Designed as a compendium to whentotest.org, this playbook provides school administrators with science-based outputs to justify specific COVID-19 mitigation and testing strategies. This guide demonstrates how prevention and containment efforts can most effectively be combined with the latest testing strategies to minimize the spread of COVID-19 in a specific environment.
The When to Test K-12 Playbook is a collaboration among CORE, GHC3, and the NIH RADxSM Initiative. The content herein is based on research, facts, and data about how to prevent COVID-19 transmission accumulated to date by the Massachusetts Institute of Technology Institute for Data, Systems, and Society, the Massachusetts General Hospital Consortium for Improving Medicine with Innovation & Technology, and the National Institutes of Health Rapid Acceleration of Diagnostics Initiative.

The When To Test website does not provide medical advice and should not be used as a substitute for specific medical advice. Information and materials are provided to inform and educate visitors. Consult a qualified health-care provider for answers to your medical questions. When to Test Calculator results are to be used as a guide only and do not represent medical recommendations.

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<td>5</td>
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<td>Presymptomatic</td>
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<table>
<thead>
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<th>TERM</th>
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Overview

The When To Test K-12 Playbook ("The Playbook") is a guide to help education leaders and school administrators assess:

- Whether current COVID-19 mitigation strategies need revision in order to decrease outbreak risk
- Whether an asymptomatic screening program is needed, given mitigation measures in place
- How frequently asymptomatic screening should take place, given the type(s) of test available

This Playbook is a companion volume to whenotest.org and the When To Test Calculator ("The Calculator"). The Calculator was developed by the Massachusetts Institute of Technology Institute for Data, Systems, and Society and the Massachusetts General Hospital Consortium for Improving Medicine with Information and Technology.

To use the Calculator, you will be prompted to enter five inputs, which correspond to the number of people you are asking the Calculator to model and the COVID-19 mitigation measures you have in place, including vaccination, reliable mask-wearing, close-contact identification and notification, and cohorting participants in unmasked indoor activities. Based on these assumptions, the Calculator tells you the following:

- Whether you would be able to avoid an outbreak using your current mitigation strategies along with an asymptomatic screening program
- How often you would need to conduct asymptomatic screening in order to decrease the risk of an outbreak
- Whether your mitigation measures are strong enough that you no longer require asymptomatic screening and need only test individuals with COVID-19 symptoms

In addition, the Calculator shows how the type of test you use for screening (antigen vs. PCR, individual vs. pooled, on- or off-site) affects the frequency of testing as well as many other details of your testing program, including staffing needs and cost.

Please note that the Calculator does not guarantee against COVID entering your school, nor does it ensure all COVID-19 infections will be eliminated. The Calculator helps determine the testing frequency needed to identify and isolate potentially contagious people. The rate at which potentially infected people may enter your school is determined by the prevalence in the broader community.

The Calculator will be updated as new tests are approved and new studies become available. Please return to whenotest.org often.

The When to Test Calculator demonstrates how key prevention and containment strategies impact whether your school needs to test people without COVID-19 symptoms in order to maintain in-person learning.
BASELINE TESTING

The calculator works best when baseline testing has been performed before starting a screening program. Baseline testing means that 100% of your population is tested and that any individuals who test positive are isolated. It gives you a “clean slate” in which any COVID-19 infections that arise come from outside the school.

If you’re planning to start an asymptomatic screening program, then one complete screening cycle in which everyone participates will address this need. If you are unable to test 100% of your population either as a baseline or during asymptomatic screening, don’t worry — you can still use the Calculator. However, if the disease prevalence is very high in your area, you’ll need to be particularly vigilant about your other COVID mitigation measures. For more details, see page 25 of the Playbook.

