K-12 NATIONAL TESTING ACTION PROGRAM (NTAP)

Connecting schools with the nation’s leading testing companies to safely reopen
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The K-12 National Testing Action Program (NTAP) is a plan to provide free Covid-19 testing for K-12 public schools to enable safe in-person learning.

**Situation**
- Due to Covid-19, a majority of US K-12 public schools are operating remotely or in hybrid learning.
- Online learning is not an adequate replacement for in-person school and is creating large education and socialization gaps.

**Complication**
- Teachers, students and communities may fear the spread of Covid-19 in schools.
- Schools are not fully equipped to provide necessary mitigation measures including testing.
- While testing capacity exists, labs do not have a clear signal on how to make capacity readily available to schools.
- The value of testing is getting lost amid the focus on vaccination.

**Question**
- How do we safely and sustainably re-open the nation’s K-12 public schools as quickly as possible?
- How do we make testing free, easy and widely available for schools?

**Answer**
1. **Implementation of full safety and mitigation activities**
2. **Prioritized vaccination for teachers and staff**
3. **Weekly testing for students, teachers and staff**
The school changes stemming from the Covid-19 pandemic have significant impacts:

- Student learning, as well as mental and physical health, particularly for underserved populations
- Parent economic security, particularly for women
- Teacher well-being, including where they focus their money, time, and mental health
- The national economy, including billions of dollars of projected losses

K-12 testing programs can help reopen schools:

- Testing programs work to quickly identify positive cases for isolation, keeping school infection rates well below their local community. Schools are the safest place for kids and adults and are safer than the grocery store
- Logistics are feasible for public schools, both large and small. Testing protocols become second nature within weeks
- Testing dramatically increases confidence in re-opening for teachers and parents. We have seen confidence grow from about 20% to over 80%
- Federal actions provide funding & demonstrate the importance of testing as the “missing link” to re-open schools and get all students back for in-person learning

Re-opening schools safely this spring requires:

1. Safety and mitigation measures (masking, distancing, cohorting, etc.)
2. Teacher and staff vaccination
3. Regular and reliable testing of students and adults
K-12 NATIONAL TESTING ACTION PROGRAM (NTAP) SUMMARY (2 OF 2)

Testing protocols are critical to program success:

- Step 1 - PCR ‘pod pooling’ or antigen tests with either anterior nasal swabs or saliva
  - Screening testing frequency is often once per week for students and up to twice per week for teachers and staff
- Step 2 - Follow-up diagnostic PCR or rapid antigen testing for individuals in positive pools
- Optional but recommended Step 0 - Test all participants as program begins

NTAP implementation and logistics requires diligent planning and partnership:

- Labs provide lab testing and logistics (including information systems) to schools and parents
  - Capacity for schools must be guaranteed and must not be reduced
  - School testing capacity must not reduce testing capacity or increase Turn Around Time for the general public
- All results must be returned to schools and test takers in 24 hours or fewer
- Costs for tests and additional test-related costs at each school are reimbursed by the state from their allocation of the $10 billion federal allocation of the American Rescue Plan Act for school testing

K-12 NTAP compilation team includes:

- Representatives from the nation’s largest labs and test manufacturers with deep experience in Covid-19 testing for schools
- Representatives from the world’s largest lab supply manufacturers with deep experience in manufacturing and distribution
- Representatives from information service providers
- In addition, the team met with school superintendents, principals, teachers and parents to inform the plan
ACKNOWLEDGEMENTS
INTRODUCTION AND CURRENT K-12 LANDSCAPE
IMPACT OF SCHOOL CHANGES ON STUDENTS

Impact on learning:

- **25% decrease** in post-educational learning potential among ninth graders in poorest communities

- Returning students expected to have only **63-68% and 37-50% annual learning gains** in reading and math respectively

Food insecurity and mental health:

- **169.6M** school meals missed weekly impacting **student nutrition & food security**

- **24%** increase in emergency department visits related to mental health for children aged 5-11 and **31%** increase among adolescents aged 12-17

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Minority Populations

In Washington D.C., the number of Black and Latino children who met literacy benchmarks dropped by **12-14%** compared to white students, whose numbers dropped by 6%

Black and Latino students could experience **learning losses equivalent to 9-10 months** as a result of the pandemic

70% of working parents do not have access to regular caregivers, and their return to work is dependent on in-person schooling for their children.

4 in 10 parents say they have less job security due to the pandemic and fear being penalized because they have childcare responsibilities.

4x more women compared to men left the workforce as the new school year began due to students at home.

Sources: Brookings, Catalyst, NPR
IMPACT OF SCHOOL CHANGES ON TEACHERS

3 in 4 teachers are working more hours during Covid-19 than before; of these, nearly one in 5 were working more than 15 hours more per week during Covid-19.

3 in 4 teachers report their school or district does not provide adequate access to counselors and mental health support for both students and teachers.

9 in 10 teachers felt their expertise was not appropriately tapped by decision-makers in the transition to distance and hybrid learning; nearly half of these expert teachers said their expertise was not tapped at all.

1 in 3 teachers report spending more out-of-pocket money teaching under Covid-19 than before; one-quarter are spending more than $500 more than before.

Source: National Board for Professional Teaching Standards
$2.5 trillion estimated cost to the U.S. in future earnings of four months of lost education – equivalent to 12.7% annual GDP

$350 billion of lost revenue and growth could be reversed with the opening of schools, according to some estimates

13.8 million Years of Life Lost (YLL) may be associated with the school closures during the Covid-19 pandemic

$64.5 billion per year in lost wages and economic activity from women leaving the labor force and/or reducing working hours to assume caretaking responsibilities

Source: Brookings, USA Today, JAMA, Center for American Progress
SUCCESSFUL PROGRAMS:
TESTING WORKS TO KEEP SCHOOLS SAFER
REGULAR TESTING IN SCHOOLS CAN REDUCE INFECTION

Evidence from Mathematica and RAND Corporation, supported by The Rockefeller Foundation, found that weekly testing of all students, teachers and staff can reduce in-school infections by an estimated 50%.

