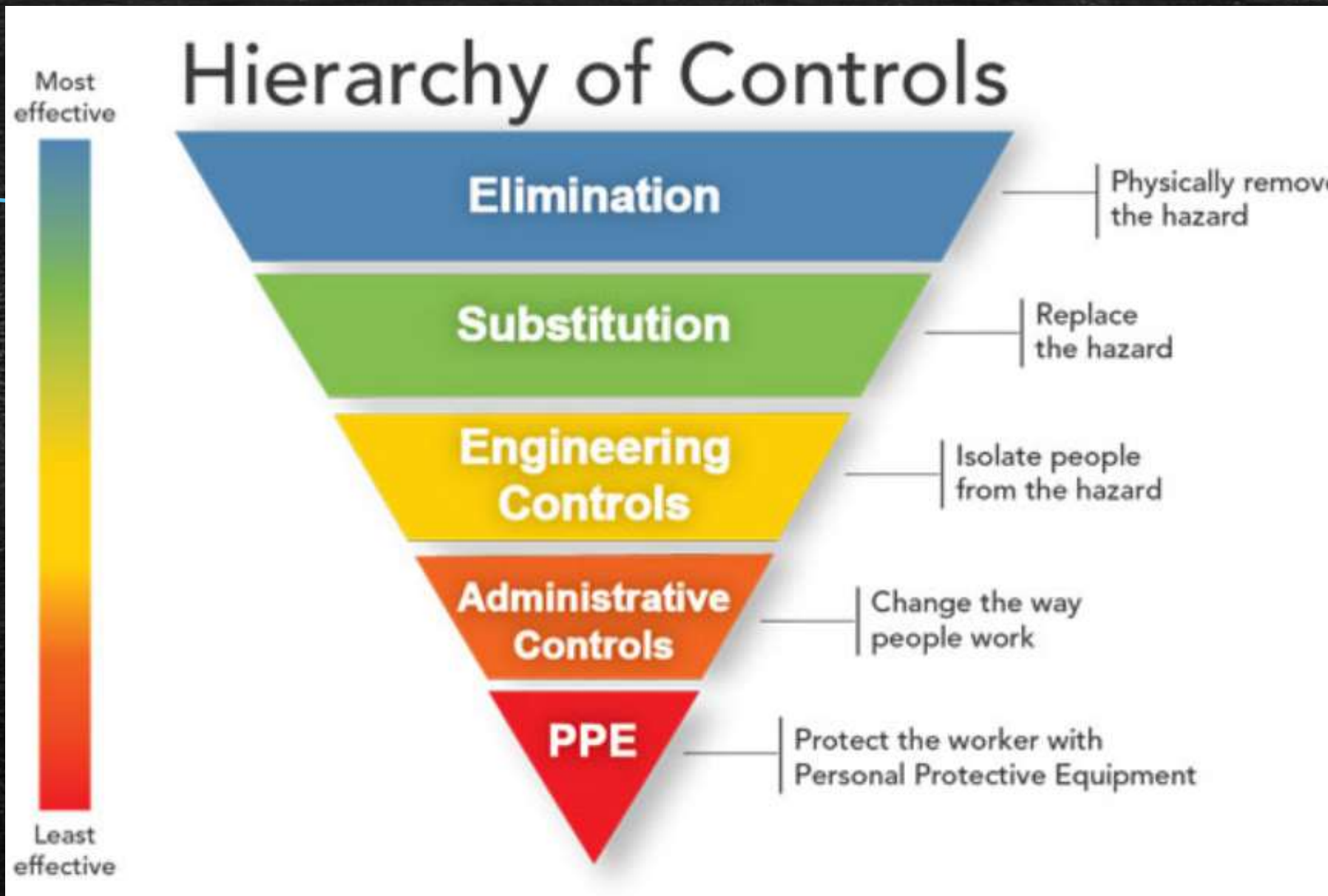
School administrators may review and complete the general readiness assessment while working with state, local, tribal, territorial, or federal officials when making initial preparations to promote healthy behaviors, environments, and operations that reduce the spread of COVID-19. The daily/weekly readiness assessment can be used to monitor recommended practices. Planning tools are also included to help school administrators prepare to respond if someone gets sick and to identify special considerations specific to their school community. Implementation should be guided by what is feasible, practical, acceptable, and tailored to the needs and context of each community.



