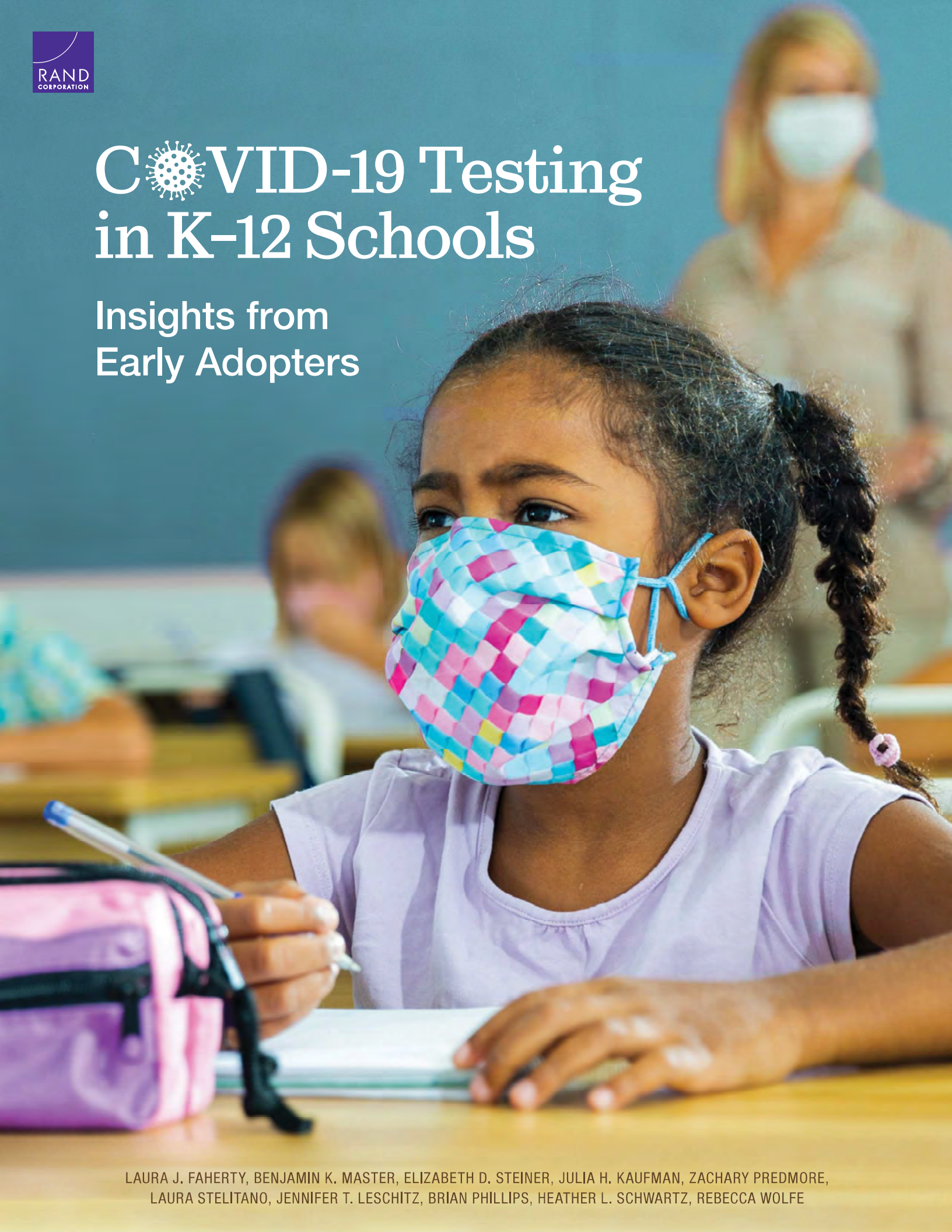# COVID-19 Testing in K–12 Schools

Insights from Early Adopters

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Background and Approach

Nearly one year into the COVID-19 pandemic, K–12 schools across the United States are struggling to remain open for in-person instruction. Inequities in academic outcomes are widening, with the most disastrous potential outcomes for students in higher-poverty schools and those who are learning remotely.[1] Children's social-emotional health has been profoundly affected, and teacher morale is suffering.[2] In a RAND Corporation survey of nearly 1,000 former public school teachers, almost half of those who left public school teaching early during the pandemic did so specifically because of COVID-19.[3] These impacts of the pandemic will have negative consequences for decades to come.

Research to date suggests that in-person instruction, when coupled with appropriate mitigation strategies, is not a major contributor to COVID-19 transmission in communities.[4] Nevertheless, some degree of transmission in school settings does occur, and widespread concern among families and staff about safety is a major barrier to schools' ability to provide more in-person instruction.[5] Roughly half of teachers who quit teaching because of COVID-19 report that they would be willing to return if there were widespread vaccination or regular COVID-19 testing.[6]

On January 14, 2021, just prior to the start of his administration, then-President-elect Joseph Biden announced a $1.9 trillion stimulus plan to combat the COVID-19 crisis and provide economic aid.[7] The proposal included $130 billion to help most schools safely return to in-person instruction within the first 100 days of his presidency and $50 billion to expand testing, including in K–12 schools. To help accomplish this ambitious goal, it will be imperative to successfully spread and scale up promising practices from K–12 schools and districts that were early adopters of COVID-19 testing of their students and staff in the fall semester of 2020.

Our Approach

To develop our recommendations, we conducted a national scan to identify schools, districts, and states that had implemented COVID-19 testing in K–12 schools in the fall semester of 2020 ("early adopters").[8] First, we scanned news reports at two time points in early December 2020 and examined the academic literature (peer-reviewed and pre-prints) and gray literature sources, including school, district, and state websites. Through our professional networks, we solicited referrals to K–12 schools that were conducting COVID-19 testing of students or staff. Through these efforts, we identified hundreds of schools and districts that had implemented COVID-19 testing as of December 2020.[9]

From our initial sample, we contacted schools that had implemented a variety of testing approaches across diverse contexts. We conducted semistructured telephone interviews lasting 30 to 90 minutes with more than 80 leaders from schools, school districts, state and local health departments, and other organizations involved in testing implementation.[10] We also fielded a five- to ten-minute online survey to a larger sample of schools and districts about COVID-19 testing to gather perspectives from a sample of early adopters. To supplement these stakeholder perspectives, we reviewed internal testing program documentation and testing data provided by schools and districts.

For the purposes of this report, we considered testing to be "feasible" if it was possible for the school to arrange the necessary logistics to begin testing staff and/or students; "acceptable" if the school community seemed generally supportive of the program and participated in testing; and "effective" if it achieved its intended goals, which could include both tangible and intangible benefits (e.g., identifying and isolating asymptomatic cases, allowing schools to offer in-person instruction, and reducing anxiety).

We provide more details about our study methods in the appendix.

In response to an urgent need to disseminate lessons learned so far about the use of COVID-19 testing to help facilitate safe school reopening, and as part of a portfolio of work to guide and support testing in K–12 settings, The Rockefeller Foundation sponsored RAND to

1. **describe the landscape** of COVID-19 testing in K–12 schools during the 2020 fall semester and characterize the variety of testing programs that early adopters put in place

2. **identify implementation insights** from those early adopters

3. **offer recommendations** on how to make widespread COVID-19 testing in schools feasible, acceptable, and effective.

In Part 1 of this report, we first describe the landscape of COVID-19 testing in K–12 schools nationwide as of December 2020, including the characteristics of early adopters and their varied approaches to testing. Next, we describe the key facilitators of feasible, acceptable, and effective COVID-19 testing that we observed across these early adopters.

We then summarize the benefits and costs of early adopters' testing programs. Informed by our findings, we conclude with recommendations to school leaders, district officials, and policymakers for implementing feasible, acceptable, and effective COVID-19 testing in K–12 schools.

In Part 2 of this report, we profile COVID-19 testing programs in selected schools, districts, and states, with a focus on describing the practical details of their testing approaches and key factors that facilitated their efforts.

Part 1: Overview and Key Findings

Landscape of COVID-19 testing in K–12 schools

Who were the early adopters of COVID-19 testing in schools in the fall of 2020?

Our national scan revealed that, as of December 2020, a large number of K–12 schools across the United States had implemented COVID-19 testing. However, schoolwide screening testing programs (i.e., testing asymptomatic individuals) that we identified were not distributed equitably, but instead were mostly implemented in public and independent schools that had access to more resources. In this section, we describe the three main types of early adopters we identified, ordered from most to least common (Table 1).

TABLE 1

Three main types of schools and districts that were early adopters of COVID-19 testing

Type 1: Public schools and districts that received tests through statewide programs, as well as guidance and training in how to use them

Type 2: Independent schools with sufficient financial and other resources, peer networks, smaller student bodies, and the ability to require testing for in-person instruction

Type 3: Public schools and districts with access to local resources and strong partners that helped them implement COVID-19 testing independent of statewide test distribution

Type 1: Public schools and districts that received tests, as well as guidance and training in how to use them, through statewide programs

The largest group of schools to implement COVID-19 testing in fall 2020 were those located in states that had begun distributing BinaxNOW rapid antigen tests from the federal government to K–12 schools through state-specific allocation processes (see the profiles of Texas, Missouri, and Utah in Part 2 of this report). While states' plans for distributing the BinaxNOW tests varied, our interviews of state and district leaders indicate that most schools were using the tests for symptomatic individuals only since they often lacked enough tests to conduct screening testing. That said, as of December 2020, some schools were conducting screening testing of specific subgroups, such as student athletes. New York State was an exception: The New York State Department of Health implemented a mandatory statewide surveillance program that sampled staff and students in all schools in zones at higher risk for COVID-19 transmission.[11] The state distributed tests and testing resources primarily through local health departments, streamlined the process for local laboratories to become licensed to analyze samples, and instituted reporting requirements and a state dashboard for displaying results.

Type 2: Independent schools with sufficient resources

A November 2020 nationally representative poll found that students in private schools were much more likely than public school students to be attending in-person.[12] We found that independent private schools in particular were frequently early adopters of testing (see the profile of Rye Country Day School, "Adaptability in an independent school in New York," in Part 2). Based on internal surveys, the National Association of Independent Schools (NAIS), the largest association of independent schools in the United States, estimated that around 20 percent of its 1,600 members conducted regular school-based screening testing as of October 2020; another 50 percent were conducting diagnostic testing only (i.e., testing symptomatic individuals). The other 30 percent were not testing. Relative to public schools, independent private schools typically have greater access to financial and other resources, the flexibility to require testing as a condition for being on campus, smaller student and staff populations, and strong school networks to share knowledge and find solutions together. For example, an association of independent schools in the Washington, D.C., area collaborated to pool resources for access to a shared mobile testing laboratory.

As part of our national scan, we fielded a brief online survey in December 2020 targeted at schools conducting screening testing, which NAIS distributed to all its members. Of the 57 independent schools implementing screening testing that responded to our survey, the majority (N=39) had begun testing by September 2020. Schools typically tested both students and staff (N=46), but some schools (N=11) only conducted screening testing of teachers. Most NAIS respondents conducted weekly testing, but a small number tested every other week or monthly. A few schools also described conducting intermittent screening testing, usually after school breaks. Most schools reported using nasal swabs to collect samples (N=42), a sizable minority were using saliva-based tests (N=21), and some used both. However, because our survey was voluntary and our response rate was low, our results may not be representative of all NAIS member schools that implemented screening testing.

Type 3: Public schools and districts with access to local resources and strong partners

The third and least common type of school that we identified were public schools that have access to both local resources and strong partners that helped them implement COVID-19 testing independent of statewide test distribution. Public schools and districts in this group had certain common characteristics: Many had academic medical center partners, and many were better-resourced than other public school districts around the country. Academic medical centers often provided access to laboratories for analyzing test samples (see the Medford Public Schools profile, "Local partners enabling testing in Massachusetts," in Part 2); were contracted to manage the complex logistics of testing (see the San Diego Unified School District profile, "Local resources supporting testing in California," in Part 2), or supported schools to launch testing programs as part of a pilot research study (see the One City Schools profile in "Resourcefulness in a charter school in Wisconsin," in Part 2).