Source: Mathematica
SCHOOL PREVALENCE RATES ARE 10X LOWER THAN COMMUNITY RATES

Aggregate data across multiple schools and their contiguous communities shows average school positivity is 0.25% to 0.5% while surrounding community positivity is ~ 7.23%*

CDC and others support a return to in-person schooling, citing low prevalence rate in schools as a key part of the justification

Disclaimer: It is important to note that community testing is an opt-in process, and the actual community positivity may be different

*Calculated by aggregating data collected by Ginkgo, CIC Health and JCM Analytics

Source: New York State Dashboard, NYC Dept. of Education Testing Report, USA Today, CDC
TESTING BRINGS STUDENT, PARENT AND TEACHER CONFIDENCE

“I feel more safe now knowing solid facts about who has it and that the people who have it are not at school. So, it's keeping everything safer.” - Parent

Participants strongly supported the use of testing to confidently return to in-person learning

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SURVEY RESULTS
(% agree/strongly agree)

<table>
<thead>
<tr>
<th>Statement</th>
<th>Parents</th>
<th>Students</th>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testing students, staff and teachers on a regular basis is important to ensure that school can remain open and the WIS community can be as safe as possible</td>
<td>91.8</td>
<td>95.1</td>
<td>92.6</td>
</tr>
<tr>
<td>Post-launch: I am open to being part of a pooled testing protocol once or twice a week, with an individual confirmatory test required if the pool is positive</td>
<td>90.3</td>
<td>93.4</td>
<td>98.8</td>
</tr>
<tr>
<td>I feel that students or teachers who refuse to be tested individually or as part of a pool on a frequent basis should not be allowed to attend in person classes</td>
<td>80.4</td>
<td>83.13</td>
<td>74.1</td>
</tr>
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</table>

Baseline testing increased confidence of safety of in-person learning

Reported Confidence in Wellesley Public Schools

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Source: WBUR, WPS Viral Testing Information, Covid-19 Testing in K-12 Brochure, UnitedHealth Group
SUCCESSFUL K-12 TESTING: MASSACHUSETTS SCHOOLS (1 OF 2)

Program overview:

- **Weekly testing** for every classroom across the state (900K+ students)
- Students and staff self-swab with a lower nasal swab
- **10+ swabs pooled together** and run using an accurate molecular test
- Samples processes at local and regional labs
- **Follow-up testing** for individuals in positive pools using Abbot BinaxNOW

Initial data:

154 school districts have rolled out testing

940 or 50% of public schools participating

~13,000 tests in first week of testing

Sources: Boston Globe, Boston Herald, WPS Viral Testing Information, Mass. DoE
SUCCESSFUL K-12 TESTING: MASSACHUSETTS SCHOOLS (2 OF 2)

Pooled testing in Massachusetts, a collaborative effort between the Massachusetts Department of Public Health and the Department of Elementary and Secondary Education with implementation support from the Shah Family Foundation, is the first statewide pooled testing effort to offer weekly testing to all students, teachers and staff in public schools. The program launched in January and schools are already testing students.

Key learnings:

- More districts, including more urban districts, are returning to in-person learning with testing
- Early data indicate that positivity rates in schools are lower than community rates
- Pooled testing is more doable & manageable than some might realize – it is very possible to implement the initiative within all kinds of districts
- It’s essential for the state to establish critical components of this initiative – including funding, a state contract list, and regulatory enablement – but districts need to have the ability to adapt the model to reflect the strengths & challenges of local contexts
- It’s very important to aggregate resources, examples and tools to streamline the process for everyone (e.g., common consent form in multiple languages, Covid Ed Testing website)
- High quality parent engagement is crucial
- It is vital to have good vendor and inter-governmental partners

Pooled testing offering:

- The tests are front-end or on-site pooling of swabs where roughly 10 swabs are put into one tube and sent to the lab for less than $5/swab
- Rapid antigen tests are provided free to schools to do follow-up tests of positive pools
- Vendors also provide individual PCR tests for follow-up testing for $26.50-$85
- The state is paying for the first phase of the program through March 28 for any interested district. To continue programs, districts may use other federal funds

Operationalizing school testing:

- Most schools are administering the program themselves using nurses and other school staff to administer program and observe tests
- Some larger school districts are contracting with ambulance companies or bringing in nursing students to help with program administration

Key partners:

- Massachusetts Department of Elementary and Secondary Education
- Shah Family Foundation
- Public health guidance

In September, BioReference embarked on a journey in collaboration with New York City Health and Hospitals to bring school back and help keep teachers and students safe throughout the school year.

- 64 BioReference teams in the field
- TAT <38 hours
- 200 Schools per day
- 209,790 students and staff tested to date
- 1200 Total schools
- .47% positivity

SUCCESSFUL K-12 TESTING: NYC PUBLIC SCHOOLS

Sources: BioReference
SUCCESSFUL K-12 TESTING: DISTRICT OF COLUMBIA SCHOOLS

Current status:

- **All** students and staff tested weekly
- **Over 605** samples from students and staff tested each event
- **7.3 people** in the average pool
- **2 positive pools** (1 faculty, 1 kindergarten) to date

Key learnings:

- Pooling in a pod is the most cost-effective and sustainable method for testing
- Staff and older students can self-swab
- Transparent communication to parents, staff, and students about importance of testing (in multiple languages) is critical
- Pooling-specific, cloud-based information management system should be used to effectively track data
- Clear standard operating procedures and setting up a governance structure is critical for success
- A list of FAQs should be created and updated as necessary to address staff and family concerns

Sources: UnitedHealth Group
SUCCESSFUL K-12 TESTING: BALTIMORE CITY SCHOOLS

Baltimore City Schools have been utilizing weekly testing with different systems for elementary, middle and high schools

Current status:
- ~10K students and staff tested
- 750+ pools
- 78 schools (soon to be 110)

Common characteristics:
- Weekly testing
- Parent consent is required for in-person learning, which includes Covid-19 screening/testing

Elementary and middle schools:
- Students and staff self-collect with lower nasal swabs
- 5-25 individuals pooled together
- Samples processed at local or regional lab
- Results ~24 hours from when samples arrive at the lab
- If a positive result, classrooms will quarantine for 2 weeks and follow up with individual PCR tests

High schools:
- Students and staff self-collect individual saliva samples
- Samples processed at a mobile lab in DC
- Results ~8 hrs from when samples arrive at the lab
- Individuals and close contacts will quarantine for 2 weeks if a positive result

Sources: Concentric by Ginkgo, CBS Baltimore, Fox 5 News
SUCCESSFUL K-12 TESTING: DELAWARE PUBLIC SCHOOLS

School testing in Delaware, a collaborative effort between the Delaware Health and Social Services and Department of Education, has successfully demonstrated a scalable, in-person, low-resource program utilizing BD antigen tests. This program started in a handful of public charter schools and has quickly expanded across the state with buy-in from parents, staff and administrators.