FIRE ANALOGY FOR MITIGATING COVID-19

<table>
<thead>
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<th>Fire Analogy for Mitigating COVID-19</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TO PREVENT A FIRE</strong></td>
</tr>
<tr>
<td>● Unplug/limit use of electric toaster ovens</td>
</tr>
<tr>
<td>● Limit use of electric heaters</td>
</tr>
<tr>
<td>● Get a permit for open outdoor fires</td>
</tr>
<tr>
<td><strong>Fire prevention does not guarantee a fire will never happen.</strong> The same is true for COVID-19. Key precautions are simple, affordable, and smart behaviors to maintain safety.</td>
</tr>
<tr>
<td><strong>TO PREVENT COVID-19</strong></td>
</tr>
<tr>
<td>● Support vaccination</td>
</tr>
<tr>
<td>● Wear masks</td>
</tr>
<tr>
<td>● Improve ventilation</td>
</tr>
<tr>
<td><strong>To Prevent COVID-19</strong></td>
</tr>
<tr>
<td><strong>TO CONTAIN A FIRE</strong></td>
</tr>
<tr>
<td>● Activate sprinkler systems</td>
</tr>
<tr>
<td>● Sound alarms and alert 911</td>
</tr>
<tr>
<td>● Evacuate the building</td>
</tr>
<tr>
<td><strong>If a fire or virus outbreak does happen despite taking precautions, then containment strategies limit the loss of property and lives.</strong></td>
</tr>
<tr>
<td><strong>TO CONTAIN COVID-19</strong></td>
</tr>
<tr>
<td>● Notify close contacts quickly</td>
</tr>
<tr>
<td>● Isolate and quarantine</td>
</tr>
<tr>
<td>● Cohort when unmasked</td>
</tr>
<tr>
<td><strong>To Contain COVID-19</strong></td>
</tr>
<tr>
<td><strong>TO DETECT A FIRE</strong></td>
</tr>
<tr>
<td>● Maintain smoke alarms</td>
</tr>
<tr>
<td>● Install carbon monoxide detectors</td>
</tr>
<tr>
<td>● Use thermal imaging cameras</td>
</tr>
<tr>
<td><strong>Warning systems can’t prevent fires nor can diagnostic tests prevent COVID. They are alarms that set containment strategies into motion.</strong></td>
</tr>
<tr>
<td><strong>TO DETECT COVID-19</strong></td>
</tr>
<tr>
<td>● Screen asymptomatic people</td>
</tr>
<tr>
<td>● Test symptomatic people</td>
</tr>
<tr>
<td><strong>To Detect COVID-19</strong></td>
</tr>
</tbody>
</table>

Learn more at whenotest.org.

PREVALENCE: The number of cases at one specific point in time in a given population.

ASYMPTOMATIC: People who are infected but never develop any symptoms. Within the U.S., nearly half of people infected with COVID-19 do not show any symptoms.

PRESYMPTOMATIC: Infected people who have not yet developed symptoms but go on to develop symptoms later.
Inputs: Number of People and Mitigation Strategies

Just as fire-prevention methods do not guarantee a fire will never happen, there is no guarantee that COVID-19 will not enter your school. However, several simple, affordable, and smart strategies have proven to significantly mitigate the spread of the virus.

To start using the Calculator, enter the number of people in the group you plan to model and the mitigation strategies you currently have in place. As you continue to work with the Calculator, you can see how adjusting your mitigation measures affects your testing needs.

NUMBER OF PEOPLE
How many people come into your school on a daily basis?

When you first use the Calculator, enter the total number of people – faculty, staff, and students – in school on a normal day. Later, you may want to model groups of people within your school whose mitigation strategies are somewhat different from one another, to see how their testing needs might differ.

For example, consider an elementary school in which 75% of the teachers are vaccinated, while the students do not yet have access to vaccination. When you model the teachers and students separately, the Calculator will recommend very different testing frequencies for each group.

VACCINATION
What percentage of people in your school have been fully vaccinated?

Your number-one weapon against COVID-19 is vaccination. Increasing vaccination rates in your school population will do more to reduce your testing needs than any other mitigation measure.

In some states, the department of public health can arrange on-site vaccination clinics at schools or field trips to vaccination sites. Many private schools have instituted vaccine mandates for all faculty, staff, and students; for public schools, vaccine mandates are typically set by the state.

USING THE CALCULATOR

If you do not know the percentage of people in your school who have been vaccinated, use the published rates from your geographic area.

While the CDC recommends that fully vaccinated people “refrain from routine screening testing if feasible,” participation in screening testing is contractually required for employees in some schools. Thus, the When to Test Calculator assumes that vaccinated individuals in your organization will continue to participate in screening. If you plan to test only the unvaccinated members of your population, then you should model them as a separate group.
MASKING

What percentage of people reliably wear masks while at school?

Masks offer protection to the wearer and also protect others if the wearer is infected with the virus that causes COVID-19. A well-fitted mask, worn properly, covers both the nose and mouth and fits snugly against the sides of the face, without leaving gaps. The CDC also recommends wearing masks with nose wires, to prevent gaps in that area. **Consistent indoor mask-wearing among your school population will greatly reduce your testing needs and, therefore, reduce your costs.**

**USING THE CALCULATOR**

In the Calculator, the input "What percentage of people reliably wear masks?" refers to the estimated percentage of students, faculty, and staff who wear masks appropriately at all times when indoors within your school. **It is common to overestimate reliable mask usage,** so using a lower percentage than you initially selected may give you a more accurate result. For example, if your school requires masking at all times when indoors, consider modeling with the Calculator input for masking at 75%.

If your school no longer has a mask policy, input "0" in this section of the Calculator.
IDENTIFYING AND NOTIFYING CLOSE CONTACTS

Can your organization identify and notify close contacts within 24 hours?

The goal of contact tracing is to identify the people who were in close contact with an infected person while they were contagious, so that those people can be prevented from spreading the disease to others. The faster close contacts are identified and notified of their status, the sooner they can quarantine, and the less likely it is that they will infect other people. If you can identify and notify close contacts within 24 hours, your need for testing will decrease.

In practice, identifying exactly who has been in “close contact” with someone can be quite difficult unless your school keeps good records. Seating charts can be very helpful for this purpose; teachers may also want to keep track of which students tend to walk together in the hallways. If you’re not sure what percentage of close contacts in your school are identified and notified within 24 hours, check with the school nurse or other staff member in charge of this task.