For accessible version, please visit: <https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/schools.html>

# Classroom Considerations





# Elimination and Substitution

- Elimination and substitution, while most effective at reducing hazards, also tend to be the most difficult to implement in an existing process.
- In terms of COVID-19 elimination and substitution controls refers back to decision of when to open schools and at what level based on level of community transmission.

| Level of Community Transmission   |   |  |  |
|---|---|--|--|
| Low Transmission <sup>1</sup><br>Blue   | Moderate Transmission<br>Yellow   | Substantial Transmission<br>Orange   | High Transmission<br>Red   |
| <b>All schools:</b> Universal and correct use of masks is required; implementing other key mitigation strategies: handwashing and respiratory etiquette; cleaning and maintaining healthy facilities; contact tracing and diagnostic testing <sup>2</sup> in combination with quarantine and isolation. |   |  |  |
| K-12 schools open for full in-person instruction<br>Physical distancing of 6 feet or more to the greatest extent possible <sup>3</sup>  |   | Elementary schools in hybrid mode <sup>4</sup> ; physical distancing of 6 feet or more required  |  |
|   |   | Middle and high schools in hybrid learning mode or reduced attendance<br>Physical distancing of 6 feet or more is required                   | Middle and high schools in virtual only instruction unless they can strictly implement all mitigation strategies, and have few cases; schools that are already open for in-person instruction can remain open, but only if they strictly implement mitigation strategies and have few cases <sup>5</sup> |
| Sports and extracurricular activities with masks required; physical distancing of 6 feet or more to the greatest extent possible <sup>6</sup>   | Sports and extracurricular activities with masks and physical distancing of 6 feet or more required | Sports and extracurricular activities occur only if they can be held outdoors, with masks and physical distancing of 6 feet or more required | Sports and extracurricular activities virtual only   |

<sup>1</sup>Levels of community transmission defined as total new cases per 100,000 persons in the past 7 days (low, 0-9; moderate, 10-49; substantial, 50-99; high, ≥100) and percentage of positive tests in the past 7 days (low, <5%; moderate, 5-7.9%; substantial, 8-9.9%; high, ≥10%).<sup>2</sup>Levels of community transmission defined as total new cases per 100,000 persons in the past 7 days (low, 0-9; moderate, 10-49; substantial, 50-99; high, ≥100) and percentage of positive tests in the past 7 days (low, <5%; moderate, 5-7.9%; substantial, 8-9.9%; high, ≥10%).