**Current status:**
- 75+ public schools participating
- 33% of schools in Delaware
- 5,000+ students and staff tested

**Easy to implement:**
- Flexible program implemented by school staff. Estimated need for 2-3 FTE / 1,000 people
- Automated results reporting expected to simplify workflow further

**Return to school:**
- Positive cases have been identified without impacting school opening
- Schools see parents switching back from virtual to in-person education

**Key learnings**
- Prioritizing communication to all stakeholders throughout the process is key
- Students can be introduced to swabbing in a drive-through environment with parents nearby
- Focusing on logistics is crucial. Walk-up service may work well for older students, while classroom service may fit for cohorted and youngest students
- Self-swabbing under observation with oldest students improves throughput and logistics
- Clear guidance on obtaining consent and addressing legal requirements early is critical
- Continuous feedback from all stakeholders can make the program sustainable
- Objective assessment of test results minimizes staff confusion and improve logistics
- Reporting and documentation is a significant resource challenge. Automating reporting may save 2 FTE time

**Sources:** NCES, Delaware Health and Social Services
SUCCESSFUL K-12 TESTING: NATIONWIDE PILOT WITH PCR POOLING

Current status of Concentric by Gingko’s pilot of pooled testing in over 130 schools across 11 states:
• <15 minutes to run a full-classroom collection
• 1000+ classrooms tested
• 10,000+ students and educators tested
• 32 positive individuals identified and isolated to reduce transmission

Key learnings
• Clear communication increases confidence among students, parents, teachers and administrators
• Streamlined and human-readable consent forms are vital for ensuring parent buy-in
• Build infrastructure (including registration portals) that can scale
• Streamlining school onboarding virtually (via a website and videos) enables rapid scale
• Minimized disruption to classroom is needed for adoption (<15 minutes and self-collection)
• Pod-pooling approach can work in a wide range of schools (multiple states, low-income areas, minority communities, etc.)

Kids feel empowered to self-swab, help their community, and teach others

Swabs go “Boogers down”.
YORK ACADEMY

You only have to go up to the squishy part of your nose.
PARK STREET SCHOOL

We have a jingle - “1, 2, 3, 4 - switch it over, do 4 more”
SHARON PUBLIC SCHOOLS

It’s a free chance to pick your nose, and no one is going to yell at you.
SHARON PUBLIC SCHOOLS

Sources: Concentric by Gingko
SUCCESSFUL K-12 TESTING: CROSS-CITY LEARNING GROUP PILOT SITES

The Cross-City Learning Group was formed through The Rockefeller Foundation’s partnerships with HHS, Duke-Margolis Center for Health Policy, Johns Hopkins University, Mathematica and six cities/states willing to pilot testing programs.

Key learnings

- Engaging early with district administrators and local partners can help gain their buy-in and support for identifying resources.
- Clear communications, delivered by trusted leaders in the community, are needed to build community members’ understanding of the program and encourage participation.
- The testing approach should be designed using both evidence-based guidance and on-the-ground knowledge of what will be acceptable to students, parents, teachers and staff.

Washington D.C. 8 learning hubs
Rhode Island 78 schools and learning education agencies
New Orleans 45 schools
Tulsa 70 schools
Louisville 12 regional testing sites
Los Angeles 60 Parks and Recreation centers

Source: The Rockefeller Foundation, Mathematica
WHAT IS THE VISION: K-12 NATIONAL TESTING ACTION PROGRAM

Testing is the missing link to K-12 schools reopening safely in-person this spring

Thus, the K-12 National Testing Action Program focuses on:

A. **Free and easy testing** for schools, kids and parents
B. No reduction of **testing availability** anywhere in the country
C. Public and private **resources mobilized** and coordinated for sustainable capacity
D. A maximum **24-hour turnaround time** for results
E. **Simple procurement, funding and implementation** processes, including results reporting
F. Including the ability to **adapt and improve**, keeping pace with scientific advances
The K-12 National Testing Action Program is designed to be **federally guided, state/regionally coordinated, and locally implemented**, all with the aim to **support the safe reopening of 100% of K-12 schools**

K-12 NTAP will provide enough support to test:
- 100% of willing students weekly (per appropriate consent/assent)
- 100% of willing teachers and all staff up to twice weekly

“Everything should be made as simple as possible but no simpler” – Albert Einstein
## Key requirements for successful testing programs

### Easy
Testing an entire classroom should take minimal time (e.g., ~12 minutes). Testing must be easy for students as young as kindergarten to do. Logistics should be streamlined and should not burden school staff.

### Effective
Testing should be accurate and give school communities data that provides them with confidence to maintain in-person learning.

### Accessible
Testing should be easy to access for every school and should be easily scalable to cover entire school districts.

### Affordable
The cost of testing should allow for every student to be tested every week. Federal funding may be leveraged to cover costs.
A strong testing protocol consists of three steps:

**Step 0**

**Initiation testing**
*(optional, if possible)*
When program begins – especially for schools in high prevalence areas – all students, teachers and staff should be tested individually or in small pods before regular weekly testing begins*

**Step 1**

**Asymptomatic screening**
High-quality ‘pod-pooled’ PCR tests or antigen tests administered weekly to students and twice-weekly to teachers and staff

**Step 2**

**Positive pool follow-up testing as required**
For individuals in positive pools, provide individual PCR or antigen diagnostic tests – via at-home, on-site, clinic, lab or pharmacy testing

*While Step 0 is not discussed in further detail here, it is possible to leverage similar testing strategies to those described for steps 1 and 2. The purpose to Step 0 is to identify infected individuals before regular testing begins, which will make it easier to identify new cases moving forward*
Multiple testing technologies and systems will be needed to collectively meet school demand and diversify the supply chain. Common types of testing include:

**Pooled PCR testing** is recommended as the preferred option for routine screening testing. Samples are collected at the school and sent to a lab for processing. Data management handled by test provider.