Another key partnership model we identified is unique to Colorado: a social benefit enterprise, COVIDCheck Colorado (CCC; https://covidcheckcolorado.org), with significant funding from the state, has partnered with schools and districts to provide comprehensive logistical support for school-based testing. As of December 2020, testing through CCC has focused on school staff, with plans to expand student testing in early 2021. We describe CCC's approach in our profile of Colorado's Westminster Public School District ("A testing program supporting schools in Colorado" in Part 2).

What were the characteristics of COVID-19 testing approaches in early adopter schools and districts?

K–12 schools and districts implemented COVID-19 testing programs in fall 2020 that varied across several key dimensions:
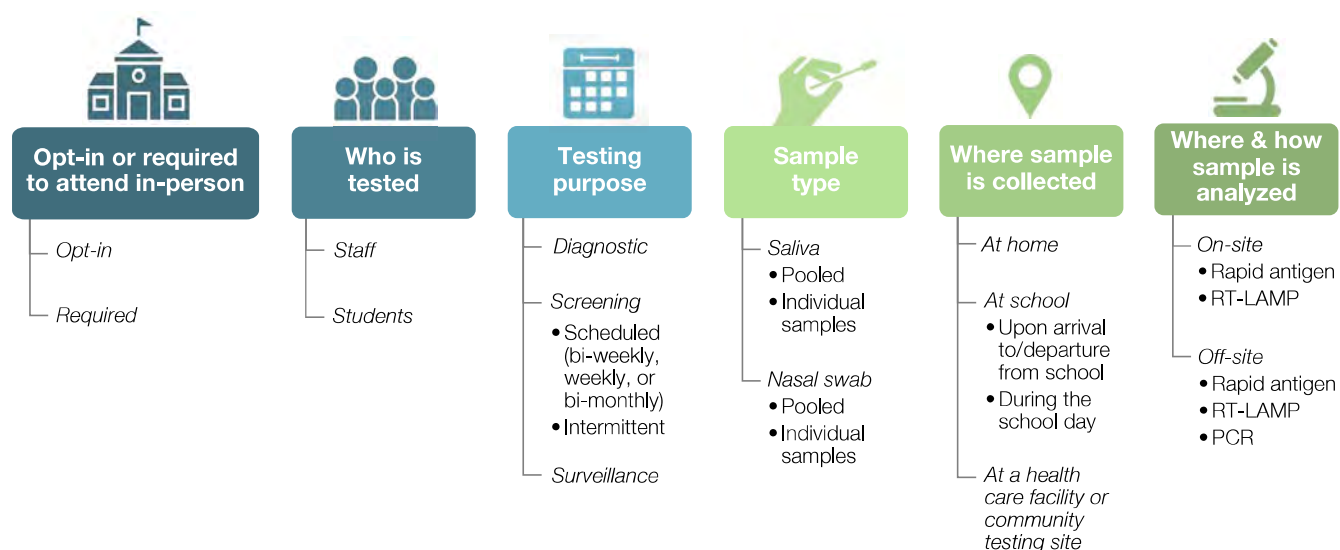
- **Opt-in or required for in-person attendance:** Most testing programs were voluntary, but some districts or schools have required COVID-19 testing for in-person instruction.

- **Who is tested:** Some programs test staff only (including teachers and contracted staff); others test staff and students. Programs may have different approaches for staff and students. For instance, staff may participate in weekly screening testing, whereas students are tested only when symptomatic or in close contact with a confirmed case.

- **Testing purpose:** COVID-19 testing may be conducted for diagnostic, screening, or surveillance purposes, each of which has different considerations for turnaround time for results and test accuracy.[13] Diagnostic testing involves testing symptomatic individuals and their close contacts to make clinical and public health decisions. Screening testing involves routine testing of asymptomatic individuals and those without an exposure history to identify and isolate infected individuals, or less frequent testing to determine disease prevalence. With surveillance testing,

individuals do not receive their test results—testing is used to understand community prevalence to inform decisionmaking.

- **Sample type:** The two types of samples used in K–12 schools were saliva samples and samples collected using nasal swabs. Schools were using the less invasive "mid-turbinate" or "anterior nasal" swabs rather than the deeper, more uncomfortable nasopharyngeal swabs. Both types of samples can be pooled, meaning that specimens from several individuals are combined into a single sample that is tested for COVID-19. If the entire pool tests positive, the individual samples are isolated and retested until the positive specimen is identified.

- **Where the sample is collected:** Samples can be collected at home using test kits sent home with students and staff a day or two before the sample collection day. Students and staff can undergo a nasal swab or provide a saliva sample upon arrival to school, at departure, or during the school day; they can also be tested at a health care facility that has a relationship with the school or at a designated testing site, such as a drive-through testing location in the community.

- **Where the sample is analyzed:** Tests can be analyzed either on site (on school grounds) or off site (at a laboratory off-campus).

- **How the sample is analyzed:** Rapid antigen tests, which typically provide results in 15 minutes, and

RT-LAMP (reverse transcription loop-mediated iso-thermal amplification) assays can be performed on school grounds, although RT-LAMP requires specialized equipment and reagents to run the assay. Rapid antigen tests, RT-LAMP assays, and reverse transcription polymerase chain reaction tests (hereafter, "PCR tests") can be performed off-site (i.e., at a laboratory).

Figure 1 organizes these characteristics into a faceted taxonomy,[14] which can be thought of as a menu of options that districts and schools may consider when designing COVID-19 testing programs to meet their needs. Characteristics of testing approaches, such as testing purpose and sample type, are organized as dimensions with corresponding options under each. We apply this taxonomy to the profiled schools, districts, and states later in this report to demonstrate the diversity of testing approaches among early adopters around the country.

Importantly, schools and districts face many more choices when designing their testing programs than are shown in Figure 1. For example, they must decide how to manage their testing data (e.g., customize a data management platform to their needs or use an existing product "off the shelf"); whether the platform needs to handle other steps of the testing workflow, such as appointment scheduling and reminders of upcoming tests; who, in addition to the tested individual, will automatically receive the results and who else should be notified (e.g., school nurse, principal, human resources [HR]); and how and by whom test results will be reported to public health authorities. The ten profiles in Part 2 of this report illustrate not only how testing programs varied across the dimensions in Figure 1, but also how schools, districts, and states differed in their approaches to other complex decisions such as these. The Rockefeller Foundation and Skoll Foundation have released a K-12 testing "playbook" which walks schools and districts through these decisions and how to operationalize them.[15]

FIGURE 1

Characteristics of COVID-19 testing approaches in K–12 schools

Opt-in or required to attend in-person	Who is tested	Testing purpose	Sample type	Where sample is collected	Where & how sample is analyzed
Opt-in	Staff	Diagnostic	Saliva • Pooled • Individual samples	At home	On-site • Rapid antigen • RT-LAMP
Required	Students	Screening • Scheduled (bi-weekly, weekly, or bi-monthly) • Intermittent	Nasal swab • Pooled • Individual samples	At school • Upon arrival to/departure from school • During the school day	Off-site • Rapid antigen • RT-LAMP • PCR
		Surveillance		At a health care facility or community testing site	

Implementation insights from early adopters of COVID-19 testing in schools

The previous section described the landscape of testing in schools across the United States as of December 2020. In this section, we present insights from early adopters on *how* they were able to implement testing in the K–12 setting in fall 2020, the benefits they perceived from doing so, and the types of costs they incurred.

A conceptual model of facilitators of COVID-19 testing in schools

From our interviews, the following lesson became strikingly clear: To successfully implement COVID-19 testing in the fall of 2020, early-adopter schools had to grapple with an array of unfamiliar and highly complex logistics. They needed numerous supports to implement feasible and acceptable testing programs that achieved their intended goals.

To organize these facilitators of testing implementation, we developed the conceptual model shown in Figure 2, an adaptation of the Exploration, Preparation, Implementation, Sustainment Framework (EPIS) Framework.[16] The model shows the factors that enable COVID-19 testing in K–12 schools and indicates how those factors are related. Next, we highlight the elements of our conceptual model shown in Box 1 and discuss how they were working in practice in the fall semester of 2020, as we do throughout the school, district, and state profiles in Part 2 of this report.

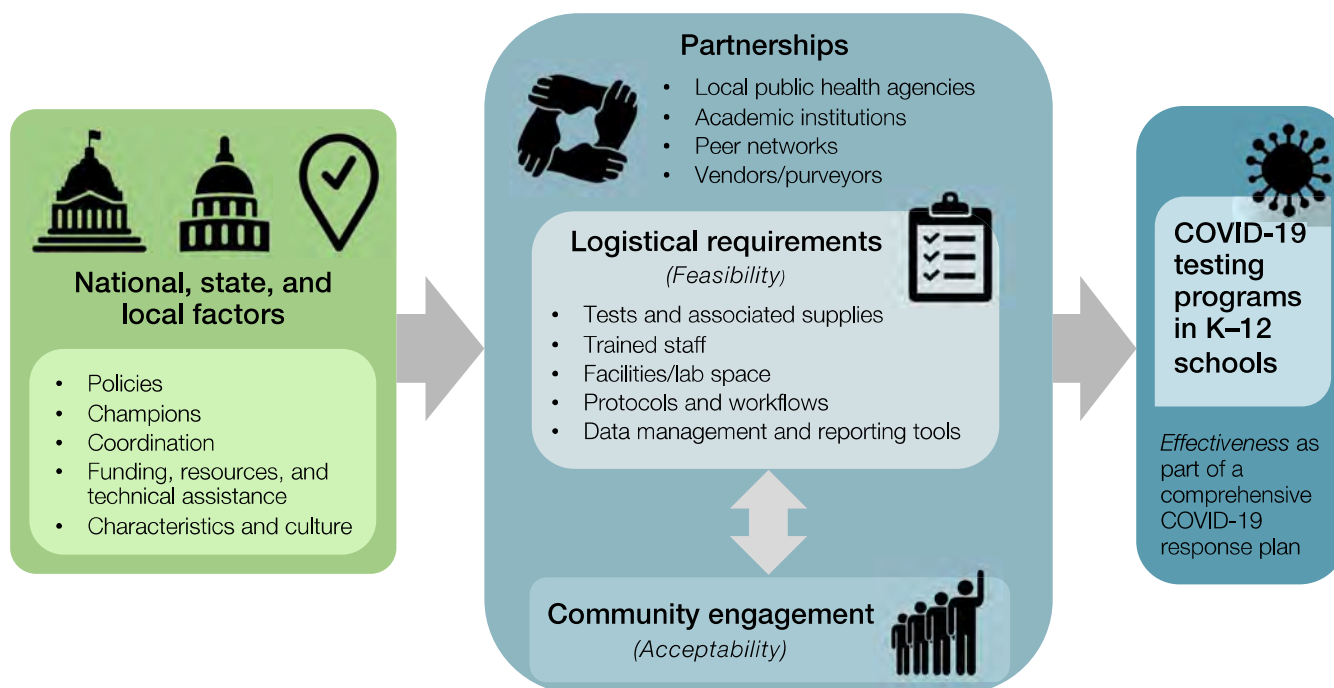## Examples of key facilitators of COVID-19 testing among early adopters

In this section, we provide examples of the key facilitators of feasible, acceptable, and more effective COVID-19 testing programs among early adopters. Applying our conceptual model, we focus on the importance of contextual factors, creative solutions to logistical challenges prompted by necessity, the essential role of partners,

FIGURE 2
A conceptual model of factors that facilitate COVID-19 testing in K–12 schools

BOX 1
More about the elements of the conceptual model of COVID-19 testing in K–12 schools

National, state, and local factors (e.g., policies, champions, funding, guidance, and coordination among entities) affect schools' ability to implement COVID-19 testing. Ideally, these factors are coordinated across levels. Characteristics such as COVID-19 transmission rates in the community also influence how school and district leadership approach testing in their local context.

The **logistical requirements** of implementing testing in schools include the provision of tests and associated supplies, staff (whether trained to do nasal swabs or simply parent volunteers who hand out saliva test kits), space to collect and analyze samples, protocols and workflows to guide testing, and data management and reporting tools to monitor and respond to positive tests.