# Engineering Controls (Isolate people from the hazards)

---

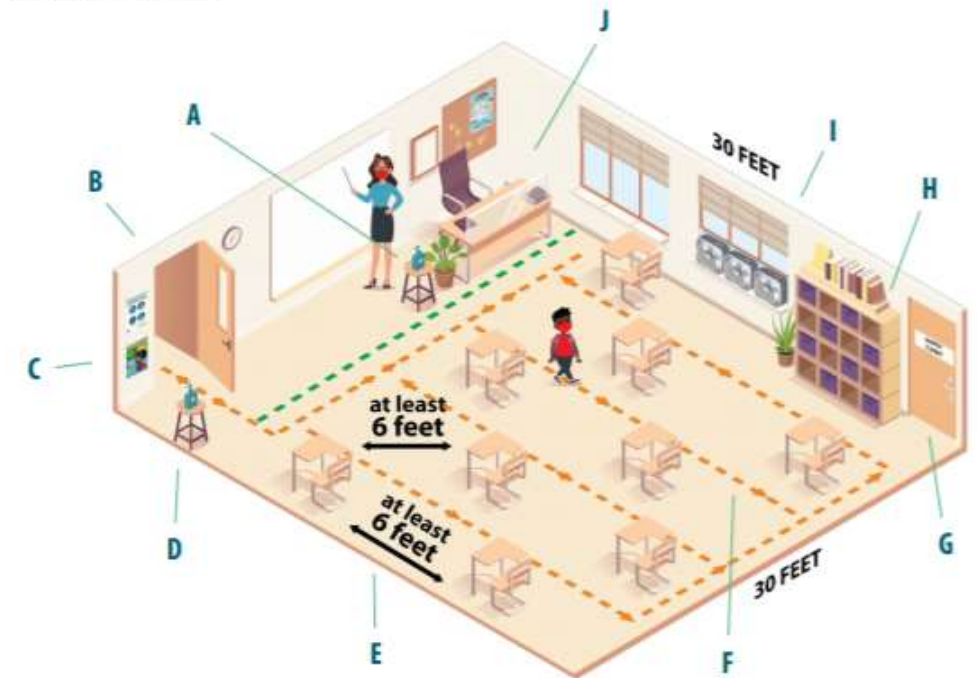
- Spacing seating/desks at least 6 feet apart when feasible; •
- Turning desks to face in the same direction (rather than facing each other), or having students sit on only one side of tables, spaced apart; and •
- Modifying learning stations and activities as applicable so there are fewer students per group, placed at least 6 feet apart if possible.
- Consider making foot-traffic single direction in narrow or confined areas.
- Place hand sanitizers with at least 60% alcohol in multiple locations throughout the classroom

# Example of engineering controls

## HOW DO I SET UP MY CLASSROOM?

- CDC recommends 15 modifications to the classroom.
- [https://www.cdc.gov/coronavirus/2019-ncov/downloads/community/schools-childcare/How\\_Do\\_I\\_Set\\_Up\\_My\\_Classroom.pdf](https://www.cdc.gov/coronavirus/2019-ncov/downloads/community/schools-childcare/How_Do_I_Set_Up_My_Classroom.pdf)

This map illustrates how to set up a classroom with student desks with attached chairs. This classroom seats nine students and allows for student desks to be spaced out at least 6 feet apart and turned to face the same direction. Other modifications are added to minimize the risk of spread of the virus that causes COVID-19.



- A. A hand sanitizing station is set up near the teacher's desk.
- B. The door is open to increase ventilation and to avoid touching the doorknob.
- C. Signs are posted in the classroom that promote everyday protective measures and describe how to stop the spread of germs.
- D. A hand sanitizing station is set up near the door.
- E. All desks are spaced out at least 6 feet apart and turned to face the same direction.
- F. Walking paths are marked with tape on the floor.

- G. A locked supply cabinet is used to store cleaning and disinfecting supplies.
- H. Each student's belongings are separated from others' in individual cubbies.
- I. The windows are open to increase ventilation, as feasible.
- J. A "teacher zone" is marked around the teacher's desk and in the front of the room. Green tape is used as a physical guide to mark this space. A physical barrier is installed on the teacher desk.

# Administrative Controls (Change the way people work)

---

- Teachers, staff and students should all have a basic understanding of how covid spreads.
  - <https://www.chconline.org/resourcelibrary/age-appropriate-resources-for-teaching-young-children-about-covid-19/> (includes you tube videos)
  - <https://www.unicef.org/coronavirus/how-teachers-can-talk-children-about-coronavirus-disease-covid-19> (general principles based on age groups).
  - <https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/talking-with-children.html>

Clean and disinfect frequently touched surfaces. Have students participate in this process.

Give students enough time to wash and dry their hands, and provide accessible sinks, soap, water, and a way to dry their hands (e.g., paper towels, hand dryer).

# Administrative Controls

Educate students and their parents about signs associated with COVID-19 and when not bring the students to school. (e.g. Parents to monitor temps at home).