**Individual rapid antigen testing** is recommended for routine asymptomatic testing of parts of a population or for diagnostic testing. Samples are collected at the school and tested on-site. Data management is handled by provider, in-state or vendor-provided portals. Individual testing for screening can be advantageous if the number of cases is high in a school.
HOW TO CHOOSE A TEST: FOLLOW-UP TESTING OPTIONS (STEP 2)

Step 2 testing options:

Follow-up test:
- Follow up with school’s test provider to deconvolute PCR pool directly with pre-existing or new nasal swab or saliva sample
- Rapid antigen test

Pre-paid coupon: Can be redeemed at a local retail pharmacy, clinic, testing lab or hospital to obtain proof of negative result to return to school

At-home kit: Can be used to self-collect a nasal swab or saliva sample and ship it back to a lab for testing. A pre-paid shipping label will be provided

Other sources: Collaboration with local Public Health Lab or university or other community labs may be used to get a confirmatory test using a pre-paid coupon

Benefits of the K-12 NTAP program

- Provides schools and families the **flexibility** to choose the right test option and location for them
- Improves equity and access to confirmatory testing
- Quickly allows students to get the confirmatory results required to return to school
- Optimizes use of local testing resources based on availability and preference
- **No cost to families or schools**
PCR POOLING: THE EVOLUTION OF PCR TESTING

The path from individual to pooled testing: what we’ve learned

**Colleges and universities demonstrate effectiveness of testing, infection control, and isolation measures** by creating sub-communities with lower Covid-19 prevalence and test positivity rates than the surrounding communities

**Tufts University implemented a regimented individual PCR testing strategy** in partnership with the Broad Institute to obtain community prevalence data across campus sites in multiple municipalities

**High costs limit the accessibility of repeated individual PCR testing** for K-12 communities

**Tufts University designed a study of pooled testing to evaluate the specificity and sensitivity of a pooled assay, which provides great confidence in identifying all positive individuals using pooling. Pooling becomes more popular in K-12 schools**

While sample dilution was an upfront concern for pooling, as it could result in false negatives, pilot results from 1576 individuals (students, staff, faculty, etc.) showed 100% congruence between pooled and individual results, no false negative results, and slightly elevated CT-values
**PCR POOLING: HOW IT WORKS**

**Classroom pooling**

All students and teachers in a pod **swab their noses** with short swabs (think: cotton swabs). Swabs are placed in one tube (this is the “pooling” step). This pool is then run as a single test at a local lab.

**Key benefit:** groups of 25 people can be tested using one test. For a school of 500, only 20 tubes must be collected and managed, instead of 500 when testing individually.

Only positive pools result in further action. Next steps are decided by the school.

**STEP 1 - Pods self-swab**

Individuals in a pod (e.g., classroom) self-swab and place swabs into a single tube. Takes minutes to complete for an entire pod.

**STEP 2 - Test the pools**

Each tube is then run using one test at a local lab, and the classroom is provided with one result.

**STEP 3 - Get results**

Results can be used by schools to make more informed decisions, detect the virus earlier, and mitigate spread.
PCR POOLING: TESTING OPTIONS FOLLOWING A POSITIVE POOL

What happens if there’s a positive pool?
The solution will look a little different for each school based on unique circumstances. However, K-12 NTAP recommends all follow-up testing be fully funded to ensure equitable access.

Approaches for follow-up testing:

School-based testing (preferred option)
Government-funded rapid antigen tests or on-site collection for lab-based nasal or saliva tests administered at school

At-home testing
Government-funded self-collected nasal or saliva sample sent to labs for testing using pre-paid shipping

Pre-paid coupon
Government-funded coupon redeemable at local pharmacies, clinics, testing labs or hospitals to obtain proof of negative result to return to school

Community-based testing
Government-funded tests administered at pharmacies, clinics, doctor’s offices, community centers or other publicly accessible sites
Studies comparing the sensitivity of pooled versus individual tests confirm that PCR pooling is more than sufficient for asymptomatic screening tests and has similar sensitivity to individual testing.

A study conducted by The Broad Institute found comparable levels of detection when samples are pooled or individually tested.

Results show that the sensitivity was comparable for pooled and individual/single samples.

Notes on the graph:
- 10 samples were pooled together to compare sensitivity N1 and N2 samples look for Covid-19 virus genome and RP samples look for human genome (control).
- A lower Ct value means a higher amount of virus genome is present.
- The RP Ct is significantly lower in the pool as expected since human genomic material is present on both positive and negative swabs.

RAPID ANTIGEN: HOW IT WORKS

Rapid antigen testing

Students and teachers have their noses swabbed with short swabs. Each swab is applied to a test card or cassette and allowed to run for the appropriate amount of time.

Each person tested has their own test. For a school of 500, a total of 500 tests are needed to test everyone.

Once the necessary time has elapsed, trained staff interpret and record each result. Positive results are communicated to the individuals and families.

STEP 1 - Individuals swabbed
Individuals are swabbed either by a trained staff member or a healthcare professional

STEP 2 - Test each swab
Each swab is applied to a test card or cassette by a trained staff member or healthcare professional

STEP 3 - Get results
Results are interpreted and recorded by a trained staff member or healthcare professional. They can be used to make more informed decisions, detect the virus, and mitigate spread.

Test Result: Negative
Given the speed, accuracy, price and widespread availability, some schools are using **rapid antigen testing as a way for recommended follow-up testing** to support the pooled test program.

When compared to PCR tests, BinaxNOW is **accurate in detecting COVID-19 in children with moderate to high viral loads**, even if they are asymptomatic. These children are the most likely to be highly contagious and transmit the disease.

### Sources:
- Massachusetts Department of Elementary and Secondary Education
- BinaxNow Study
- Covid Response Advisors
WHO PROVIDES TESTING: LAB FOOTPRINT FOR SCALING K-12 TESTING

Population by Zip Code
- 0 to 499
- 499 to 1,640
- 1,640 to 5,010
- 5,010 to 18,000
- 18,000 or more

Note: Lab coverage areas are approximate within national map. Additional coverage possible through public health and university labs.
WHAT WILL IT COST: ALL-IN COST ESTIMATES AND ASSUMPTIONS

ALL-IN COST PARAMETERS

$30 per person for Step 1: asymptomatic testing
- $10-15 per person: pooled PCR or antigen tests
- $15-20 per person: school administrative costs

$60 per person for Step 2: positive pool follow up
- $40-50 per person: individual PCR or antigen
- $5-10 per person: school administrative costs

ASSUMPTIONS

Per person testing costs, including school administrative costs, are estimated from current operations in school testing programs

Assumption that ~1% of pools are positive and require deconvolution / Step 2 testing

Sources: Testing for America; estimates include PPE, logistics, software, labor, and overhead
K-12 NATIONAL TESTING ACTION PROGRAM: IMPLEMENTATION LOGISTICS
Minimum standards help ensure quality testing programs are available to all students, teachers and all staff, while still allowing the schools flexibility to design and customize their programs based on their unique context and needs.