Partnerships with entities such as local public health agencies, academic institutions, vendors, and peer networks are shown in Figure 2 as supporting both logistical requirements (**feasibility**) and community engagement (**acceptability**). Partners provide technical assistance; help with logistics, staffing, and outreach; and systems for data management, reporting, and contact tracing.

Successful implementation of a COVID-19 testing program is contingent on **community engagement** to participate in testing. The logistics of the program (i.e., how it is designed and how well it operates) influence engagement, and the level of engagement informs adaptations and adjustments to the testing program as needed.

Testing is one of several important tools to facilitate safer in-person instruction in K–12 schools. For testing to be **effective**, it must be implemented in concert with other measures as part of **comprehensive COVID-19 response plans**. These measures include mask-wearing, physical distancing, handwashing, and enhanced ventilation.

strategies for increasing engagement in testing, and the use of testing as only one of many tools for making in-person instruction safer. In our profiles of early adopters in Part 2 of this report, we provide additional details about these facilitators, as well as key challenges, in the selected school, district, and state examples.

National, state, and local factors facilitated COVID-19 testing in schools.

Several federal policies and actions, as well as state policies, supported COVID-19 testing adoption. Other state-level factors that facilitated testing were that governors in several states championed school-based testing (e.g., Massachusetts, Texas); state governments provided funding to districts, schools, and testing vendors (e.g., Colorado); and state agencies coordinated in unprecedented ways to distribute BinaxNOW rapid antigen tests to schools, provide ready-to-use templated materials, and train school staff to administer tests (e.g., Utah, Missouri, Texas).

At the school and district levels, schools benefited from local champions (e.g., principals, teachers, superintendents, parents), and, in many places, coordination among the mayors' offices, local departments of health, local health systems, and other entities helped set the stage for COVID-19 testing in schools. Finally, school characteristics (e.g., size, independent versus public) played a large role in their ability to require testing for in-person instruction (e.g., Rye Country Day School in New York, One City Schools in Wisconsin), to cover the costs of testing from their operating budgets or Parent Teacher Associations (e.g., Hunter College Elementary School in New York), and to encourage widespread participation in screening testing programs. Box 2 summarizes many examples of these contextual factors that facilitated testing.

BOX 2
Examples of national, state, and local factors that facilitated COVID-19 testing

- **Policies:** The Coronavirus Aid, Relief, and Economic Security (CARES) Act required private insurance plans to cover costs of diagnostic testing.
- **Funding:** States and localities have used federal funding through the CARES Act to support COVID-19 testing in schools, including purchasing test supplies and hiring additional staff.
- **Resources:** The U.S. Department of Health and Human Services allocated millions of BinaxNOW rapid antigen tests to states for distribution in K–12 schools and other settings.
- **Guidance:** The Centers for Disease Control and Prevention (CDC) disseminated guidance on implementation considerations for COVID-19 testing in K–12 schools.[17]

- **Policies:** Statewide Clinical Laboratory Improvement Amendments (CLIA) waivers and statewide standing physician orders for screening testing allowed schools to conduct testing on school grounds.[18] New York state issued detailed COVID-19 testing policies for K–12 schools that required them to test a certain proportion of their in-person students and staff over a defined time period to help determine whether they could remain open for in-person instruction.[19] The Utah Department of Health allowed screening testing as an alternative to a statewide pause on high school extracurricular activities. This policy created demand for testing.
- **Champions:** Many state governors supported efforts to expand testing in K–12 schools, including prioritizing distribution of BinaxNOW tests to schools.
- **Coordination among state agencies**, such as departments of health, education, and emergency management, helped several states more effectively support schools to ramp up COVID-19 testing.
- **Funding, resources, and guidance:** Numerous state governments provided funding to districts and schools to support testing. State departments of health and education across the country assembled online repositories of ready-to-use materials: consent form and standing order templates, flyers, and letters to parents about testing.

- **Policies:** Some schools (especially charter and independent schools) required regular testing for in-person instruction.
- **Champions:** School and district leadership and staff worked nights and weekends and outside their regular roles to make testing possible. Many commented that running a testing program felt like a full-time job. In one district, a panel of voluntary local scientists, physicians, and committed parents helped establish a multidistrict collaborative that convenes regularly to share expert guidance and lessons learned around implementing testing in schools. Parent leaders at one elementary school felt so strongly about testing that they designed and run a twice-weekly Parent Teacher Association (PTA)–led screening program with the permission of the school administration.
- **Coordination:** In many localities, coordination among the mayor's office, the city or county department of health, local health systems, local universities, and other entities helped set the stage for COVID-19 testing in schools.
- **Funding and resources:** Many school districts used their annual operating budgets to cover the cost of testing; local foundations also helped some schools and districts pay for testing programs.
- **Characteristics and culture of schools:** Charter schools had flexibility to make decisions about requiring testing independently of a school district; independent schools had similar latitude, as well as significantly more resources to devote to testing. Better-resourced schools also benefited from parents who were able to be more involved in testing programs.

Early-adopter schools developed a variety of creative solutions to address the complex logistical challenges of testing.

Some schools took innovative in-house approaches by enlisting volunteers to assemble saliva test kits for at-home use or scanning barcodes on sample tubes. Others relied on partners, outsourcing much of the work. They experimented with finding the right place and time to collect samples from students and staff: at drop-off, at pick-up, during the school day in the classroom, or in a common area of the school, to name a few. Schools had to streamline their consent procedures and adapt them if needed when they shifted to remote learning or found that parents struggled to access consent forms through online portals. In addition, many schools, particularly independent schools, developed systems to manage testing data and report results to state and local health authorities. Other schools leveraged state data management systems or custom-built data platforms that handle the entire testing workflow (e.g., Primary.Health [https://primary.health], Project Beacon [https://www.viget.com/work/project-beacon]). Box 3 provides examples of creative solutions to logistical challenges of testing.

Early adopters found it critical to partner with local public health departments, local health systems, academia, their peers, and vendors to launch their COVID-19 testing programs.

Partnerships with local public health departments provided schools with numerous supports to implement COVID-19 testing. Several school districts partnered with local health systems, which provided staff to administer tests and managed the testing workflow. In other cases, academic medical centers conducted pilot research studies in local schools that helped get testing programs off the ground, gradually overcome resistance to testing, and work out the logistical details. Another type of partnership schools relied on to launch COVID-19 testing were peer networks. For instance, a multidistrict collaborative of more than 20 greater Boston-area districts meets regularly to share expert guidance and lessons learned. Finally, partnerships with vendors or purveyors (e.g., COVIDCheck Colorado) helped schools by outsourcing the many logistics of testing. Box 4 summarizes insights from schools, districts, and states on partnerships that were particularly helpful for launching testing in the K–12 setting.

BOX 3
Examples of how schools addressed the logistics of COVID-19 testing

- **Tests:** Some schools value the 15-minute turnaround time for results and ease of use of BinaxNOW rapid antigen tests, while others find take-home saliva tests to be convenient and minimally disruptive to the school day. Ensuring that students remember to bring in their samples on the correct day has been a challenge. Many schools implemented backup plans, whereby students who forget their saliva sample can provide a specimen upon arrival to school.

- **Staff:** Schools have enlisted parents, volunteers, substitute teachers, bus drivers, medical and nursing students, and older students to assist with testing logistics, such as assembling saliva test kits for at-home use. Others have relied on partners, outsourcing the work.

- **Facilities:** Finding the right place and time to test are key considerations for schools implementing screening testing. At drop-off, at pickup, during the school day in the classroom, in a common area of the school—each comes with its own advantages and limitations. In one district, staff initially deployed a "testing cart" to make rounds to different classrooms so students could provide their samples, but this district later switched to a staged dismissal in which one class at a time goes to a "testing hub" in a low-traffic area of the school.

- **Protocols:** After realizing that online scheduling and consent forms were a barrier for families less comfortable with technology, some districts were working on streamlining their protocols to require only a one-time consent for regular COVID-19 testing rather than asking parents to log in to an online portal, authorize testing, sign a consent form, and sign a Health Insurance Portability and Accountability Act (HIPAA) waiver each time their child is tested.

- **Data management and reporting:** Schools have developed a variety of ways to most efficiently manage their testing data and report results to state and local health departments. An Illinois district, New Trier, is an exemplar of a detailed, transparent data dashboard (https://www.newtrier.k12.il.us/RAB). Many schools, particularly independent schools, have developed their own online data reporting systems; other schools have been able to leverage state data management systems or end-to-end customized data platforms. Some schools designed their programs so that the partnering laboratory provides test results directly to school administrators, then school staff (e.g., nurse, family liaison) communicate the result to the individual.

Early adopters encountered varying degrees of resistance to testing and used a number of strategies to engage their communities.

Schools with whom we spoke experienced a variety of reactions to COVID-19 testing, from near-universal enthusiasm to widespread skepticism from staff or parents. School leaders commented that privacy concerns were a common reason for hesitation to be tested: Staff and parents were worried about their health information being shared with others. Relatedly, members of school communities expressed concern about how their samples would be used, wanting to make sure that they would not be saved or studied without their consent. Another common barrier to participation was doubt about the actual danger posed by COVID-19. District leaders also heard from students and staff that they were hesitant to get tested because of the stigma of COVID-19 and the burden of isolating and missing work or school because of a positive test. Finally, some school leaders encountered parents who were uncomfortable with a medical procedure (albeit a simple one) being performed on school grounds, sometimes by school staff rather than medical professionals. In Box 5, we provide a range of examples of how schools, districts, and states approached engaging their communities and overcoming these barriers to testing.

Nearly all of the district and school leaders we interviewed stressed the importance of using testing as one of several tools to facilitate safer in-person instruction.

Leaders described using a "Swiss cheese mitigation strategy," which refers to layering different measures on top of one another for maximal effectiveness. They universally viewed testing as one of several tools in their toolbox, and several noted that testing served as a helpful reminder to adhere to safety protocols that schools had put in place. Box 6 provides insights from schools and districts on how they integrated COVID-19 testing into their broader planning for safe in-person instruction.

BOX 4
Examples of partnerships that facilitated COVID-19 testing

- **Partnerships with local public health departments** helped schools communicate with their communities about the value of testing and respond to positive tests with contact tracing, quarantines, and other public health measures.

- **Partnerships with local health systems and academia:** Several school districts (e.g., San Diego Unified School District) partnered with local health systems, which provided staff to administer tests and managed the testing workflows, including handling the consent process and reporting of results. In One City Schools in Madison, Wisconsin, an academic medical center conducted a pilot research study that helped launch testing; then the researchers handed over the programs to One City Schools to continue the program.

- **Networks among peers** helped schools to learn from each other and to navigate challenges. For example, a multidistrict collaborative in the greater Boston area (the Safer Teachers, Safer Students: Back-to-School SARS-CoV-2 Testing Collaborative Pilot) convened regularly to share expert guidance and lessons learned around implementing testing in schools.[23] In Illinois, a consortium of approximately 40 school districts met weekly to exchange ideas about mitigating the risk of COVID-19 transmission in their schools. A network of independent schools in the Washington, D.C., area collaborated with higher education institutions to establish a shared mobile testing lab.

- **Partnerships with vendors or purveyors** have helped schools by outsourcing the immense logistical challenges of testing. COVIDCheck Colorado, an innovative vendor for the state of Colorado, provides a "soup to nuts" testing service that has made COVID-19 testing scalable for districts. It also provided hands-on and on-demand technical assistance for school and district leaders. The superintendent of one Colorado district reported exchanging daily text messages with her COVIDCheck Colorado client manager.

BOX 5
Examples of strategies for community engagement

- **A "listening period":** State, district, and school leaders emphasized the importance of a "listening period" before implementing testing programs to understand and address concerns and engage key stakeholders, including parents, teachers, other staff, and school administrators.

- **Piloting first:** Many schools and districts first piloted their testing programs on a small scale to gradually build acceptance and work out the logistics before ramping up. One district found that "getting it right" and having positive word-of-mouth reviews of the testing experience convinced members of the school community who may have had reservations about COVID-19 testing to participate.