Be prepared if a student does show with symptoms of COVID-19

## A Student is Showing Signs of COVID-19 in My Classroom: What Do I Do? Quick Guide for Teachers

### KNOW POSSIBLE SYMPTOMS OF ILLNESS



Cough



Fever



Headache



Diarrhea



Vomiting

#### OTHER SYMPTOMS INCLUDE:

Shortness of breath, chills, sore throat, loss of taste or smell, muscle pain, runny nose, feeling tired, and poor appetite.

#### EMERGENCY WARNING SIGNS (CALL 911):

Trouble breathing, persistent pain or pressure in the chest, new confusion, inability to wake or stay awake, and bluish lips or face.



### 1. SEPARATE THE STUDENT

- Be discreet and calm.
- Make sure you and the student are wearing a mask and standing at least 6 feet apart.
- Following the school protocol, have the student safely escorted from the classroom to the isolation area.



### 2. INFORM

- Contact designated staff responsible for COVID-19 concerns (e.g., school nurse).
- Let them know the student is on the way to the isolation area or wait for the student to be escorted (according to school protocol).



### 3. CLEAN AND DISINFECT

- Close off the classroom and wait 24 hours before cleaning and disinfecting, if possible. This will allow more time for the virus to die off.
- The classroom should be cleaned and disinfected, especially items in the student's area and shared items the student may have touched (e.g., doorknob and supplies).
- Note: Disinfectants can trigger an asthma attack. Choose safer products if students in the class have asthma.
- Open outside door(s) and window(s) to increase ventilation in the classroom, if possible.



### 4. IDENTIFY CLOSE CONTACTS

- Write down where the student was seated relative to other students in the classroom.
- Note if any person was within 6 feet of an infected student for a cumulative total of 15 minutes or more over a 24-hour period. Work with school officials on close contacts in accordance with applicable privacy laws.



### 5. PLAN FOR THE POSSIBILITY THAT YOUR STUDENT MAY REQUIRE VIRTUAL OR AT-HOME LEARNING

- Speak with school administration about options for virtual learning.
- Make sure the student can make up work without penalty.















### 6. NOTIFY ADMINISTRATION ABOUT THE SICK STUDENT

- Assist administration with close contact assessment. Observe applicable privacy laws.
- Consider learning accommodations for students who are close contacts who may need to quarantine at home.

# Personal Protective Equipment (PPE)

- Teaching students and staff the proper use of masks.
- The CDC does not recommend the use of google or face shields as substitutes for masks.
- More info:
- [https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cloth-face-cover-guidance.html?CDC\\_AA\\_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fcommunity%2Fschools-childcare%2Fcloth-face-cover.html](https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/cloth-face-cover-guidance.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fcommunity%2Fschools-childcare%2Fcloth-face-cover.html)

| Recommended  | Not Recommended   |
|--|---|
|  <p>Medical procedure masks (sometimes referred to as surgical masks or disposable face masks)</p>                              |  <p>Masks that do not fit properly (large gaps, too loose or too tight)</p>                                  |
|  <p>Masks that fit properly (snugly around the nose and chin with no large gaps around the sides of the face)</p>               |  <p>Masks made from materials that are hard to breathe through (such as plastic or leather)</p>              |
|  <p>Masks made with breathable fabric (such as cotton)</p>  |  <p>Masks made from fabric that is loosely woven or knitted, such as fabrics that let light pass through</p> |
|  <p>Masks made with tightly woven fabric (i.e., fabrics that do not let light pass through when held up to a light source)</p> |  <p>Masks with one layer</p>  |
|  <p>Masks with two or three layers</p>  |  <p>Masks with exhalation valves or vents</p>  |
|  <p>Masks with inner filter pockets</p>   |  <p>Wearing a scarf/ski mask</p>   |

Special Situations.