### STANDARDS FOR SUCCESS

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<tr>
<th>A. School and community alignment and engagement</th>
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<tbody>
<tr>
<td>B. ‘Right test, right place, right time’</td>
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<tr>
<td>C. Necessary supply of tests, supplies and other resources</td>
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<td>D. Resources to administer and process tests efficiently and effectively</td>
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<td>E. Clear public health guidance and resources for every stage of the process</td>
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<td>F. Reporting and data systems</td>
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<td>G. Regulatory support</td>
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<td>H. Ensuring equity and broad access</td>
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MINIMUM STANDARDS FOR PROGRAM SUCCESS
PROGRAM MINIMUM STANDARDS (1 OF 2)

A. School and community alignment, engagement and education
   ▪ School committees, superintendents, teachers, unions and families should understand the goals of the testing program and how it helps to safely and sustainably reopen

B. “Right test, right place, right time” (pooling or individual testing strategy)
   ▪ A standardized menu of testing protocols and workflows should be designed for schools that offer 24-hour results to test takers
   ▪ Testing programs should screen students and staff at a frequency that prevents outbreaks and enables the quarantining of individuals who test positive

C. Necessary supply of tests, supplies and other resources
   ▪ A stable and reliable supply of tests with a consistent process and result reporting should be available
   ▪ Fulfilling school demand nationally requires multiple types and sources of tests

D. Resources to administer testing programs efficiently and effectively
   ▪ Testing service providers should manage procurement, contracting and onboarding with individual districts and schools
   ▪ Testing playbooks and toolkits can explain how to roll out and manage a testing program at the district or school level
   ▪ Testing lead or coordinator should be appointed for each school; potentially a school nurse, school administrator, district administrator, or USPHS Commissioned Corps

E. Clear public health guidance and educational resources for every stage of the process
   ▪ Easy-to-understand rationale for and explanation of testing protocol is critical
   ▪ Situations that necessitate confirmatory tests require some guidance
   ▪ There should be an explanation of how schools and families should react to a positive case in school or in household
   ▪ Protocol for quarantine and return-to-school should be published
F. Reporting and data systems

- Aggregate pool results should be reported to school, parents and student; tracking should be facilitated by online secure software products
- Any positive individual diagnostic results – whether antigen or molecular -- should be reported to local public health authorities per existing public health laws and facilitated by HIPPA-compliant software products
- Test results are intended to keep school open and are not aimed at individual diagnostics

G. Regulatory support

- Standard consent for adults and students is necessary, including release of personal health data as appropriate
- A quick and easy option is to have schools designated as CLIA sites for POC testing when relevant
- It can be useful to have a standing physician order to authorize individual diagnostic tests under school testing protocol

H. Ensuring equity and broad access

- All public schools and districts are encouraged to take participate in program
- Testing programs should be offered at no cost to schools or participants or families
- State and local customization can provide varying levels of support for school districts with differing needs
- Test demand forecast can be created on objective factors (# students, ages, geographic densities et. al.)
WHAT DO SCHOOLS DO: RUBBER HITS THE ROAD – OPERATION OVERVIEW

There are 4 key steps to executing K-12 NTAP, but each component within the key steps must be designed and executed based on individual needs of the school.

### Key steps

1) **Coordination & administration**
   - Establish key positions & roles
   - Hire, train and build partnerships
   - Receive authorization and registration for testing

2) **Testing modality selection**
   - Choose testing partner(s)
   - Finalize protocols for Step 1 Asymptomatic Screening and Step 2 Follow-up Testing for positive pods
   - Decide on Initiation Testing

3) **Facility set-up**
   - Set-up on-site, centralized, decentralized or other physical models

4) **Results reporting**
   - Decide reporting strategy
   - Establish procedures for reporting positive results and confirmatory testing

### Considerations for tailoring design and execution

- Local epidemiology
- Student population needs (age, special needs, etc.)
- Access to approved contracts and vendors
- Proximity to labs
- Human and financial resources
- Number of students, teachers and staff

For additional resources to support school operations and planning, see: [Testing for America](#)
**WHAT DO SCHOOLS DO: COORDINATION AND ADMINISTRATION**

Successful implementation, coordination and administration requires that schools fill staff positions prior to launching K-12 NTAP; schools can choose to hire additional employees, partner with external stakeholders, and/or train existing staff for these roles.

<table>
<thead>
<tr>
<th>Positions necessary to implement K-12 NTAP</th>
<th>A combination of hiring, training and partnerships can be used for these positions. Options include:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordinator(s)</td>
<td><strong>Hire temporary employees</strong> <em>Partner with external stakeholders (e.g., Commissioned Corps or health professionals)</em> <em>Train existing staff</em></td>
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<tr>
<td><strong>Oversee the daily operations and verify authorization/consent and registration</strong></td>
<td></td>
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<tr>
<td>Ushers</td>
<td><strong>Hire temporary employees</strong> <em>Partner with external stakeholders (e.g., Commissioned Corps or health professionals)</em> <em>Train existing staff</em></td>
</tr>
<tr>
<td>Direct students, teachers and staff to testing locations</td>
<td></td>
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<tr>
<td>Test Administrators</td>
<td><strong>Hire temporary employees</strong> <em>Partner with external stakeholders (e.g., Commissioned Corps or health professionals)</em> <em>Train existing staff</em></td>
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<tr>
<td>Collect or oversee sample collection</td>
<td></td>
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<tr>
<td>Logistics Leads</td>
<td><strong>Hire temporary employees</strong> <em>Partner with external stakeholders (e.g., Commissioned Corps or health professionals)</em> <em>Train existing staff</em></td>
</tr>
<tr>
<td>Ship collected samples to labs and maintain shipping records</td>
<td></td>
</tr>
<tr>
<td>Quality Controllers</td>
<td><strong>Hire temporary employees</strong> <em>Partner with external stakeholders (e.g., Commissioned Corps or health professionals)</em> <em>Train existing staff</em></td>
</tr>
<tr>
<td>Manage safe testing environment and disposal of biohazards</td>
<td></td>
</tr>
<tr>
<td>Results Manager</td>
<td><strong>Hire temporary employees</strong> <em>Partner with external stakeholders (e.g., Commissioned Corps or health professionals)</em> <em>Train existing staff</em></td>
</tr>
<tr>
<td>Ensure all results are promptly shared with key stakeholders</td>
<td></td>
</tr>
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</table>

Depending on the position being filled and experience of the individual, specific trainings and certifications may be needed.