- **Maximizing convenience:** Convenience, timely results, and minimally invasive tests were all key considerations in the design of testing programs, along with cost and staffing requirements. Many schools modified their testing programs based on feedback from the school community (e.g., extended hours at off-campus testing sites led to more engagement).

- **Frequent communication and updates, including sharing data on testing:** School leadership spoke with parents at drop-off and pickup, held regular "town hall"–style meetings, distributed newsletters, displayed flyers and banners promoting testing programs, and shared aggregated test results on data dashboards. Districts found that these dashboards motivated their school communities to participate in screening testing because identifying asymptomatic COVID-19 cases motivated support for testing.

- **Effective messengers:** Schools found that the most effective messenger about the value of COVID-19 testing was often a parent champion. Some schools designated certain parents to be those champions and equipped them with the tools they needed to address COVID-19 testing concerns of the school community, from answers to frequently asked questions to suggested phrases for one-on-one discussions. PTAs hosted regular "office hours" to share information about COVID-19 testing.

- **Incentives:** When given a choice between remote learning or attending in person through testing, many families preferred to test. For example, when two high schools in Utah had to switch to remote learning because of COVID-19 case clusters, more than 70 percent of students opted into screening testing as a way to return to in-person instruction. One district in Illinois encouraged staff participation in testing with a policy that they would not have to use their benefit time for a COVID-19-related illness as long as they were tested through the district's testing program. In a Colorado district, the superintendent sent principals the data on their school's participation rates in staff screening testing and compared them with rates in other district schools. When principals saw that participation ranged from 20 to 90 percent, those with lower participation rates were highly motivated to improve.

BOX 6
Examples of integrating testing into comprehensive COVID-19 planning
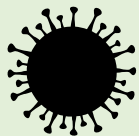
- **Layering measures:** Nearly all the districts and schools we interviewed emphasized the importance of using testing as one of several tools to facilitate safer in-person instruction. They described testing as one of several "layers" of mitigation strategies, as a tool in their toolbox, and as a way to encourage safer behaviors both inside and outside of school.

- **An example of integrating testing in an overall COVID-19 plan:** Synapse School, an independent school in Menlo Park, California, provides an exemplar of an evidence-based, comprehensive, and clearly communicated plan for returning to campus safely.[24]

Benefits of implementing COVID-19 testing in schools

Interviews with early adopters and quantitative data they shared shed light on three main benefits of COVID-19 testing for schools: (1) providing a sense of safety among staff and families, (2) identifying and isolating asymptomatic cases, and (3) maximizing in-person instructional time.

Providing a sense of safety among staff and families

Almost all the district and school leaders with whom we spoke said that their screening testing programs made staff and families at their schools feel safer and lessened their anxiety about in-person instruction. They described how testing provides "tremendous peace of mind" and "great confidence for staff." Another school leader stated, "After some initial reluctance to the testing, [due to] concern over privacy matters, the overwhelming response has been positive. It gives our community a sense of security and comfort that we are staying ahead of the virus."

In addition to the perspectives that school and district leaders shared, a few leaders provided data from surveys of staff and parents that gauged how screening testing affected their sense of safety. For example, in the Wellesley Public Schools district in Massachusetts, district leaders surveyed both parents and staff about implementing screening testing at various points during the fall of

2020. Among other findings, their survey results indicated that only 12 percent of staff and 39 percent of parents felt mostly or very comfortable returning to school without baseline screening testing at the start of the year; 82 percent of staff and 87 percent of parents felt reassured after baseline screening testing was implemented.[20] In another example in the Westminster Schools, an independent school in Georgia, school leaders reporting that after implementing screening testing, they saw a 30 percent decrease in surveyed faculty who reported feeling "worried" or "very worried" about in-person instruction. In the same time period, there was a 38 percent increase in the "cautiously optimistic" and a 9 percent increase in the "optimistic" categories. While these are anecdotal data points, they support the perceptions of leaders we interviewed that screening testing increased feelings of safety in their school communities.

Identifying and isolating asymptomatic cases

Schools also implemented screening testing to identify and isolate individuals with asymptomatic COVID-19 infections and break the chain of transmission. As shown in Figure 3, across the five school districts that we profiled that had implemented regular (at least weekly) screening testing of most staff and students and that shared their data with us, screening testing identified about 44 percent (153 out of 345) of all COVID-19 cases reported to the districts. In the absence of screening testing, these cases would likely have been identified later or not at all. However, while screening

FIGURE 3

Proportion of reported COVID-19 cases that were identified through school screening testing versus other testing in five selected districts
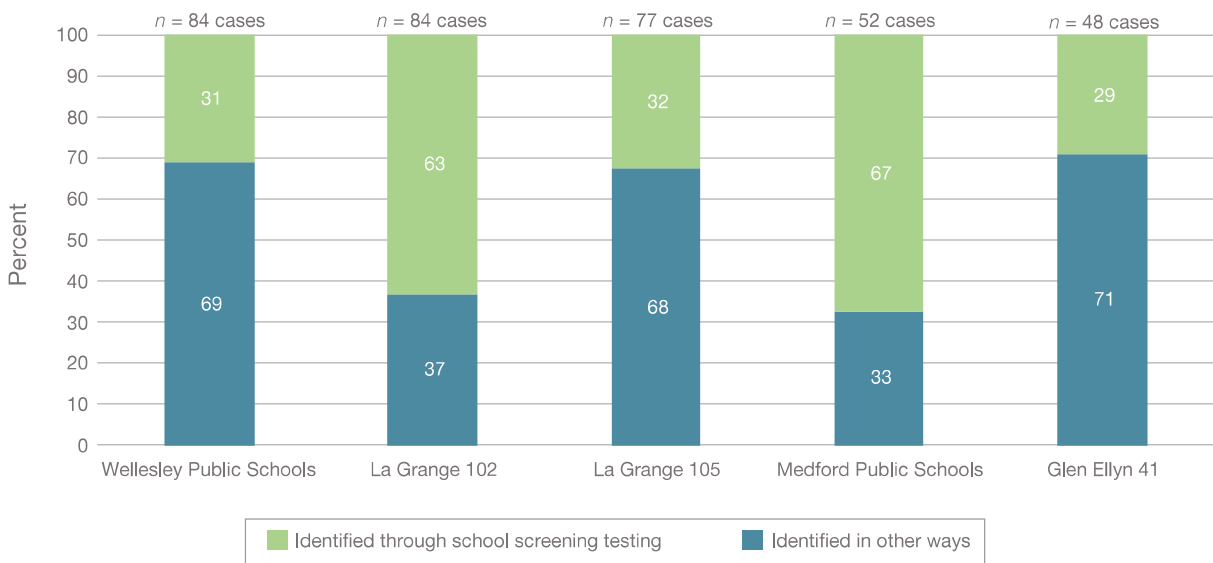
NOTES: Data include all reported staff and student cases in each district since the start of regular screening testing. Cases identified in other ways include those found through school-based diagnostic testing, as well as cases identified outside of school-based testing, including during weekends and holidays.

testing reduced the number of infected individuals attending schools in-person, we lack data to evaluate whether proactively identifying and isolating these cases also decreased in-school COVID-19 transmission rates. Analyses that have modeled the predicted impact of weekly screening testing indicate that the practice should substantially reduce transmission,[21] with the largest benefits expected when test results are returned rapidly.[22]

The proportion of total cases identified through school screening testing in these districts ranged from 29 percent to 67 percent. This variation may stem from the availability of diagnostic testing in the school and community, participation rates in school-based screening testing (which in these districts ranged from 60 to 90 percent, averaging around 75 percent), how reliably staff and parents notified schools of cases, the age of students participating in screening testing, and other factors.

Maximizing in-person instructional time

Of course, screening testing cannot eliminate the risk of COVID-19 transmission in schools. Rather, schools that implemented screening testing reported using testing data as one of multiple factors—usually including community-level case counts and positivity rates—that informed whether and the degree to which they would offer in-person learning. Leaders from several districts and schools also said their screening testing programs were a prerequisite for offering the option of in-person instruction. A school leader advised: "Do it. It's critical to health and safety and provides data to drive decisionmaking, instead of relying on a great unknown. It also signals to your community how much you care about them." Another school leader described the value of testing for keeping the school open: "In a period of rising case numbers in the region, I don't think we'd be able to maintain in-person learning without regular testing, either because of community anxiety or actual cases in our midst."

Many school and district leaders in contexts that were not implementing regular screening testing nevertheless noted the value of having access to rapid diagnostic testing to help maximize in-person learning time in schools. School and district leaders described the common practice of quarantining individuals with symptoms consistent with COVID-19 as very disruptive to in-person instruction. Rapid testing of students and staff with potential COVID-19 symptoms allowed schools and districts to avoid quarantining a large majority of these individuals while awaiting confirmatory PCR tests or for the full quarantine period. For additional discussion of this topic, see the profile of Marshall and Prairie-Hills school districts.

Costs of testing

Despite the compelling benefits of implementing COVID-19 testing in the school setting, cost was one of the most significant barriers for early adopters. Many aspects of testing contributed to costs, including purchasing test kits and related test materials, acquiring personal protective equipment (PPE) to administer tests safely, transporting samples to laboratories, and a variety of labor costs that are difficult to quantify. In our interviews with district and school leaders and in reviewing their testing program documentation, we were not able to itemize these costs. Moreover, costs related to COVID-19 testing change frequently as supply fluctuates, technology advances, and negotiated payments are modified. Despite these limitations, interviewees provided insights on key drivers of COVID-19 testing costs as of December 2020. Here we focus on two types of costs: (1) costs of tests and their analysis and (2) labor costs.

Costs of tests—inclusive of the test kit and its analysis, but not the time spent on sample collection—varied widely based on test type, how the test was analyzed, and the source of the test. Schools and districts that were larger and/or part of strong networks often reported having access to lower-cost options than smaller entities. At one end of the cost spectrum, representatives from state departments of health cited the anticipated "market rate" for a state agency purchasing BinaxNOW rapid antigen tests (when not provided by the federal government) to be approximately $5 per test. In contrast, some schools and districts that we spoke with purchased PCR tests for about $20 to $30 per test, while others described substantially higher costs (e.g., $50 to $130 for a PCR test run by a local laboratory). Pooled-sample PCR tests were more cost-effective (e.g., $12 to $30 per test), according to those we interviewed.

Labor costs include time spent managing testing programs, preparing test kits, administering tests on school grounds, and/or collecting saliva samples that students and staff brought in from home. Districts also described spending many person-hours managing data related to testing, keeping data dashboards updated, communicating with their school communities about testing in general, reporting results to state and local public health authorities and assisting with contact tracing, and notifying individuals with positive tests.

The early adopters we interviewed were not able to estimate labor costs with any precision, but they noted that the costs were substantial, accounting in some cases for an estimated one-half to two-thirds of their total testing costs to date. The early adopters universally observed that the time required to prepare test kits and/or administer tests was a major challenge, and many of them hired additional staff, outsourced sample collection activities to a local health system or other testing service (although the range of prices that such services charged was not available to us), or relied on parent volunteers or health professional student volunteers. However, the latter approach was not viewed as sustainable or scalable to other contexts.

Discussion and recommendations

The early adopters profiled in Part 2 of this report, and other districts and schools that we identified through our national scan, illustrate the complexity of implementing COVID-19 testing in K–12 schools. Even for the most well-resourced districts and schools, testing is a major undertaking. The experiences of early adopters of COVID-19 testing during the fall 2020 semester show that schools *can* implement testing and *can* operate safely, but significant investments are required to make that possible. Launching a testing program requires time and funding, engaging school communities to participate, communicating frequently and transparently, navigating new workflows and partnerships, complying with regulations such as CLIA and HIPAA, establishing new data systems, and a commitment to be flexible and adapt along the way.

As described in the previous chapter, schools, districts, and states provided insights about *what they need* to make COVID-19 testing feasible, acceptable, and more effective. Table 3 summarizes these insights, and Part 2 of this report explores them in greater detail.