USING THE CALCULATOR

The Calculator assumes that only 50% of close contacts are identified and notified, but many schools are able to do better than that. If you know your school’s efficiency in this area is above or below 50% (0.5), go to the Results page and click on Show Advanced Settings (see yellow arrow).

Then click on Main Calculator Settings (green arrow), find Contact Identification Efficiency (red arrow), and adjust the default there.

CLOSE CONTACT: Someone who was within six feet of an infected person while they were contagious, for a total of at least 15 minutes over a 24-hour period. (Exception: Students who were three — six feet away from an infected person in a classroom setting while both students were consistently masked and when other COVID-mitigation measures are in place.) When someone with no symptoms tests positive, it’s assumed that they were contagious for the 48 hours (two days) before they provided the sample that was tested.

QUARANTINE AND ISOLATION: Quarantine means keeping someone who was in close contact with an infected individual away from others. Isolation means keeping someone who is infected away from others, even in their own home.
VENTILATE INDOOR SPACES

When indoors, ventilation mitigation strategies help to reduce the concentration of viral particles in the air. There are several ways to improve ventilation including but not limited to:

- Opening windows and doors (if consistent with school safety protocols)
- Placing a window exhaust fan safely and securely in a window to draw room air to the outdoors
- Using portable high-efficiency particulate air (HEPA) fan/filtration systems to help enhance air cleaning (especially in more confined or higher risk areas such as a nurse’s office)
- Implementing ventilation system upgrades or improvements (obtain consultation from experienced Heating, Ventilation and Air Conditioning (HVAC) professionals when considering changes to HVAC systems and equipment)

IMPLEMENT PHYSICAL DISTANCING

Physical distancing (at least six feet) should be maximized to the greatest extent possible. Within classrooms, turn desks to face in the same direction (rather than facing each other), or have students sit on only one side of tables, spaced apart.

Where possible, learning stations should be modified to reduce the number of students in each area. Plexiglass barriers may be effective in seating areas where maintaining six or more feet of distance isn’t possible. Create distance between children on school buses by seating one child per row and/or skipping rows.

GROUP AND SEPARATE

An unmasked group activity occurs when social distancing cannot be maintained and masks cannot be worn. The most typical example of such an activity is a group of people eating and drinking while within six feet of distance of one another.

A best practice to mitigate the risks of COVID-19 in these situations is to group and separate. This is achieved by cohorting students into consistent small groups and separating those groups by six feet or more of distance. In the example below, two cohorts of four students eating lunch are separated by six feet of distance. Other examples of unmasked cohorts would be a basketball team, a choir, or a marching band, if those groups participate in their activities indoors and unmasked.

COHORTING WHEN UNMASKED

Do individuals in your organization ever gather indoors in close proximity (for example, while eating) without wearing masks? Does anyone in your organization participate in high-COVID-risk activities such as sports, singing, or playing wind instruments while unmasked? (High-COVID-risk activities are those in which people breathe heavily or with force.)

When people are indoors and unmasked, some activities carry higher risk of virus transmission than average day-to-day interactions. These activities involve either gathering close together for extended periods of time (most commonly while eating or drinking) or breathing heavily and/or with force.

To mitigate the risk of COVID-19 in these situations, keep the cohorts of people who participate in them as small as possible. In the example below, two cohorts of four students eating lunch are separated by six feet of distance. Other examples of unmasked cohorts would be a basketball team, a choir, or a marching band, if those groups participate in their activities indoors and unmasked.
USING THE CALCULATOR

If people participate in high-COVID-risk activities indoors and unmasked at your school, enter the size of the largest cohort of people who either gather in close proximity or who participate in another high-COVID-risk activity together. For example, if there are 10 people in your choir and 20 on the basketball team, enter “20.” If lunch is the only time when people are allowed to be unmasked together, enter the size of the largest group of people who eat lunch at the same table.

If unmasked indoor group activities are not permitted, or if people eat lunch indoors alone and no other indoor unmasked activity is permitted, input “0.”

Often, people neglect to account for eating activities or smoke breaks as unmasked indoor activities. Remember, chatting for 10 minutes with your mask at your neck while getting coffee is considered an unmasked indoor activity.

ADDITIONAL MITIGATION MEASURES

IMPROVED VENTILATION

The virus that causes COVID-19 can be transmitted by aerosols: microscopic droplets of liquid that can float in the air. Improving ventilation is a critical mitigation strategy because it helps to reduce the concentration of virus-carrying aerosols indoors. Outdoors, aerosols disperse very quickly. That’s why COVID-19 is so rarely transmitted during outdoor contact.