**Example: Watertown Public Schools, Broad Institute and CIC Health collaborated to administer individual testing for high need students**

- School nurses championed, coordinated, and administered testing
- School nurses provided in-house training for ancillary support
- Cost savings from leveraging in-house resources

**Source:** Watertown Public Schools
WHAT DO SCHOOLS DO: SETTING UP COLLECTION FACILITIES

To maintain quality and consistency, on-site collection (e.g., at schools, local pop-up labs, etc.) is preferred to at-home collection. School’s can tailor their on-site collection set up based on size, resource availability and testing modality

Set-up options

Centralized (walk-up)
- Examples: Gym, cafeteria
- When it works well:
  - ✓ High-volume testing
  - ✓ Limited testers available
  - ✓ Test technologies that require more equipment or storage
- Challenges:
  - ✓ Space may already be in use for other school activities and social distancing needs

Decentralized
- Examples: Individual classrooms
- When it works well:
  - ✓ Homeroom or pod model
  - ✓ Minimizes day-to-day disruptions for younger students (more familiar to them)
- Challenges:
  - ✓ Staff capacity
  - ✓ Transporting PPE and supplies to each location (e.g., hazard waste removal)

Centralized (drive-thru)
- Examples: Parking lot, drop-off zones
- When it works well:
  - ✓ Areas with high community prevalence (limits potentially infected individuals from entering common areas)
  - ✓ For testing one-time visitors, substitute teachers, etc.
- Challenges:
  - ✓ Sufficient physical space may not be available

Alternative collection approaches

- At-home collection may be used when the individuals are already showing Covid-19 symptoms or when a school lacks the staff needed to test the volume of students necessary
- Off-premise testing at pharmacy or other third-party location may be used when individuals prefer their primary care provider to testing in school

Source: UnitedHealth Group

Example: Washington International School and UnitedHealth Group collaborated to perform weekly pooled rapid testing

- Centralizing sample collection to make it easy was the key to success
- Using a phased approach allowed continuous improvement in sample collection methods

Photo Credit: Natasha Bhalla
WHAT DO SCHOOLS DO: RESULTS REPORTING

Regular and prompt reporting of results to testing participants and their families, schools and school districts and the state and federal government is critical to maintaining safe school environment and overall public health.

### What to report on

**Results to students, teachers and staff**

- **PCR pool test results / antigen test results**
  Clearly and promptly provide test results as soon as they are available.
- **Quarantine and isolation guidance**
  Reshare quarantining and isolation guidelines when positive pools/individual tests are identified.
- **School positivity rates and trends**
  Regularly share updates to the school community on the total number of cases and positivity trends to maintain trust.

**Results to local, state and federal government**

- **Positive cases**
  Provide regular updates on the total number cases and positivity trends at school or school district level (according to state and federal guidelines).

### Tools and technologies to facilitate reporting

- **Centralized information platform** to store data with the ability to remove PII and aggregate at school district level as needed per FERPA and HIPAA guidelines.
- **Website and/or text messaging** options to share results as soon as they are available.
- **Inquiry form** to get status updates if the test results are not available in the expected timeframe.

**Example:** Washington International School and UnitedHealth Group collaborated to perform weekly pooled rapid testing.

- Use cloud-based information management system to track results and communication.
- Report results to parents, staff and students within 40 minutes.
- Created list of easily accessible FAQs about testing, operations, data security and safety.

Source: UnitedHealth Group
Over the last few weeks, the Nurse Jamie (testing coordinator), the district superintendent, principal and school nurses have coordinated to obtain consent to test and completed registration to begin testing. They have determined that groups of 10 students will be pooled and teachers tested individually, all via PCR testing. Pre-paid vouchers for confirmatory testing will be provided to parents in positive pools.

Nurse Jamie, in close collaboration with the school nurses, helped by hiring additional temporary staff to help with ushering, testing and shipping tasks. She also helped coordinate the set-up of testing booths in the gym for students and a separate area to test teachers. The testing team conducted a dry run of all operation on Sunday before school reopened.

It’s Monday and students and teachers begin to arrive to school. Nurse Jamie is in the command center of the school making sure that all individuals are getting tested. Once all the test samples are collected, Nurse Jamie checks in with the logistics staff to ensure all samples get shipped promptly to the nearby labs.

When she comes back on Wednesday, she sees emails from all the parents who needed to get individual tests and 3 out of the 30 students were positive while the others negative for Covid-19. She authorized the remaining 27 to come back to school the following Monday and shared the update with school Principal and Superintendent.

Over the last few weeks, the Nurse Jamie is the head nurse at a high school in a city supporting the school principal and the district superintendent as they adopt the K-12 NTAP. She firmly believes that both students and teachers should be tested regularly if the school is to reopen for in-person learning.

SCHOOL OPERATIONS IN ACTION: SCHOOL NURSE PERSPECTIVE

Coordination and test modality

Set-up

Sample collection

Results reporting

Nurse Jamie gets to school early on Tuesday and sees she has an email from the lab saying that 2 pools in grade 8 tested positive. She immediately sends an email voucher to the parents of the students in the pool to get an individual test.
Molly’s school has worked hard to implement the K-12 NTAP program, which is a national testing strategy that allows teachers and students to safely come back to school in-person. She can hardly contain her excitement to start school this coming week because she will finally be able to see her friends and teachers in-person.

Over the last few weeks, Molly's parents have been talking with the school about the new testing program to understand all the steps they are taking to safely test Molly and keep her safe when she is in school. They have filled out required consent forms and registered for regular testing.

It’s Monday and when Molly arrives at school with her new rainbow mask, one of the school staff checks her in and directs her to head to the gym with the rest of her homeroom classmates. There are arrows on the ground directing her to one of the several tables that are set up in the gym. She only waits in line for 5 minutes (standing 6 feet apart from her classmates of course).

When it is her turn, the school nurse watches Molly swab her nose. That took only a minute and wasn’t as scary as she thought it would be! Then Molly follows the arrows out of the gym and back to her class for the rest of the day.