In light of our findings around key facilitators of testing among early adopters, we also offer recommendations for policymakers to consider as they seek to support COVID-19 testing in schools (Table 4).

Our national scan and the selected districts, schools, and states that we profile in Part 2 of this report demonstrate just how much school communities value in-person learning and the lengths they are willing to go to make it safer for students and staff alike. Implementing COVID-19 testing programs in schools comes with costs and complexities to consider, yet the early adopters we profile in Part 2 demonstrate that testing *can* be effectively integrated into schools' COVID-19 response plans and that it helps families and staff feel comfortable participating in in-person instruction. The United States is poised to devote significant resources to safely reopening most schools in early 2021, and there is no time to waste in learning from early adopters of COVID-19 testing, spreading and scaling their most promising practices, and ensuring that testing programs are tailored to local contexts and needs. Maximizing safe in-person instruction will have significant, long-lasting benefits for children, teachers, schools and districts, families, and the broader community.

TABLE 3
What schools need to implement feasible, acceptable, and more effective COVID-19 testing

COVID-19 testing is most feasible when schools:

- Do not have to recreate the wheel and instead get financial resources, tools, and guidance from national, state, and local levels.
- Do not have to go it alone and can rely on partnerships to help them figure out the complex logistical requirements of testing.

COVID-19 testing is most acceptable when schools:

- Take time to plan and listen to concerns from their communities and design testing programs that are a good fit for their local contexts.
- Clearly communicate the goals and process of testing to their communities, and check in regularly with the school community to ensure they are addressing their questions.
- Draw on internal and/or external scientific expertise to communicate up-to-date and accurate information to engender trust among the school community.
- Maximize convenience for participants.
- Start small and learn as they go.
- Implement a variety of strategies to engage the school community in testing (e.g., parent champions, promoting testing as a social norm, linking testing to in-person instruction or extracurricular activities).

COVID-19 testing is most likely to achieve its intended goals when schools:

- Use data management and reporting tools to track key performance metrics for testing.
- Collaborate with local public health departments to respond appropriately to positive tests.
- Integrate testing into comprehensive COVID-19 response plans that emphasize "layering" of different strategies, a sense of shared responsibility, and adaptability.
- Design COVID-19 testing programs with an explicit focus on equitable access.

Our findings suggest important areas for future exploration:

1. continuing to investigate the degree of in-person COVID-19 transmission in schools and the extent to which frequent screening testing can mitigate transmission

2. systematically examining the costs of different COVID-19 testing models and the financial sustainability of testing programs as they become more common around the country

3. improving on existing performance metrics that districts and schools are currently collecting, making them more standardized, higher quality, accessible, and useful for decisionmaking, potentially through incentives and a common data platform

4. rigorously adapting implementation lessons from highly resourced school settings to under-resourced schools and districts with a single-minded focus on equity

5. exploring how lessons learned from engaging school communities in testing might be applied to COVID-19 vaccine confidence and acceptance.

Policy momentum is growing to dramatically expand screening testing in K–12 schools. Massachusetts, for instance, recently committed to begin offering weekly screening testing to schools statewide. In addition, as noted previously, The Rockefeller Foundation and Skoll Foundation have published a testing "playbook" that provides detailed guidance to districts and schools on how to set up testing programs.[25] By building on the important insights and implementation lessons from the early adopters of COVID-19 testing in schools, our country can tackle the challenge of reopening K–12 schools with the urgency it deserves.

TABLE 4
Recommendations for policymakers to support COVID-19 testing in schools

To support feasible COVID-19 testing in schools, policymakers can:

- Expand federal and state funding for screening testing in schools to pay for tests and associated materials, to hire needed staff (e.g., more school nurses and testing program managers), and to contract with vendors for logistical support.
- Continue to streamline requirements (e.g., CLIA certification waivers) to reduce barriers for schools to implement testing.
- Convene learning networks of state, district, and school leaders to share promising practices.
- Continue to invest in research and development of testing solutions that are convenient to administer and that can relieve the logistical burden on schools of sample collection.

To support schools in making COVID-19 testing acceptable to their communities, policymakers can:

- Convey clear, consistent, and science-based messages around the risk of COVID-19 transmission in schools and how testing can help to mitigate that risk.
- Provide incentives (e.g., paid leave) for teachers and families to be tested and to isolate if infected.
- Build on existing guidance around the range of potential testing program designs (e.g., frequency of testing, times of days, locations on campus) to help school and district leaders identify an approach that makes the most sense for their context.[26]

To support schools to implement COVID-19 testing programs that achieve their intended goals, policymakers can:

- Enact policies to expand laboratory capacity and access to tests that can provide rapid turnaround of test results.
- Provide practical, concrete guidance as knowledge evolves about how best to use testing to help mitigate the risk of COVID-19 transmission in schools.
- Establish state and regional technical assistance networks for schools and districts to access as they design and implement their testing programs.
- Promote the use of standardized metrics (i.e., key performance indicators) and of robust data and reporting platforms to support decisionmaking.
- Provide resources to strengthen state and local public health departments, ensuring they are equipped to help schools and districts respond appropriately to positive tests.

Part 2: Profiles of Early Adopters

Introduction

In this part of the report, we apply our taxonomy of testing approaches and conceptual model of facilitators to ten profiles of early adopters of COVID-19 testing in K–12 schools (Table 2). These profiles provide insights and implementation lessons for other districts and schools looking to develop testing programs for their school communities. They each follow a similar structure and address several key questions about the experiences of schools, districts, and states with implementing COVID-19 testing:

- How does the testing program work?

- How are test results reported and acted on?

- What investments are needed to implement testing?

- How does the school, district, or state engage the community to participate in testing?

- What challenges have schools, districts, and states had to overcome along the way?

- What were the early results of the testing program?

From the large number of impressive and inspiring early adopters, we selected a purposive sample of schools, districts, and states that (1) represent a wide range of internal and external contexts (e.g., public, charter, and independent schools of varying sizes; in states with and without statewide testing policies for schools); (2) are geographically and socio-demographically diverse; (3) faced a variety of implementation challenges; and, since there is no "one size fits all" strategy, (4) have implemented different approaches to COVID-19 testing.[27] We note that the entities we profile here are not a nationally representative sample of K–12 schools overall or of schools that conduct COVID-19 testing, as our purposive sample was intended to highlight lessons learned from early adopters. In addition, these profiles do not cover six pilot cities that are using BinaxNOW tests in their schools as part of a partnership with The Rockefeller Foundation and the U.S. Department of Health and Human Services.

TABLE 2

Characteristics of COVID-19 testing approaches in selected K–12 districts and schools and key facilitators of testing: application of the taxonomy and conceptual model

	Characteristics of COVID-19 testing approaches							Facilitators of testing				
	Opt-in or required to attend	Who is tested	Testing purpose (frequency)	Sample type	Where sample is collected	Where sample is analyzed	How sample is analyzed	State factors	Local factors	Logistics	Engagement	Partners
Marshall Community Unit SD (IL)	Opt-in	Both	Diagnostic	Nasal swab	School	On-site	Rapid antigen detection assay	●	●			
Prairie-Hills SD (IL)	Opt-in	Both	Screening (intermittent)	Nasal swab	School	On-site	Rapid antigen detection assay	●	●			
Utah schools/districts in state's BinaxNOW program	Opt-in	Both	Varies	Nasal swab	School	On-site	Rapid antigen detection assay	●		●		
Texas schools/districts in state's BinaxNOW program	Opt-in	Both	Varies	Nasal swab	School	On-site	Rapid antigen detection assay	●		●		
Missouri schools/districts in state's BinaxNOW program	Opt-in	Both	Varies	Nasal swab	School	On-site	Rapid antigen detection assay	●		●		
San Diego Unified SD (CA)	Opt-in	Both	Screening (Twice monthly)	Nasal swab	School	Off-site	PCR		●			●
Del Mar Union SD (CA)	Required	Staff	Screening (Twice monthly)	Nasal swab	Off-site	Off-site	PCR		●			●
Medford Public Schools (MA)	Opt-in	Both	Screening (Weekly)	Nasal swab	School	Off-site	PCR		●			●
Westminster Public Schools (CO)	Opt-in	Both	Screening (Twice monthly)	Nasal swab	School, clinic, testing site	Off-site	PCR		●		●	●
La Grange 102, La Grange 105, Glen Ellyn 41, and Riverside 96 SDs (IL)	Opt-in	Both	Screening (Weekly or twice weekly)	Saliva	Home or school	Off-site	RT-LAMP		●		●	●
One City Schools (WI)	Required	Both	Screening (Twice weekly)	Saliva	Home	On-site	RT-LAMP		●	●	●	
Rye Country Day School (NY)	Required	Both	Screening (Weekly)	Saliva-Pooled	Home	Off-site	PCR		●		●	
Hunter College Elementary School (NY)	Opt-in	Both	Screening (Twice weekly)	Saliva-Pooled	Home	Off-site	PCR	●	●		●	

We organize these ten profiles by type of specimen collected (nasal swab or saliva) and by how the test is analyzed. The first set of profiles consists of districts and states performing rapid antigen tests on nasal swab specimens; next are districts using PCR-based tests on nasal swab specimens. We then move to a set of public school districts and a charter school using a saliva-based RT-LAMP test; we conclude with two schools using pooled PCR testing on saliva samples. Some of the profiles tell the story of a single district, school, or state, but many integrate the experiences of several of these entities to emphasize their similarities and differences. For example, one profile focuses on San Diego Unified School District and includes important insights from a nearby district, Del Mar Union.

We aim to provide enough detail of the "nuts and bolts" of their testing approach to paint a picture of *what* they have implemented, and, as noted previously, we focus on a few big-picture questions around *how* they launched COVID-19 testing. Finally, while the available data from testing programs vary across the individual profiles, we briefly summarize the *results of testing* to date in each case.

Table 2 shows the characteristics of testing approaches taken by the profiled schools, districts, and states. The icons in the rightmost columns correspond to the facilitators of COVID-19 testing that we highlight in each profile. Importantly, while each early adopter provides insights and implementation lessons that address several, if not all, of the facilitators of COVID-19 testing in schools, we emphasize the most noteworthy facilitators in each case.

Testing in two pilot districts in Illinois

"You have to know your community"

State Factors

Highlights:

The state-led pilot program provided resources and guidance and convened the pilot district's leaders to share insights.

Local Factors

Even with state support for testing programs, implementation can be challenging. Each district implemented the approach it felt was the best fit for its community.

About the districts[28]

Marshall Community Unit School District C-2 (Marshall, Illinois)

- Grades PreK–12, public school district
- 4 schools; 94 teachers
- 1,286 students; 37% eligible for free or reduced lunch; 1% black or Hispanic
- Instructional model in fall 2020: Voluntary in-person

Prairie-Hills Elementary School District 144 (Markham, Illinois)

- Grades PreK–8, public school district
- 8 schools; 207 teachers
- 3,052 students; 95% eligible for free or reduced lunch; 83.2% African American, 12.7% Hispanic
- Instructional model in fall 2020: Hybrid

Overview and context

The federal government began distributing BinaxNOW rapid antigen tests to states in October 2020. Illinois set aside tests for several priority groups, including a set of pilot school districts serving under-resourced communities.[29] Six pilot districts, including Marshall and Prairie-Hills, began using the tests in November as an additional mitigation tool to reduce COVID-19 transmission risk and help staff and students feel safe to attend school in-person. The Illinois Department of Public Health, in collaboration with the Illinois State Board of Education, provided the BinaxNOW tests, as well as guidance and support for districts that were under-taking the pilot. As of mid-December, the state was preparing for a second phase of piloting with 40 school districts.

School districts chose the BinaxNOW approach because they could obtain free tests that provided quick information about whether symptomatic students or staff likely had COVID-19. The state has been exploring other testing options, including saliva testing and the Shield T3 testing system developed by the University of Illinois.[30] According to state officials, the latter had not been approved by the Food and Drug Administration (FDA) at the time of data collection for this report but is being explored as an option for school districts upon its approval. State officials consider BinaxNOW to be more scalable than other approaches because tests are run on-site and results are available in minutes.