Methods that improve indoor ventilation and air cleanliness include:

- Opening windows and doors (if consistent with school safety protocols)
- Placing a fan safely and securely in a window to pull room air outdoors
- Reducing or eliminating heating, ventilation, and air conditioning (HVAC) air recirculation, and implementing ventilation system upgrades or improvements (all in consultation with experienced HVAC professionals)
- Using portable high-efficiency particulate air (HEPA) filtration systems, especially in more confined or higher-risk areas such as nurse’s offices (these work best when positioned at head height)
- Installing ultraviolet germicidal irradiation (UVGI) units in HVAC systems or at ceiling level (if ceiling height permits)

Portable carbon dioxide (CO₂) monitors can be used to assess the level of ventilation in a room. If the CO₂ level is above 800 parts per million (ppm) during normal occupancy, then the ventilation needs to be improved. If increased ventilation does not bring the levels down adequately, then HEPA filters and/or UVGI units are necessary.
DISTANCING
To whatever extent is possible, unvaccinated individuals should remain physically distanced when indoors. Ideally, unvaccinated students should be spaced at least three feet apart from one another and six feet apart from teachers when in the classroom. Unvaccinated teachers should also remain six feet apart from one another if possible.

HAND HYGIENE
Teach and reinforce handwashing with soap and water for at least 20 seconds and increase monitoring to ensure adherence among students and staff. Hand sanitizer that contains at least 60% alcohol should also be made available. Clean frequently touched surfaces within the school and on school buses daily.
Outputs: Testing Strategies

Once you have entered the inputs, the Calculator will recommend a range of testing strategies based on how strong your COVID-19 mitigation measures are.

Just like a smoke alarm is a detection strategy for a fire, testing is a detection system for a potential COVID-19 outbreak. Testing to detect COVID-19 is part of a comprehensive strategy and should be used in conjunction with other behaviors that reduce spread.

Because there is no one-size-fits-all plan, schools should determine, in collaboration with local health officials, whether to implement any testing strategy and if so, how best to manage it. For many schools, testing will be a critical aspect of their pandemic resilience plan.

The When-To-Test Calculator is designed to support this decision making, helping you determine:

- Whether symptomatic testing or asymptomatic screening is right for your school
- Frequency of asymptomatic screening based on several different test methods
- Costs for each testing scenario

Ultimately, the type of test used in your school will be decided based on test availability, cost, and timeliness of results. In many cases, a single test or a range of test vendors will be selected at the state level. No matter what test is chosen, it is essential for school decision-makers to understand the strengths and weaknesses of that test and how best to assess and act on test results.

In addition to state and local laws, school administrators should follow guidance from the Equal Employment Opportunity Commission when offering testing to faculty, staff, and students who are employed by the school. Schools should also follow guidance from the U.S. Department of Education on the Family and Educational Rights and Privacy Act (FERPA) and the Health Insurance Portability and Accountability Act (HIPAA).

IMPORTANT INFORMATION

The Calculator provides results for several types of COVID-19 test. The test types are examples; none of them represent any one individual test. The performance and cost of individual tests can vary significantly, even if they are the same general type of test.

The sensitivity and specificity chosen for each test type is a conservative estimate for asymptomatic screening based on consultation with industry experts.

The Calculator provides guidance for asymptomatic screening of an organization under health-care practitioner guidance. This type of screening is off-label use for most tests.

Test results must be received and reviewed within 48 hours (two days) of sample collection to ensure that contact tracing is effective.

COVID-19 cases must be reported, by health-care providers and laboratories, to state, tribal, local, and territorial (STLT) health departments. All case investigation and contact-tracing support activities in your school should be undertaken in coordination and agreement with your local department of public health.

School-based testing should NEVER be conducted without consent from a parent or legal guardian (for minors) or from the individual themselves (for adults).
NAVIGATING THE RESULTS PAGE

The results page of the Calculator has three main sections.

- The Input Bar (green arrow below) allows you to change the inputs so that you can see how changing your mitigation strategies affects your testing needs.

- The Results Tables (yellow arrow below) show you the Calculator’s recommended testing strategies based on your inputs. The results appear in two tables so that you can compare scenarios involving groups of people with different mitigation strategies and/or different environmental conditions side by side. The first time you see this page, the table on the left will provide your first-pass results under typical conditions, and the table on the right will provide those results under hotspot conditions. If you skipped the guided entry, both tables will populate with a default scenario, again with typical conditions on the left and hotspot conditions on the right.

- At the top of the page you can select which saved scenarios you want to edit and name new scenarios that you create (red arrow below).
CONFIRMATORY TESTING: Confirmatory testing is done to make sure the results of a test are correct. In most cases involving COVID-19, confirmatory testing is used to verify whether an antigen test result is accurate.

If a test with a specificity of less than 99% comes back positive, especially in low-prevalence environments, confirmatory testing is recommended. Asymptomatic screening programs are frequently supplemented by confirmatory testing because false positives are more common when screening asymptomatic individuals.
TYPES OF TESTS

The Calculator provides recommendations based on several different test types. The test types differ from one another in three main ways: the type of chemistry they use, where the samples are analyzed, and how many people’s samples are tested at one time.