---

# Asthma and School

- Asthma treatments using inhalers with spacers (with or without face mask, according to each student's individualized treatment plan) are preferred over nebulizer treatments whenever possible in the school setting.
- Nebulizer treatments at school should be reserved for children who cannot use or do not have access to an inhaler (with or without spacer or face mask) or for children who are in significant respiratory distress while awaiting emergency transport.
- Use of peak flow meters, including in the school setting, involves forceful exhalation
- If a nebulizer treatment or use of peak flow meter is necessary at school for a student, the number of people present in the room should be limited to the student and the staff member administering the treatment or peak flow meter. If appropriate, based on the student's age, level of maturity, and breathing status, the staff member could observe the student from a distance of 6 feet or greater or outside the room
- Tran K, Cimon K, Severn M, Pessoa-Silva CL, Conly J (2012) Aerosol Generating Procedures and Risk of Transmission of Acute Respiratory Infections to Healthcare Workers: A Systematic Review. PLoS ONE 7(4); <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3338532/#lpo=72.2222>
- <https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/schools-faq.html#Administrators>

# YOUTH SPORTS GAME PLAN

Reduce the Spread of COVID-19

LOWER RISK

HIGHER RISK



Skill-building drills  
at home



Team practice



Within-team  
competition



Competition with  
teams from your area



Full competition from  
different areas

- Resources:
- Coach's checklist: <https://www.cdc.gov/coronavirus/2019-ncov/downloads/community/checklist-for-coaches-covid19.pdf>
- Keep Athletes safe: <https://www.cdc.gov/coronavirus/2019-ncov/downloads/community/youth-sports-fact-sheet-covid19.pdf>
- Considerations for Youth Sports Administrators: <https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/youth-sports.html>

# Restarting School Competitions

- CDC's Indicators [for Dynamic School Decision Making](#) can be used to determine whether and how to hold extracurricular activities with the necessary mitigation strategies in place.
- Based on the new guidelines from the CDC on Feb 12, 2021. Coordination between the schools and transmission rates in both areas need to be know to assess for potential risk,

New Indicators and Thresholds for Community Transmission of COVID-19\* (reported over 7 days) (from CDC's New Operational Strategy for K-12 Schools through Phased Mitigation)

| Indicator   | Lowest Transmission  | Low Transmission Blue | Moderate Transmission Yellow | Substantial Transmission Orange | High Transmission Red |
|---|--|-----------------------|------------------------------|---------------------------------|-----------------------|
| Total new cases per 100,000 persons in the past 7 days**    | Category no longer exists. It has been merged into one low transmission (blue) category. | 0-9                   | 10-49                        | 50-99                           | ≥100                  |
| Percentage of NAATs that are positive in the past 7 days*** |  | <5.0%                 | 5.0%-7.9%                    | 8.0%-9.9%                       | ≥10.0%                |

\*If the two indicators suggest different levels, the actions corresponding to the higher threshold should be chosen. County-level data on total new cases in the past 7 days and test percent positivity are available on the County View tab in [CDC's COVID Data Tracker](#).

\*\*Total number of new cases per 100,000 persons in the past 7 days is calculated by adding the number of new cases in the county (or other community type) in the last 7 days divided by the population in the county (or other community type) and multiplying by 100,000.

\*\*\*Percentage of positive diagnostic and screening NAATs during the last 7 days is calculated by dividing the number of positive tests in the county (or other administrative level) during the last 7 days by the total number of tests results over the last 7 days. Additional information can be found on the [Calculating Severe Acute Respiratory Syndrome Coronavirus 2 \(SARS-CoV-2\) Laboratory Test Percent Positivity: CDC Methods and Considerations for Comparisons and Interpretation](#) webpage.

# Performing Arts And Band

- Principles for sports activities hold true for performing arts but additionally there are specific concerns:
- Singing or playing wind instruments generates respiratory droplets and aerosols that may contain the virus that causes COVID-19, if the person singing or playing is infected.
- Practicing in small groups (i.e., cohorts, pods) with the same 5-10 students always rehearsing together
- installing transparent shields or other physical barriers where possible to separate individual students and staff.
- use of “bell covers” for the openings of brass instruments and specially designed bags with hand openings for woodwind instruments. s COVID-19, if the person singing or playing is infected.



ANY  
QUESTIONS  
?