How does the testing program work, and how are test results reported and acted on?

School nurses administer tests to symptomatic individuals within each district, and results are available within 15 minutes. In Prairie-Hills, the superintendent informs individual parents or staff about a positive result, emails the district leadership, and then ensures that the district's COVID-19 dashboard is updated. In Marshall, the superintendent informs parents or staff of positive results, but as of December 2020 the district did not have a public dashboard. Instead, the superintendent provided a weekly radio report of testing results. School districts reported all test results to the Illinois Department of Health and also reported positive results to the county health department.

ABOUT THE TESTING PROGRAMS

Who: Staff and students who opt in

How often: Diagnostic testing when symptoms are present, and, in Prairie-Hills, intermittent screening

Sample type: Nasal swab

Where and how analyzed: On-site, rapid antigen testing

Spotlight on partnerships

State officials involved in the pilot meet with districts regularly, and the State Board of Education liaison spoke with district staff almost daily. Both superintendents with whom we spoke noted that they particularly appreciate the biweekly meetings with other pilot districts, where they could ask questions and gather information on testing approaches, especially given how rapidly knowledge is evolving about COVID-19. The state created a checklist of action items for any district that is undertaking the BinaxNOW testing, reflecting lessons learned through the state's collaboration with the six pilot districts. Finally, one superintendent noted that the state was "instrumental" in helping the district to get a standing order from the local public health department to administer tests.

In the Prairie-Hills district, educators began intermittent schoolwide screening testing (with more than 90 percent of staff and students participating) using the BinaxNOW tests, implemented for the first time after the Thanksgiving holiday. As of December 2020, additional screening testing was scheduled for January 2021.

Investments needed to implement testing

Districts did not have to pay for the BinaxNOW tests because they were provided by the state through a federal allotment of tests. State officials reported providing PPE for school staff administering the tests (e.g., gowns, surgical masks, N-95 masks, and gloves). District leaders also noted purchasing at least some PPE to ensure that testing was not delayed because of backlogs of available equipment.

One superintendent provided a stipend to the head school nurse for conducting symptomatic testing, as well as to the other school nurses doing screening testing after the holidays and to a staff member assigned to do contact tracing. However, stipends were not being provided in all pilot districts for staff undertaking these tasks.

In addition to investments required by those individuals actually conducting the tests, it was clear from speaking to superintendents that they and/or other district administrators have spent significant time planning the testing program, including consulting with their legal counsel and school boards, completing CLIA Certificates of Waiver, obtaining standing orders from a local public health depart-

ment or physician, training staff who will be performing the rapid tests, acquiring the necessary PPE, creating and gathering parent/staff consent forms, and reporting results, among other tasks.

"If we build it, will they come?" How do districts engage their communities in testing?

The superintendents of these two districts acknowledged the importance of thoughtful communication with parents and staff about the goals of testing and how it would work. One of the superintendents noted that they initially erred by reaching out to staff about the BinaxNOW testing approach via email. Staff meetings would have been preferable, she acknowledged, because staff had so many questions about testing and initially resisted the idea. The same superintendent—as well as state officials—noted the importance of stressing to staff the voluntary nature of the program. In addition, superintendents noted that their communication strategies and testing approaches varied because of differences between the school districts: "You have to know your community." For example, one superintendent chose to use BinaxNOW tests only for symptomatic cases because they didn't think the community would "stand for" screening testing.

What other challenges had to be overcome?

This section describes additional challenges the districts and state officials described in implementing the pilot BinaxNOW testing programs and discusses how they were addressed.

Incentivizing participation

Several state officials involved in the BinaxNOW pilot program mentioned how critical it was to ensure that staff were supportive of testing. According to these officials, one pilot district incentivized staff to participate in testing with a policy that meant they did not have to use their benefit time (i.e., capped sick time) for a COVID-19 related illness as long as they were tested through the district's BinaxNOW program.

Coordination across state and local partners

Another challenge mentioned by state officials was collaboration between districts and local public health departments. In Illinois, there are 96 local public health departments, each of which decides how to collaborate with school districts. As the official noted, local public health departments have varied in how they work with school districts. For instance, some have provided standing orders for testing, but others have not.

In the Prairie-Hill pilot district that conducted screening testing after the Thanksgiving holiday, they detected 7 cases among staff (out of around 400 screened), which may have saved 2,100 days of in-person instruction.

State officials also mentioned the regulatory challenges involved in testing. One official observed that the federal government could have waived the need for CLIA waivers and issued a national standing order. However, because that did not occur, districts had to work individually with their state government to address regulatory issues regarding use of the BinaxNOW tests.

What were the early results of the testing programs?

Illinois state officials have been estimating the number of in-person instructional days saved through the BinaxNOW pilot program. With diagnostic testing, they believe that each negative rapid antigen test result corresponds to two days of in-person instruction saved, plus additional days for siblings or close contacts who might also have had to quarantine due to exposure while awaiting a negative confirmatory PCR test. By this calculation, state officials estimated that in just the first two weeks of symptomatic testing across all six of the districts participating in the pilot, a combined total of 163 negative results (along with 6 positive results) resulted in 326 days of in-person instruction saved, not including sibling(s) or other close contacts.

Similarly, for the screening testing of staff, state officials assume that each staff member comes into contact with 30 individuals a day, who would then need to quarantine in the event of exposure. Therefore, assuming that staff who test positive have not yet exposed others, each positive test identified through asymptomatic screening saves an estimated 300 days of in-person instruction (30 people × 10

school days of quarantine avoided each). By this calculation, in the Prairie-Hill pilot district that conducted screening testing after the Thanksgiving holiday, they detected 7 cases among staff (out of around 400 screened), which may have saved 2,100 days of in-person instruction.

These estimates rely on simplified assumptions (e.g., that every staff member with a COVID-19 infection would have developed symptoms and been diagnosed, thus requiring their students to quarantine). Nevertheless, they speak to an important benefit of rapid, convenient test results.

The last word

One state official said the most important recommendation to give other states is, "as much as you can, have your superstar districts . . . talk with each other," because they noted that district administrators are most receptive to advice from other administrators.

For more information:

Marshall CUSD C-2 website:
https://www.marshall.k12.il.us/

Marshall CUSD C-2 overview of COVID testing (includes student permission waiver):
Kevin Ross, "Optional School Co-Vid Testing Available," webpage, November 30, 2020:
https://www.marshallk12.net/article/357381?org=marshall-community-school-district-c2

Prairie-Hills Elementary School District (ESD) 144 website:
https://www.phsd144.net/

Prairie-Hills ESD 144 COVID-19 data dashboard:
https://infogram.com/prairie-hills-esd-144-covid-19-dashboard-1h7j4dq9z7716nr

Illinois Department of Public Health, "Local Health Department BinaxNOW Allocation Guidance," webpage, October 21, 2020:
https://www.dph.illinois.gov/sites/default/files/20201207_IDPH_AntigenTestingBinaxNow.pdf

Overview and context

As most schools reopened for in-person instruction in Utah in fall 2020, the Utah Department of Health (UDOH), with support from researchers from the University of Utah's Health and Economic Recovery Outreach (HERO) project,[31] observed that COVID-19 rates were higher among youth 15–24 years old than among younger students; high school students were deemed to be at a greater risk for COVID-19 transmission than junior high and elementary school students. After the federal government committed to providing a stable (although limited) supply of BinaxNOW tests earmarked for K–12 schools, UDOH prioritized distributing tests to high schools throughout the state and developed testing programs targeting high school students. Through two policies known as "Test to Play" and "Test to Stay," UDOH and its partners have been successful not only in distributing rapid antigen BinaxNOW test kits to school districts, but also in enlisting a large number of high schools statewide to begin implementing on-site COVID-19 testing at scale.[32]

How do the testing programs work?

In November 2020, UDOH piloted the Test to Play and Test to Stay policies. Test to Play requires students and staff to be tested regularly to participate in high school extracurricular activities, including athletics (provided they have no COVID-19 symptoms and are not in quarantine). Test to Stay provides students who test negative in schools with

COVID-19 case clusters the option to continue to receive in-person instruction, as an alternative to requiring remote instruction for all students for 14 days.

Before implementing these policies statewide, UDOH collaborated with a range of partners across Utah to assess the policies' feasibility (see sidebars for more detail on their pilot programs). UDOH staff reflected that piloting and streamlining the logistics of mass testing was key in preparing to launch a statewide implementation of the Test to Play and Test to Stay policies. Through the pilot programs, Utah partners demonstrated—both to themselves and the public—the feasibility of testing students and staff at scale

ABOUT THE TESTING PROGRAMS

Who: "Test to Play" tests staff and students involved in extracurricular activities. "Test to Stay" tests students in schools with COVID-19 case clusters.

How often: "Test to Play" testing is every two weeks. "Test to Stay" is a one-time screening.

Sample type: Nasal swab

Where and how analyzed: On-site, rapid antigen detection assay using BinaxNOW tests

> **"The test is easy but beyond that, it's parent consent and what do you do with the kids whose parents don't consent. . . . And the data entry . . . it's work. Not impossible, but work."**

and learned valuable lessons about the logistics and support needed to implement testing in schools.

Following the success of the pilot programs, UDOH began to implement Test to Play in November 2020 (by public health order) and Test to Stay in January 2021 (by a policy outlined in the Utah COVID-19 School Manual[33]) throughout the state. In preparation for introducing the policies, the state distributed the BinaxNOW rapid antigen tests and provided clear step-by-step guidance to districts on how to set up their testing sites. The guidance included topics such as how to apply for a CLIA waiver to conduct tests, how to use the BinaxNOW tests, how to report results, and how to address Family Educational Rights and Privacy Act (FERPA) concerns. The state also worked with the Utah High School Activities Association to update and strengthen its guidance for safe participation in extracurricular activities.

In addition to providing clear guidance to districts and schools, UDOH capitalized on the demand that the new Test to Play policy created for school-based testing by launching a statewide blitz of in-person training programs for school staff, supplemented by online training, videos, and guidance documents. The state implemented a train-the-trainer model, with regional in-person trainings provided by UDOH to more than 250 staff from around 50 local education authorities (public and private) statewide. Once familiar with the logistics of rapid testing, these representatives helped lead local efforts to prepare for the regular screening testing.

Aside from the guidance and training they receive, school districts have substantial control over how to design, staff, and offer testing to students. For example, some districts provide testing on any day, while others conduct screening testing on a particular day of the week. To meet

Piloting "Test to Play" with high school football teams

With COVID-19 cases on the rise, in November 2020 Utah's governor paused all high school extracurricular programs. However, an exception was made for the final two weeks of the high school football season, conditional on all participating athletes and staff getting tested once per week (within 72 hours before a game) for COVID-19. UDOH mobilized state mobile testing teams, local health departments, school nurses, hospital staff, and others to test more than 1,800 students and staff in the first week (with a positivity rate of about 4 percent). In the second and final week of the football tournament, 800 students and staff still in competition were tested (with a positivity rate of about 2 percent). The pilot provided a proof of concept for the feasibility of mass-testing students who are participating in extracurricular activities and generated data suggesting to UDOH that serial testing could reduce percent positivity in a population. UDOH staff attribute this potential impact to two mechanisms: (1) identifying and isolating COVID-19 cases and (2) incentivizing preventive behaviors. The Test to Play pilot also served as a model for the statewide policy that followed.

the requirements to Play or to Stay, students can provide proof of any FDA-approved COVID-19 test, not just the district-administered BinaxNOW tests.

How are test results reported and acted on?

Most school-based testing statewide has been tracked through REDCap, which is a secure HIPAA-compliant web-based application. UDOH purchased a license to use REDCap statewide and has encouraged schools to use it. When students or staff consent to be tested through school-based programs, they also provide consent for their data to be stored in REDCap. Authorized school staff submit test results to REDCap, which are then sent via encrypted email to the tested individual. In addition, REDCap routes test results directly to UDOH. However, some schools have opted to use their local health departments' reporting systems instead.