CHEMISTRY: ANTIGEN VS. PCR

Antigen tests (see red arrow below) detect proteins from the virus. They tend to be quick (results in under an hour) and less expensive than lab-based PCR tests, but because they aren’t as sensitive as PCR, they can misdiagnose infected people who are carrying very small amounts of virus. They also aren’t as specific as PCR, so they may require confirmatory tests.

PCR tests (see blue arrow below), also called molecular tests, detect genetic material from the virus using a lab technique called polymerase chain reaction (PCR). PCR test can detect very small amounts of virus, so they can diagnose an infection very early. Results can take up to 48 hours (two days) to arrive from commercial labs; on-site PCR tests take under an hour.

SENSITIVITY: How well a test designates someone who HAS the disease as positive. If you have a test with 95% sensitivity and you test 100 people who have COVID-19, 95 will test positive (true positive) and 5 will test negative (false negative). Tests with high sensitivity will find most cases of the virus. They will return few false negatives.

A smoke detector is very sensitive: it picks up even small amounts of smoke. However, it’s not very specific: it can’t tell if the smoke is from a fire or from something else.

SPECIFICITY: How well a test designates someone who DOESN’T have the disease as negative. If you have a test with 95% specificity and you test 100 people without COVID-19, 95 will test negative (true negative) and 5 will test positive (false positive). People who test positive using tests with high specificity are very likely to truly have the disease, which means that very few people will be quarantined unnecessarily. These tests return few false positives.

A firefighter’s thermal imaging camera is very specific: it tells the user when there’s a hot fire burning in the next room. But it’s not very sensitive: It can’t pick up tiny amounts of heat.
CLIA AND CLIA WAIVER: All laboratories in the US that test human specimens for the diagnosis, prevention, and treatment of disease are regulated under the Clinical Laboratory Improvement Amendments (CLIA).

CLIA-regulated tests are classified as complex, moderate, or waived. A CLIA Certificate of Waiver can be issued to a lab or testing site when the test to be performed is deemed by the FDA to be of moderate or low complexity, with a low probability of producing incorrect results. The FDA has temporarily classified point-of-care COVID tests as waived, allowing a lab or testing site to perform that test by following the manufacturer’s instructions. For more details, see CDC – Waived Tests.

ANALYSIS LOCATION: ON-SITE VS. OFF-SITE

On-Site Testing: Also called point-of-care (POC) testing. Samples are collected and tests are run at the school. These tests provide same-day results, but most require trained staff to run them, and most also require that the school be certified under the Clinical Laboratory Improvement Amendments (CLIA). (See red arrows below.)

Some point-of-care tests are now available over the counter (OTC). Also called home-based tests, they can be done anywhere, and the samples can be collected and analyzed by the individuals being tested. However, reporting of results for these tests may need to be done on the honor system.

On-site tests on a small instrument: Most schools will require multiple instruments in order to test enough people quickly. In addition, the instruments require trained staff to run and maintain them. (See yellow arrow below.)

Off-Site Testing: Also called lab-based testing. Samples are collected at the school and sent to a commercial laboratory for analysis. Select a lab that can provide results within 48 hours (two days) after samples are collected. (See blue arrow below.)

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Your Testing Scenarios

<table>
<thead>
<tr>
<th>Type of Test</th>
<th>Frequency</th>
<th>Cost per Week</th>
<th>Type of Test</th>
<th>Frequency</th>
<th>Cost per Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid Antigen, On-Site</td>
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<td>N/A</td>
<td>Rapid Antigen, On-Site</td>
<td>N/A</td>
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<tr>
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<td>Antigen w/ Instrument, On-Site</td>
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<td>Pooled PCR, Follow-Up, Automatic</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Congratulations! Your other mitigation measures are keeping testing costs lower than average.

With your mitigation strategies, you will need ongoing testing to help control outbreaks.

View More Pooling Options

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Testing a pooled sample cannot diagnose a person with COVID-19 – only an individual test can do that. For that reason, pooled tests and follow-up tests may each require a separate consent form.
Pooled testing is a way to make highly sensitive PCR testing more cost-effective. In pooled testing, samples are gathered from multiple people and mixed together into a pool. Instead of testing each individual sample on its own, the lab tests the pool, thus using fewer resources and lowering processing costs.

If the pool tests negative, then all individuals in the pool are considered to be negative for COVID-19.

If the pool tests positive, follow-up testing (also called “reflex testing” or “deconvolution”) is required to identify the COVID-positive individual(s) in the pool.

How follow-up testing is done depends in part on where the pooling takes place.

- **In-lab pooling (red arrow below):** Individual swabs or vials of saliva go to the lab and are pooled there. The lab saves each individual sample so that when a pool tests positive, all individuals in that pool can be tested automatically.
- **On-site pooling (blue arrow below):** Individual swabs are placed into the same test tube at the school before being sent to the lab. When the lab finds a positive pool, all members of the pool must be re-swabbed and individually tested.
The Calculator identifies four strategies for follow-up testing a positive pool. The strategy you choose will depend on a variety of factors, including recommendations or requirements from your state department of education, the logistical constraints of your school or district, and the personnel required for testing and sample acquisition. Funding for COVID-19 testing in public K-12 schools is currently being provided by the federal government. For private schools, the cost of testing will also factor into your choice of testing strategy.