Molly comes back to school on Tuesday. While her whole class is there, the class next to them is empty because someone in that pod had a positive test. The teacher explains that the students in that pod will be tested again to confirm the positive individual.

Molly’s parents receive another email from the school on Wednesday confirming the Covid-19 positive individuals were successfully identified and asked to continue in-home learning for at least 2 weeks and provide a Covid-19 negative result. For contact tracing purposes, they were also told that Molly was not in contact with the Covid-19 positive individuals and should attend school normally.
**WHO IS NEEDED: BUILDING CONFIDENCE FOR PARTICIPANTS**

Wide-spread adoption and participation relies on building confidence for participants by understanding their priorities and concerns. State and local leadership must proactively reassure and address the concerns of stakeholders.

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<thead>
<tr>
<th>Priorities and Concerns</th>
<th>Superintendents</th>
<th>Teachers and staff</th>
<th>Parents</th>
<th>Students</th>
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<tbody>
<tr>
<td></td>
<td>All willing individuals are getting tested</td>
<td>Keeping themselves and students safe</td>
<td>Safety of children</td>
<td>Fear of getting the swab</td>
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<tr>
<td></td>
<td>Results are obtained quickly</td>
<td>Preparing for when someone gets sick in school</td>
<td>Testing without parent/guardian present</td>
<td>Test collection safety</td>
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<tr>
<td></td>
<td>Payments and funding vehicles are in place</td>
<td>Missing work when they test positive</td>
<td>Perceived cost and time of confirmatory test if applicable</td>
<td>Stigma or lost school time linked to positive results</td>
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<td></td>
<td></td>
<td>Data privacy</td>
<td>Data privacy</td>
<td>Making testing process as easy as possible to reduce stress and anxiety</td>
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<tr>
<td></td>
<td></td>
<td>Test collection safety</td>
<td>Test collection safety</td>
<td>Provide guidance on what do you if you’re feeling sick</td>
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</tbody>
</table>

**Actions to Build Confidence**

|                         | Set frequency and sensitivity standards | Provide guidance on isolation and other mitigation strategies | Provide information on getting confirmatory tests | Make the testing process as easy as possible to reduce stress and anxiety |
|                         | Provide easy-to-use consent forms | Bring in trained people to administer tests | Make consent forms easy to understand | Provide guidance on what do you if you’re feeling sick |
|                         | Provide central POC to ask questions | Be transparent about data privacy and use | Provide results quickly | |
|                         |                                             | Be transparent about data privacy and use | Be transparent about data privacy and use | |

*Note: The Testing for America K-12 Playbook provides a tactical communications plan to engage stakeholders including who is responsible for the communication.*

For additional resources to support school operations and planning, see: [Testing for America](#).
## CONTACT INFORMATION (1 OF 3)

<table>
<thead>
<tr>
<th>Company</th>
<th>HQ</th>
<th>Contact Name</th>
<th>E-mail</th>
<th>National Reach?</th>
<th>Regional Reach</th>
<th>PCR - pooled</th>
<th>PCR - individual</th>
<th>Antigen without instrument</th>
<th>Antigen with instrument</th>
<th>Experience with K-12 Testing</th>
<th>Own lab or partner lab?</th>
<th>Ready to start testing?</th>
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<tr>
<td>BD (BD Veritor)</td>
<td>NJ</td>
<td>TJ Salerno; Jeff Eisinger</td>
<td><a href="mailto:thomas.salerno@bd.com">thomas.salerno@bd.com</a>; <a href="mailto:jeff.eisinger@bd.com">jeff.eisinger@bd.com</a></td>
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<td>BioReference Laboratories</td>
<td>NJ</td>
<td>Ellen Beausang</td>
<td><a href="mailto:ebeausang@bioreferences.com">ebeausang@bioreferences.com</a></td>
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<tr>
<td>CIC Health</td>
<td>Cambridge, MA</td>
<td>Lindsay Clark</td>
<td><a href="mailto:clark@cic.com">clark@cic.com</a></td>
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<td>Yes</td>
<td>Broad Institute</td>
<td>Yes</td>
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<tr>
<td>Color</td>
<td>Burlingame, CA</td>
<td>Caroline Savello</td>
<td><a href="mailto:caroline@color.com">caroline@color.com</a></td>
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<td>Exact Sciences</td>
<td>Madison, WI</td>
<td>Melanie Hayward</td>
<td><a href="mailto:mhayward@exactsciences.com">mhayward@exactsciences.com</a></td>
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<td>GENETWORx</td>
<td>Glen Allen, VA</td>
<td>Maryrose Roberts</td>
<td><a href="mailto:mroberts@recoverycoa.com">mroberts@recoverycoa.com</a></td>
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<tr>
<td>Ginkgo BioWorks</td>
<td>Boston, MA</td>
<td>Matt McKnight</td>
<td><a href="mailto:mmcknight@ginkgobio.com">mmcknight@ginkgobio.com</a></td>
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<tr>
<td>Helix</td>
<td>San Mateo, CA</td>
<td>Ed MacBean</td>
<td><a href="mailto:edgar.macbean@helix.com">edgar.macbean@helix.com</a></td>
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<tbody>
<tr>
<td>LabCorp</td>
<td>Kevin DeAngelo</td>
<td><a href="mailto:deangek@labcorp.com">deangek@labcorp.com</a></td>
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<tr>
<td>PathGroup</td>
<td>Richard Halstead; Brent Sower</td>
<td><a href="mailto:rhalstead@pathgroup.com">rhalstead@pathgroup.com</a>; <a href="mailto:bsower@pathgroup.com">bsower@pathgroup.com</a></td>
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<tr>
<td>Quest Diagnostics</td>
<td>Stacia Rivello</td>
<td><a href="mailto:stacia.x.rivello@questdiagnostics.com">stacia.x.rivello@questdiagnostics.com</a></td>
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<tr>
<td>Quidel Corporation</td>
<td>Patrick Sweeney; Rick Graham</td>
<td><a href="mailto:patrick.sweeney@quidel.com">patrick.sweeney@quidel.com</a>; <a href="mailto:rick.graham@quidel.com">rick.graham@quidel.com</a></td>
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<td>Partner</td>
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<tr>
<td>Sonic Healthcare USA - Clinical Pathology Laboratories</td>
<td>Tony Jones</td>
<td><a href="mailto:tjones@cpllabs.com">tjones@cpllabs.com</a></td>
<td>Yes</td>
<td>TX, LA, OK, NV, NM</td>
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<tr>
<td>Sonic Healthcare USA - Clinical Labs of Hawaii</td>
<td>Michele Cox</td>
<td><a href="mailto:michele.cox@hawaiilabs.com">michele.cox@hawaiilabs.com</a></td>
<td>Yes</td>
<td>HI</td>
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<tr>
<td>Sonic Healthcare USA - American Esoteric Laboratories</td>
<td>David Smalley, PhD</td>
<td><a href="mailto:dlsmalley@ael.com">dlsmalley@ael.com</a></td>
<td>Yes</td>
<td>TN, MO, AR, MS</td>
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<td>Sonic Healthcare USA - Sunrise Medical Laboratories</td>
<td>Hicksville, NY</td>
<td>Alan Greenberg</td>
<td><a href="mailto:agreenberg@sunriselab.com">agreenberg@sunriselab.com</a></td>
<td>Yes</td>
<td>NY, CT, DC, MD, VA</td>
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<td>Sonic Healthcare USA - West Pac Laboratories</td>
<td>Santa Fe Springs, CA</td>
<td>Joel Bentz, MD</td>
<td><a href="mailto:jibentz@westpacific.com">jibentz@westpacific.com</a></td>
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<td>Gary Sammarco</td>
<td><a href="mailto:gary@esclab.com">gary@esclab.com</a></td>
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<td>Jacksonville, FL</td>
<td>Bruce Walton</td>
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<td>Sonic Healthcare USA - Laboratory Medicine Consultants</td>
<td>Las Vegas, NV</td>
<td>Bruce Walton</td>
<td><a href="mailto:bwalton@auroradx.com">bwalton@auroradx.com</a></td>
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<td>Bruce Walton</td>
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<td>Sonic Healthcare USA - Greensboro Pathology Associates</td>
<td>Greensboro, NC</td>
<td>Bruce Walton</td>
<td><a href="mailto:bwalton@auroradx.com">bwalton@auroradx.com</a></td>
<td>Yes</td>
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</tr>
<tr>
<td>Sonora Quest Laboratories / Laboratory Sciences of Arizona</td>
<td>Phoenix, AZ</td>
<td>Tom Leggett</td>
<td><a href="mailto:sonya.engle@sonoraquest.com">sonya.engle@sonoraquest.com</a>, <a href="mailto:tom.legestt@sonoraquest.com">tom.legestt@sonoraquest.com</a></td>
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<tr>
<td>Veritas Genetics</td>
<td>Danvers, MA</td>
<td>Mirza Cifric</td>
<td><a href="mailto:mcifric@veritasgenetics.com">mcifric@veritasgenetics.com</a></td>
<td>Yes</td>
<td>All</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Both</td>
<td>Yes</td>
</tr>
</tbody>
</table>