Piloting "Test to Stay" in two high schools

Motivating students and communities to participate in widespread COVID-19 screening can be a significant challenge. However, through its pilot of the "Test to Stay" program, UDOH demonstrated that most students and families were open to testing if it allowed them to continue with in-person learning, rather than requiring remote instruction for all students, after discovery of a cluster of COVID-19 cases in the school community. In each of the two high school pilots in December 2020, more than 70 percent of students opted to participate in testing rather than transition to remote instruction. However, UDOH and district staff reported that ensuring participation in the program required intensive outreach to students and families (e.g., phone calls to every parent) to help them access testing and to gain their consent. As one leader from the Davis School District who participated in the pilot described the effort, "The test is easy but beyond that, it's parent consent and what do you do with the kids whose parents don't consent. . . . And the data entry . . . it's work. Not impossible, but work."

"If we build it, will they come?" How did the state engage school communities?

Both Test to Play and Test to Stay provide students and schools an alternative to state restrictions on in-school activities. UDOH staff noted that the timing of these strategies, as well as the way they related to statewide policy, seemed to help make testing more acceptable. Test to Play was offered shortly after the governor's pause on school extracurricular activities, so it was presented as offering flexibility in the face of those restrictions. Similarly, Test to Stay was not implemented as a mandate, but rather as a voluntary strategy to keep schools open for in-person learning.

Additionally, both UDOH and district staff reported that the popularity of extracurricular activities motivated schools to begin offering testing to participants and incentivized a large number of students and staff to participate in regular testing. As a leader from the Canyons School District put it, "If you can do [testing], we would encourage it. Not only for students but for staff. Whatever you can do to keep schools

> ## "If you can do [testing], we would encourage it. Not only for students but for staff. Whatever you can do to keep schools open and give students opportunities. Those extracurriculars are good for their mental health and personal lives."

open and give students opportunities. Those extracurriculars are good for their mental health and personal lives."

Initially, UDOH considered a weekly mandatory testing frequency; however, given concerns and feedback about the potential burden of testing for school staff, UDOH ultimately opted for an every-other-week testing requirement. District staff with whom we spoke agreed that the every-other-week frequency, while still quite challenging, was feasible to implement. UDOH staff reported that more than 90 percent of high schools that offer extracurricular activities participate in Test to Play, with the remaining schools opting to instead pause those activities.

What other challenges had to be overcome?

This section describes additional challenges that Utah faced and how they were addressed.

Staffing to meet the testing demand

Both UDOH and district staff reported that identifying local qualified staff who could conduct testing was a major challenge for schools. For example, a leader from the Davis School District described how "Parents were okay with testing but only if it was done by a medical professional." However, given school nurse staffing concerns and an already heavy workload, UDOH staff realized that school nurses alone could not handle all of the necessary test-

ing. Given the focus of Test to Play, athletic trainers at high schools proved to be a motivated group that districts frequently enlisted and trained to administer tests. Some districts also hired additional staff to conduct testing. Federal CARES Act funding has been a helpful resource for some schools and districts to help pay for hiring staff to conduct testing. Some districts also use mobile testing resources that can be deployed to different locations on different days of the week. However, in spite of the available supports and districts' best efforts, staffing shortages continue to limit the capacity of schools (and UDOH) to implement testing on a larger scale.

Technical challenges with results reporting systems

Although the statewide reporting processes are now largely working as intended, the initial rollout posed significant challenges. When the Test to Play program began statewide, the high volume of tests reported on REDCap in the first week crashed the server. UDOH leadership and technical support staff scrambled over the next several days to re-create school accounts and permissions and then host REDCap on a server with greater capacity. During this period, schools had to keep separate records and notify students, staff, and health departments manually, outside of REDCap. Another reporting-related challenge has been ensuring that school staff who log test results are consistently flagging which tests were conducted through the Test to Play and Test to Stay programs. While REDCap largely automates this step, schools that have opted to use local health department reporting systems must be trained and reminded to include this information.

Balancing safety and costs to students when quarantining close contacts

In retrospect, both district staff and HERO researchers described quarantine procedures for close contacts as overly conservative in the fall 2020 semester, with very few quarantined students later testing positive. In response, UDOH recently revised its quarantine recommendations for schools. Under the new guidelines, individuals exposed in school settings are not required to quarantine if both the COVID-19-positive individual and the exposed individual were wearing masks at the time of contact ("mask on mask"). This new policy applies to contacts of all COVID-19 cases, including those identified through Test to Play and Test to Stay.

What were the early results of the testing programs?

In the first six weeks of implementing Test to Play statewide (December 2020 through early January 2021), tests of more than 38,000 students and 7,000 staff from 144 schools were reported. However, because of incomplete initial reporting, UDOH staff indicated that these preliminary numbers are an undercount of tests associated with the policy to date. Test to Stay was implemented statewide in January 2021, and data are not yet available.

The last word

"Start small and voluntary. Start from a place where there's a benefit for a parent to test or school to test. The benefit is that if you test you can come back to school. There has to be an incentive to parents to test—opening a school is one."

— A Davis School District leader

For more information:

State of Utah, "State and Local Orders and Directives," webpage (includes 2020-27):
https://coronavirus.utah.gov/special-orders/

Utah High School Activities Association, *Safe Participation Protocols—Winter Version*, undated:
https://www.uhsaa.org/sportsmedicine/UHSAA%20
Return%20to%20Play%20Document%20Winter%20
Sport-by-Sport%20USSA%20UHSAA%20Plan.pdf

Highlights

State Factors

State agencies coordinated to distribute BinaxNOW tests and provide training and materials to districts. Both states obtained a statewide CLIA waiver for schools to conduct on-site testing.

Local Factors

The states allowed schools and districts to define their own testing objectives and to design testing programs to meet their local needs.

Community Engagement

Unexpectedly low testing uptake in schools required state and district leaders to identify and address potential reasons.

About the states

- 1,200 public school districts in Texas; 555 public school districts in Missouri
- State population (2019): Texas: 29.0 million; Missouri: 6.1 million
- Instructional models in fall 2020: Texas encouraged and incentivized in-person instruction, but districts could offer families a remote learning option; Missouri allowed schools and/or districts broad discretion to determine their instructional models.

Overview and context

Texas exemplifies state-level coordination across multiple state agencies to efficiently distribute BinaxNOW rapid antigen tests and associated materials (e.g., training, guidance documents, applications to participate in rapid testing) across a large and socio-demographically diverse state. This profile focuses on Texas's experience with COVID-19 testing in its K–12 schools while also incorporating relevant insights from Missouri, a state with a similar testing approach and strong state-level coordination. The profile includes examples of testing strategies in three populous districts that have opted into Texas's K–12 testing program: Austin Independent School District (ISD), Dallas ISD, and San Antonio ISD.

How does the testing program work?

Like other states that launched rapid antigen testing in fall 2020, Texas received a supply of BinaxNOW test kits from the federal government free of charge and has been providing the tests to school districts across the state, along with necessary PPE. The state obtained a statewide CLIA certificate of waiver and provided recommendations and guidelines for local testing programs. Tests are distributed to districts according to a formula that is based on local COVID-19 hospitalization rates. Specifically, local hospitalization rates, along with staff counts and student enrollment, inform the state's recommended frequency of testing in K–12 schools; the recommended frequency of testing in turn determines the number of tests provided to districts. Districts in regions with higher hospitalization rates received more tests per each staff member/student.

At the state level, leadership by the governor, the state commissioner of education, and the chief of emergency management facilitate a strong partnership between the Texas Education Association (TEA) and the Texas Division of Emergency Management (TDEM). TEA, as the state education agency, is responsible for helping schools provide instruction safely; TDEM, as the state emergency response agency, is well positioned to rapidly scale up statewide testing and distribution efforts. The testing program began piloting in a small number of districts in October 2020, only

ABOUT THE TESTING PROGRAMS

Who: Each district decides, but the state recommends testing symptomatic staff and students and conducting screening testing of staff.

How often: Varies by district

Sample type: Nasal swab

Where and how analyzed: On-site, rapid antigen detection assay using BinaxNOW tests

three weeks after initial planning discussions between TEA and TDEM. The program rolled out statewide in November 2020. According to TEA staff, the state commissioner of education encouraged the governor to allocate a share of the BinaxNOW tests Texas received for use in K–12 schools.

The state allows districts and independent schools substantial local control in deciding how to deploy the rapid tests. This approach is strategic because of the state's strong tradition of local decisionmaking and its size. While the details of test administration vary by district, all staff who supervise BinaxNOW test administration must complete the state's mandatory online training course. In addition, all districts and schools opting into the state's BinaxNOW testing program must agree to[34]

- allow any student who wants to attend school in-person to do so

- make testing voluntary for district staff and/or students

- provide testing at no cost

- review and adhere to program policies, such as how to administer tests and track and report results; they must also appoint a site test coordinator

- obtain formal consent from the person being tested (or the legal guardian of students under 18).

In two of the three districts we examined (Dallas and San Antonio ISDs), administration of the testing program is further localized: School principals can opt in to the district's rapid testing program and decide how to use their allocation of tests. Staff in Dallas and San Antonio ISDs report that their testing program goal is to identify asymptomatic individuals and keep them out of school while keeping athletics and other extracurricular programs running. Staff who supervise testing include school nurses and district administrators; tests are administered on-site. San Antonio and Dallas ISD leaders indicated that they needed to hire additional staff or reassign staff to oversee their rapid testing programs.

In contrast, Austin ISD leadership describe their approach as more centralized at the district level. Austin ISD focuses its testing on symptomatic staff and students, close contacts of a case, and individuals returning from travel. The district has implemented mass testing efforts as a proactive measure after reported clusters and after holiday breaks. Austin ISD has also made testing available to all staff and students attending school in-person who wish to use the resource.

The details of test administration vary across the three districts. Adults and older students administer their own tests, supervised by trained district health services staff

The view from another state: Missouri's experience with rolling out BinaxNOW tests to K–12 schools and districts

Missouri, a state of 6.1 million people with 555 public school districts, prioritized K–12 schools as the first recipients of its allocation of BinaxNOW rapid antigen tests from the federal government. Led by the state Department of Health and Senior Services (DHSS), Missouri developed a process for distributing BinaxNOW tests to K–12 schools or districts, including charter and independent schools, that begins with school leaders submitting an application to the Department of Elementary and Secondary Education to receive tests. The process has run smoothly, sustained by clear guidance from DHSS on applying for tests, administering them, and reporting results and supported by extensive training and a standing order for school nurses or their designees to perform the tests under a statewide CLIA certificate of waiver.[37] Testing was messaged to school and district leaders as just one component of a comprehensive COVID-19 response plan that includes other mitigation strategies, such as mask-wearing and physical distancing. The state has recommended that the tests be used for symptomatic students and/or staff, with staff prioritized to avert personnel shortages that could cause school closures, and asymptomatic close contacts on or after quarantine day 7. As in Texas, schools and districts make the ultimate decisions about how their tests will be used, after meeting certain requirements to receive tests from the state.

(e.g., school nurses, clinical assistants) who document the test results. In Austin ISD, parents can also assist with administering the test to students younger than 14. Although Austin ISD, through a partnership with a local medical school, has sufficient staff to manage the process, some district administrators chose to become trained to perform the rapid COVID-19 tests. Finally, Austin ISD conducts regular testing on school campuses and organizes mass testing events in large outdoor venues, such as stadiums.

How are test results reported and acted on?

Test administrators enter results into a mobile app, which the Southwest Texas Regional Advisory Council (STRAC) developed for TDEM in about one week.[35] Accustomed to handling sensitive health information and personal data, STRAC is affiliated with all the major hospitals in Texas and has experience with implementing secure data collection on a large scale. Individuals who have preregistered for testing receive a QR code, and test administrators scan that code to input the individual's personal information. Then they scan the individual's driver's license or manually enter their personal data, linking the test result to the individual while maintaining HIPAA compliance.