The table below reviews how the four follow-up strategies work and what their strengths and weaknesses are.

<table>
<thead>
<tr>
<th>Follow-Up Test Type</th>
<th>Pooling Process</th>
<th>Follow-Up Testing Process</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic</td>
<td>Individual samples collected on-site and shipped to off-site lab. Lab creates pools and tests pooled samples using PCR.</td>
<td>Lab keeps original samples and retests them individually with PCR.</td>
<td>Eliminates need to re-collect individual samples. Results provided faster than other pooled testing strategies.</td>
<td>May be 2-3x more costly per test than rapid antigen and on-site PCR follow-up.</td>
</tr>
<tr>
<td>On-Site Rapid Antigen</td>
<td>Individual samples collected and pooled on-site. Pooled samples are shipped to off-site lab for testing using PCR.</td>
<td>On-site staff re-swabs and retests individuals with rapid antigen tests.</td>
<td>Faster than off-site PCR follow-up. Likely to be least expensive option.</td>
<td>Requires re-swabbing individuals in positive pool. Requires trained staff on site. Slightly less accurate than PCR follow-up.</td>
</tr>
<tr>
<td>On-Site PCR</td>
<td>Individual samples collected and pooled on-site. Pooled samples are shipped to off-site lab for testing using PCR.</td>
<td>On-site staff re-swabs and retests individuals using PCR instruments.</td>
<td>Faster than off-site PCR follow-up. Less expensive than automatic or off-site PCR follow-up. Highly accurate.</td>
<td>Requires re-swabbing individuals in positive pool. Requires trained staff on site. Requires purchase and maintenance of instruments.</td>
</tr>
<tr>
<td>Off-Site PCR</td>
<td>Individual samples collected and pooled on-site. Pooled samples are shipped to off-site lab for testing using PCR.</td>
<td>On-site staff re-swabs individuals; samples sent to off-site lab for PCR tests.</td>
<td>Highly accurate.</td>
<td>Requires re-swabbing individuals in positive pool. Slowest pooling option. More expensive than on-site follow-up.</td>
</tr>
</tbody>
</table>

Testing a pooled sample cannot diagnose a person with COVID-19 – only an individual test can do that. For that reason, pooled tests and follow-up tests may each require a separate consent form.
**TEST TYPE OVERVIEW**

Just as no fire-sensing device is perfect, no test is perfect – they all have trade-offs.

<table>
<thead>
<tr>
<th>SMOKE DETECTORS</th>
<th>OFF-SITE PCR TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early warning</td>
<td>Detects disease even without symptoms</td>
</tr>
<tr>
<td>False alarms happen</td>
<td>Slower turnaround</td>
</tr>
<tr>
<td>Good at true negatives (no fire)</td>
<td>Good at confirming that someone doesn’t have disease</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>THERMAL IMAGING CAMERAS</th>
<th>POINT-OF-CARE ANTIGEN TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real-time results</td>
<td>Inexpensive</td>
</tr>
<tr>
<td>Not good for early warnings</td>
<td>Same-day results</td>
</tr>
<tr>
<td>Better at true positives (TOO HOT)</td>
<td>Can miss infected people who don’t have symptoms</td>
</tr>
</tbody>
</table>
If you have a choice of what kind of test to use, the When to Test Calculator can help you make an informed selection. If your state has mandated a specific test type, the Calculator can help you determine how frequently you need to test, evaluate whether you need to adjust your mitigation strategies, and assess test results and respond to them appropriately. The table below shows the strengths and weaknesses of the five major test types covered in the Calculator.

<table>
<thead>
<tr>
<th>TEST TYPE</th>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rapid Antigen, On Site</td>
<td>Typically lowest cost</td>
<td>May give false negative results in people without symptoms or false positive results in low-prevalence environments</td>
</tr>
<tr>
<td></td>
<td>Fast turnaround time</td>
<td>Typically requires more frequent testing than PCR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May require CLIA waiver and trained staff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Can’t conduct many tests at once</td>
</tr>
<tr>
<td>Antigen with Instrument, On Site</td>
<td>Fast turnaround time</td>
<td>May give false negative results in people without symptoms or false positive results in low-prevalence environments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Typically requires more frequent testing than PCR</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May require CLIA waiver</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Requires trained staff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Instrument(s) must be purchased and maintained</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Can’t conduct many tests at once</td>
</tr>
<tr>
<td>PCR, On Site</td>
<td>Fast turnaround time</td>
<td>Requires CLIA waiver</td>
</tr>
<tr>
<td></td>
<td>More likely to detect asymptomatic infection than antigen tests</td>
<td>Requires trained staff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Instrument(s) must be purchased and maintained</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Can’t conduct many tests at once</td>
</tr>
<tr>
<td>PCR, Off Site</td>
<td>Detects nearly all infections – almost no false negatives</td>
<td>Most expensive option</td>
</tr>
<tr>
<td></td>
<td>Can test a lot of people at once</td>
<td>Slower turnaround time</td>
</tr>
<tr>
<td>Pooled PCR</td>
<td>Lower cost than individual off-site PCR</td>
<td>More expensive than on-site options</td>
</tr>
<tr>
<td></td>
<td>Detects nearly all infections – almost no false negatives</td>
<td>Pooling strategies that require re-swabbing have slowest turnaround time</td>
</tr>
<tr>
<td></td>
<td>Best at testing a lot of people at once</td>
<td>May need CLIA waiver and/or trained staff, depending on follow-up strategy</td>
</tr>
</tbody>
</table>
TEST FREQUENCY