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APPENDIX AND REFERENCES
CDC RECOMMENDS SCREENING TESTING TO REDUCE TRANSMISSION

“Viral testing strategies in partnership with schools should be part of a comprehensive prevention approach. Screening testing is intended to identify infected people without symptoms...to prevent further transmission.” – CDC Guidelines

<table>
<thead>
<tr>
<th>Community transmission</th>
<th>CDC Recommendations for Screening Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low</strong> (~30% of states)</td>
<td>Students: No screening testing</td>
</tr>
<tr>
<td><strong>Moderate</strong> (~70% of states)</td>
<td>Students: At least once per week</td>
</tr>
<tr>
<td><strong>Substantial or High</strong> (~0% of states)</td>
<td>Students: At least once per week</td>
</tr>
</tbody>
</table>

In last 7 days, 0-9 new cases per 100K, <5% positive tests

In last 7 days, 10-49 new cases per 100K, 5-7.9% positive tests

In last 7 days, 50+ new cases per 100K, 8%+ positive tests

Given the **CDC recommends screening testing in schools in most instances**, it is critical to establish a program that is **easy to administer** and **requires minimal additional resources** from schools

Sources: [CDC recommendations](https://www.cdc.gov); [State transmission rates (New York Times)](https://www.nytimes.com)
BUSINESS AND HEALTH LEADERS SUPPORT SCHOOL REOPENING

- Dr. Rajiv J. Shah and Randi Weingarten. “With robust testing, we can open schools this spring before the vaccine is widely available.” USA Today Op Ed. January 24, 2021. Retrieved from https://www.usatoday.com/story/opinion/2021/01/24/re-opening-schools-precautions-and-testing-column/6661567002/
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- Covid-19 school closures most harm students from poorest neighborhoods. (2021, January 5). Retrieved from Covid-19 school closures most harm students from poorest neighborhoods | YaleNews
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REFERENCES (3 OF 3)

- Schwartz, Heather L., David Grant, Melissa Diliberti, Gerald P. Hunter, and Claude Messan Setodji, Remote Learning Is Here to Stay: Results from the First American School District
- Shah, D. R., & Weingarten, R. (2021, January 24). With robust testing, we can open schools this spring before the vaccine is widely available. Retrieved from https://www.usatoday.com/story/opinion/2021/01/24/re-opening-schools-precautions-and-testing-column/6661567002/
GUIDING PRINCIPLES FOR K-12 NTAP DEVELOPMENT

The K-12 NTAP team operates by a set of core principles which have guided the design and implementation of the program:

- **Think Big but Design Small** – Standardize guidance to be widely applicable and scalable yet also tailorable for state-level coordination and school or district-level implementation

- **Provide Clear, Simple and Realistic Guidelines** – Encourage use and adoption by making the guidelines easy to follow and proactively identifying ways to reduce barriers

- **Be Reasonably Comprehensive** – Provide a common platform to understand the minimum requirements for K-12 testing at a broad level to enable the return of in-person learning

- **Be Focused** – Prioritize testing solutions and strategies. Other mitigation strategies are assumed but secondary to this program (e.g., vaccine distribution, masking, physical distancing)

- **Enable Agility** – Develop a plan that is practical and sustainable, while acknowledging the dynamic environment and likely necessity of real-time adaptation

- **Build Capacity** – Identify ways meet demand for K-12 testing without diminishing existing testing capacity

- **Minimize Burden** – Minimize burden on schools and families throughout the process to increase adoption
QUESTIONS AND FOLLOW UP

Mara G. Aspinall
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