Along with your other mitigation measures, the Calculator takes the strengths and weaknesses of the tests into account. Because of the differences between the tests, how often your school needs to test may vary depending on the type of test you use.

For example, in the scenario on the right, in order to decrease the risk of an outbreak using an on-site rapid antigen test without an instrument, you would need to test your population two times a week (see red arrow below). Using any of the other tests shown, you would only need to test once a week (see blue arrow below).
COMPARING AND SAVING SCENARIOS

The two tables at the bottom of the screen are designed to allow you to compare groups of people with different mitigation strategies and/or different environmental conditions side by side.

The first time you see this page, the table on the left will provide your first-pass results under typical conditions, and the table on the right will provide those results under hotspot conditions. If you skipped the guided entry, both tables will populate with a default scenario, again with typical conditions on the left and hotspot conditions on the right.

The scenario on the left is your primary scenario and will not change when it is in that position. Once you’ve created and saved new scenarios, you can use the dropdown menu above the left-hand table to choose which one you want to show as your primary scenario (see green arrow below).

The scenario on the right is intended to be used for comparison with your primary one. Any changes you make to the inputs at the top of the page will populate there. You can bring up any of your saved scenarios in this table using the dropdown menu above it (see yellow arrow below). If you wish, you can then edit them using the inputs at the top of the page and save them under a new name (see red arrow below).
Communicating Your Strategy and Results

Open communication with your larger school community about your COVID-19 strategy can help reduce anxiety regarding participation in testing and contact tracing and help build trust in the process, which will be critical for its success. Be sure to listen to and address the concerns of teachers, staff, students, families, caregivers, and guardians.

We recommend holding (virtual) school- and community-wide communications events to

- Communicate school policy regarding COVID-19 precautions
- Demonstrate the Calculator and show how decisions on testing type and/or frequency were made
- Provide information about the tests (and the lab that will be processing them, if applicable)
- Describe the logistics of the testing program, including how long testing will take for students and educators, how individual privacy will be maintained, and how parents and guardians can provide consent for testing
- Ensure that school employees have a specific point of contact for accessing health and safety support
- Ensure that families, guardians, and school employees have a specific point of contact for accessing testing program support

Getting buy-in from teachers and from students themselves is often the key to creating a successful testing program.

As part of planning a testing program, your COVID team will need to determine how data will be collected and how that data will be shared with the community. Not only will you want to know whether your COVID-19 precautions were able to prevent outbreaks, but you should also be able to use the data to make informed decisions about whether and how those precautions need to change over time.

Many schools use an online dashboard to communicate testing results to the community. Dashboards are most useful when they clearly describe what COVID mitigation measures are in place, including policies regarding isolation and quarantine. Transparent communication on these topics will help promote confidence both in the testing process and in the safety of in-person learning. A sample dashboard appears at right.

<table>
<thead>
<tr>
<th>STUDENT DATA</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Current COVID-19 confirmed positive</td>
<td>Current percent students quarantined</td>
<td>Total COVID-19 positive cases</td>
</tr>
<tr>
<td>0.2% 12 Students</td>
<td>3.2% 232 Students</td>
<td>38 Since October 21, 2020</td>
</tr>
</tbody>
</table>

What To Do If You Test Positive

Per CDC guidelines, unvaccinated individuals with symptoms who test positive must isolate until

- At least 10 days after symptoms first appeared, AND
- At least 24 hours with no fever, without fever-reducing medications, AND
- Other symptoms of COVID-19 are improving

Unvaccinated individuals without symptoms who test positive must isolate until

- 10 days after the positive test, as long as they remain symptom-free

What To Do If You Are A Close Contact

Unvaccinated close contacts must quarantine for 14 days after their last contact with a person who has COVID-19.

DO YOUR PART - GET VACCINATED!
Additional Guidance for Using the Calculator

While the Calculator provides results for a variety of different test types, remember that the test you have access to is always your "best test."

If the Calculator’s recommendations for the type of test you have aren’t feasible, or if they indicate that you cannot prevent an outbreak using that type of test, consider how you can improve other mitigation measures at your school. Use the Calculator to model various scenarios and predict how improvements in vaccination, mask-wearing, close-contact identification, and decreasing the size of unmasked cohorts can change your test recommendations.

The Calculator works best when you have performed baseline testing (testing 100% of your population and isolating any individuals who test positive) before starting an asymptomatic screening program. However, in many schools, that simply isn’t possible. If the prevalence of COVID-19 is low in your surrounding community, the Calculator’s recommendations are likely to be the same with or without baseline testing, and no additional action is needed. However, if your school is in a geographic area with a high COVID-19 prevalence, you will need to be particularly vigilant about your mitigation measures other than testing in order to decrease the risk of an outbreak.

The virus has continued to mutate over the course of the pandemic, giving rise to what are called variants. (A variant is a mutated form of the original or “wild type” virus.) Some of these variants are more transmissible than the wild type and are also more likely than the wild type to cause significant illness in children. When more-transmissible variants become highly prevalent in your geographic area, your testing needs may change, as well. The When to Test Calculator will be updated as the CDC adjusts their data regarding the transmissibility of the most prevalent variant across the US. We recommend that you recheck your testing needs with the Calculator periodically, to make sure that your testing program stays up to date.
Resources

The When to Test Calculator brings the latest testing strategies into a single innovative modeling tool that demonstrates how vaccinations, masking, contact tracing, limiting unmasked group activities, and screening for COVID-19 can decrease the likelihood of an outbreak at your school. Many additional considerations will factor into your COVID mitigation plans. We recommend reviewing the CDC guidelines on the following topics to further aid in your decision making and planning:

■ CDC - Operational Strategy for K-12 Schools through Phased Prevention
  The CDC’s basic recommendations for COVID-19 mitigation in K-12 schools.

■ CDC - Ventilation in Schools and Childcare Programs

■ CDC - Strategies for Protecting K-12 School Staff from COVID-19

■ CDC - Screening K-12 Students for Symptoms of COVID-19: Limitations and Considerations

■ CDC - K-12 Schools COVID-19 Mitigation Toolkit

■ CDC - Considerations for Case Investigation and Contact Tracing in K-12 Schools and Institutions of Higher Education (IHEs)

■ CDC - Information for School Nurses and Other Healthcare Personnel (HCP) Working in Schools and Child Care Settings

GH3C has collated and summarized this information in the GH3C B2S Checklist.

Additional Resources:

■ CDC and Shah Family Foundation - Open and Safe Schools
  A web-based toolkit for planning and implementing a school’s COVID-19 screening program.

■ Chiefs for Change - Project Planning Workbook for K-12 COVID-19 Testing
  A spreadsheet-based checklist for planning and implementing a school’s COVID-19 screening program.

■ CDC - Resources for Teachers and Staff
  Includes downloadable fact sheets and posters, as well as information specifically for janitors and maintenance staff; school bus drivers and bus aides; coaching and athletic staff; music, choir, and performing-arts teachers; and direct service providers for individuals with disabilities.

■ Rockefeller Foundation - K12 National Testing Action Program

■ Rand Foundation - COVID-19 Testing in K-12 Schools: Insights from Early Adopters

■ FDA - CLIA Waiver by Application

■ CMS - How to obtain a CLIA Certificate of Waiver

■ COVID-Safe Schools
  Information on COVID-19 screening and best practices for COVID mitigation in the K-12 setting.
About Us

CORE

CORE is a Los Angeles based NGO committed to providing immediate and effective community-based disaster relief to the most vulnerable of our community. The mission of CORE is to not only react to disaster but proactively support the communities in the wake of disaster through education, infrastructure projects, neighborhood planning, women's entrepreneurship and community health programs. Today, CORE is responding to the global pandemic by lending its experience and expertise to providing the necessary testing and social services to those communities that are most vulnerable to devastating effects of COVID-19.

GHC3

The Global Health Crisis Coordination Center was established in March 2020 as a division of the Center for Global Health Innovation by a group of public health and business leaders in Atlanta focused on supporting the private sector public health response to the COVID-19 pandemic, GHC3 was tasked by the CDC Foundation to share information and coordinate resources between public health, private sectors and philanthropic organizations during this global health crisis.

Since its inception, GHC3 has worked closely with corporate partners and the CDC to identify gaps in guidance and formulate best practices for a safe return to school, work and worship in the face of COVID-19. It has stood up over ten strike teams to address issues such as critical equipment needs, equitable distribution of vaccines, and mental health. Its near-term projects include the development of a global health data management system, a collaboration portal to effectively connect resources by leveraging AI, and a health monitoring system for at-risk healthcare workers.

NIH RADx℠

The National Institutes of Health launched the Rapid Acceleration of Diagnostics (RADx℠) Initiative to speed innovation in the development, commercialization and implementation of technologies for COVID-19 testing. This project has been funded in part through the NIH RADx℠ Initiative via federal funds from the National Institute of Biomedical Imaging and Bioengineering, National Institutes of Health, and Department of Health and Human Services via NIH grant number U54EB015408. The COVID-19 Testing Impact Calculator was developed by CIMIT at MGH and MIT IDSS with funding from the NIH RADx℠ Initiative.