A positive result from the BinaxNOW rapid antigen test is treated as a presumptive positive. Individuals with a presumptive positive result are instructed to isolate and obtain a confirmatory PCR test. Individuals who are symptomatic but receive a negative result on the BinaxNOW test are also referred for confirmatory PCR testing. District officials use the confirmatory PCR test results and consult with the county health department to make decisions about further testing, quarantine, or school closures.

The app routes data on positive tests to state and local departments of public health, which follow up with the individual to take appropriate public health action, including contact tracing. Districts also report positive test results weekly to the Texas Department of State Health Services via an online reporting form. Districts and schools are not able to track who has been tested outside the school-based program; they must track how many staff and students are quarantined and when they can return to school separately from the app.

The view from another state: Successful partnerships in Missouri

Cross-agency collaboration and clear delineation of roles and responsibilities have been critical to Missouri's implementation of rapid COVID-19 testing in K–12 schools. Representatives from each of the state departments listed below meet on a weekly basis to coordinate efforts. According to one of the state leaders we interviewed, "If one of these parts was not involved, the system wouldn't work."

- The state Department of Health and Senior Services (DHSS) plays a lead role in developing the state's system for distributing tests, acts as the main point of contact for the federal government, and led the creation of the state cross-departmental team tasked with the planning, distribution, and reporting requirements for the tests. DHSS also oversees the state's CLIA waiver administration, maintaining oversight of all required reporting elements for both positive and negative results. A state school nurse consultant from DHSS advises schools and districts on the requirements for receiving BinaxNOW tests.
- The Office of Administration for the State Government is responsible for setting up the data dashboard to report multiple COVID-19 testing metrics and for keeping it updated.[38]
- The state Department of Elementary and Secondary Education (DESE) set up and runs the application process for schools and districts. DESE is the main source of communication to schools and districts about how to request tests, and the commissioner of education strongly supports allocation of BinaxNOW tests to K–12 schools.
- The Missouri State Emergency and Management Agency ensures that tests are delivered in a timely fashion to schools and districts.
- Local health departments partner with state leaders to implement COVID-19 testing in schools. In Missouri, as in many states, school district leaders turn to the local health department to interpret state guidance and implement it in their local contexts. In some cases, health department staff help to administer the rapid tests at schools and train others to collect nasal swab samples. State leaders believe this assistance has greatly increased the comfort level of K–12 school leaders to take on COVID-19 testing.
- Another important partner for state leaders is the Missouri School Boards Association, the key policymaker for many school districts in the state. Engaging this association and their legal counsel was an important step in implementing testing in Missouri schools.

"If we build it, will they come?" How did the state and districts engage school communities?

In Texas, statewide participation in the rapid testing program has been lower than desired. State leaders reported that as of mid-December 2020, about one-third of the state's approximately 1,200 districts and about one-quarter of the 1,000 independent schools have opted in to the program.[36] Uptake has also been low within participating school districts. As of January 2021, only about 10 percent of the test kits distributed to schools have been used statewide.

State- and district-level staff offer logistical complexity as one of several possible reasons for low district participation in the testing program. Although the state has removed several barriers to testing for districts, districts still must ensure staff complete required trainings; locate, set up, and staff testing sites; store equipment; and address numerous other logistical needs. Some districts or schools may not be equipped to manage these steps; for others, it may be time-consuming to put all the logistics in place. Some districts might be indisposed to testing because they view it as yet another burden added to the other state-mandated COVID-19 mitigation requirements. In the view of one state-level official, "We also had to overcome the challenge of not making the nursing staff and school staff feel like we were dumping one more thing on them after we already made them redesign their schedules, adopt cleaning regimens, wear masks. . . ."

> ## "We also had to overcome the challenge of not making the nursing staff and school staff feel like we were dumping one more thing on them."

Other districts were reportedly hesitant to use rapid tests, preferring the more sensitive PCR tests from their county departments of health. Others do not have the support of their communities or boards of education or were afraid they would have to close schools if they have a case of COVID-19. TEA staff are reaching out to some districts to understand their choice not to opt in, but TEA does not

The view from another state: Missouri's efforts to increase uptake of BinaxNOW tests in K–12 schools and districts

As in Texas, uptake of the BinaxNOW tests has been a challenge in Missouri. Understanding the gap between the number of tests distributed as of mid-December 2020 (about 230,000) and the number of tests used (about 6,000) is an urgent issue that state leaders are exploring. Some lag in uptake is expected, but expiration dates are a concern. The state allows districts to request as many as one test per student and staff member in the district but advises that tests are initially only to be used for symptomatic individuals. Some districts chose to offer testing only to staff, despite requesting the maximum allowance of tests, potentially contributing to the discrepancy between tests distributed and tests used. Another reason for this lag, according to state leaders, is apprehension around performing the tests; however, they have seen reservations dissipate as schools see how simple the tests are to administer. Still, the sizable gap between the number of tests distributed and the number of tests used has led state leaders to question the extent to which schools feel truly comfortable administering tests and to explore ways in which local health departments and federally qualified health centers could better support schools.

have the capacity to pursue statewide follow up. Staff in Dallas ISD also lacked capacity to contact every school to understand why it had not yet joined the testing program. Because usage has been low in K–12 settings, TDEM staff say the state may offer testing to other sectors, such as small businesses, through local chambers of commerce.

According to TEA staff, a key lesson learned is that getting a testing program off the ground is a big lift for districts. This effort takes time, and it has been a challenge for many districts to implement a broad testing program quickly. In addition, one state leader observed that, in retrospect, the state could have done more to promote testing as an important strategy and to help school districts use the many tools that the state provided. State staff who worked closely with the initial pilot sites and conducted in-person trainings note

that testing appears to have more support and to more closely match the state's vision in districts where in-person training occurred. State leaders had hoped that districts that launched testing programs would communicate the benefits of testing to their peers. According to a state-level official, "We thought if we could get some places excited about the program that would prime the pump, but that was not as successful as we would have liked." However, state leaders feel that state agencies did all they could to publicize the program in such a large, diverse state.

What other challenges had to be overcome?

This section describes additional challenges Texas has faced in supporting districts to implement testing programs and discusses how the challenges were addressed.

Meeting districts' needs for state support

As it was launching the BinaxNOW program, TEA engaged local districts in a discussion about what kind of state support would be most valuable for testing efforts. According to TEA staff, districts wanted tests and guidance, communication, and training materials they could adapt; they did not want extensive rules and requirements. TEA keeps communication channels open across the state by sending weekly update emails to district superintendents and by convening a weekly phone call with them.

Encouraging schools to opt in to testing

Staff in two of the three districts we interviewed confirmed that many schools in their districts had not yet opted into testing. However, as one district leader said, "I think the community is bought in, generally, even in schools that haven't brought testing in." One district leader suggested that districts just starting a testing program should get essential information out well in advance of implementing testing to allow the school community to become comfortable with the idea. The three districts are using the state's templates and communications materials to share testing program plans and updates with the community.

Encouraging optimal use of BinaxNOW tests

TEA policy requires districts to provide testing to students who wanted to return to in-person instruction, but TEA does not have the capacity to monitor local testing protocols or work individually with districts to set up their testing programs. State officials report trying to persuade districts to ramp up testing efforts by keeping the message focused on safety and emphasizing how testing will help "mitigate risk to keep schools open."

TEA staff reported that although they had some initial hypotheses about how the BinaxNOW tests might be most useful to districts, they allow each school district to use the tests in the way that best meets its local needs. Some districts use the tests as state staff had envisioned (such as widescale screening testing of both staff and students in Austin ISD), but other districts are taking different approaches. A majority of Texas school districts are reportedly focusing on their student athletes and athletic staff in an effort to keep athletic and other extracurricular programs operational. Two of the three districts with whom we spoke confirmed that they are using the rapid tests for student athletes and staff, but noted that the rapid tests are just one part of their testing strategy and that most staff are getting tested at county testing sites.

Working out complex logistics at the state level

The initial challenge of developing and implementing a statewide testing program in K–12 schools was addressed by the effective partnership between the TEA and TDEM. TEA understood the testing capacities and needs of districts. TDEM had the planning expertise, partnerships, and distribution infrastructure and equipment to rapidly develop and implement a testing program.

TEA and TDEM collaborated to rapidly develop a testing program that would remove as many barriers as possible for local districts. Together, they built a suite of communications and training materials that included a playbook for test administration and data collection, frequently asked questions (FAQs), training materials, and other communications materials geared toward staff, students, and families, and training materials. The two agencies work to continuously refine the materials based on patterns in feedback (if they receive many questions about one issue, they will update the materials) and maintain a list of FAQs. TDEM also obtained a statewide CLIA waiver and works with state medical officers and nurses' associations so that anyone who has completed the state's online training program—regardless of whether they are a medical professional—can administer rapid tests.

As one state-level official said, "The statewide CLIA waiver was amazing. . . . It can cover an infinite number of sites in theory, can cover any site that you can bring online . . . . Schools don't know what CLIA is and don't have any idea how to apply for it, so it was huge." Staff with whom we spoke in the three districts shared this perspective—they had used the state's materials and found them comprehensive and crucial to enabling their rapid testing programs.

Working out complex logistics at the district level

A district leader from Austin ISD suggested engaging departments throughout the school district (e.g., communications, transportation, safety and security) to support the complicated testing logistics. Austin ISD offered mass testing events which, according to staff, only succeeded because of collaboration across multiple district departments. For instance, Communications staff were essential for publicizing the event, Operations staff helped to set up testing sites and deliver essential PPE to test administrators, Safety and Security personnel directed vehicle and pedestrian traffic and provided security, and Transportation staff brought WiFi-enabled buses to the testing site so that test administrators could use their smartphones to enter data into the state's data tracking app.

Deciding who is in charge

State leaders highlighted the importance of having clear, candid conversations among state agencies early in the process to agree on the goal of testing and to specify each agency's role. Equally important was the role of strong leadership, according to a TEA representative, "You can have all the collaboration you want but someone still has to decide what you're doing." Leadership was provided by the state commissioner of education, the chief of emergency management, and the governor of Texas, who decided that most of the state's BinaxNOW tests would be routed to schools. A TEA staff member noted that, in their opinion, state leadership was necessary in the "absence of leadership from the federal government."

What were the early results of the testing program?

Texas distributed approximately 1,300,000 BinaxNOW test kits to K–12 schools between late October 2020 and December 21, 2020; more than 133,000 students and staff in more than 650 public and private schools (representing around 25 percent of schools statewide) had been tested as of late December 2020.

The last word

According to a TEA representative, "We know schools and TDEM knows emergency response."

For more information:

Texas Division of Emergency Management, "K–12 COVID-19 Testing," webpage:
https://tdem.texas.gov/k-12testing/

Texas Education Agency, "K–12 COVID-19 Testing Project," webpage:
https://tea.texas.gov/texas-schools/
health-safety-discipline/covid/
covid-19-support-public-health-orders#project

Texas Health and Human Services, "Public Schools COVID-19 Data," webpage:
https://www.dshs.texas.gov/coronavirus/schools/
texas-education-agency/

Local resources supporting testing in California

"We know all the local players"

Highlights:

The district designed its testing program based on guidance from the county health department and resource availability.

Local Factors

Partnerships

The district partnered with UC San Diego Health to customize a screening testing program to suit its needs and to handle many of the logistics. The county health department also convened weekly calls for district and school leaders and public health officials to share updated guidance, build relationships, and answer questions.

About this district

San Diego Unified School District (San Diego County, California)

- 176 schools; 4,388 teachers; 103,194 students in grades K–12
- 60% eligible for free or reduced-price lunch; 51% Black or Hispanic
- 10 pilot schools in the testing program so far
- Instructional model in fall 2020: Primarily remote instruction, with in-person instruction for those who opt in. The pilot is intended to facilitate additional voluntary in-person instruction.

Overview and context

San Diego Unified School District (SDUSD) in San Diego County, California, exemplifies how school districts with access to community partnerships and resources can implement robust testing programs that are suited to their particular circumstances and needs. In this profile, we describe how SDUSD leaders have partnered with the University of California (UC) San Diego Health to co-design a screening testing program that would facilitate safer in-person instruction. We also include a brief description of how a neighboring school district, Del Mar Union, is leveraging the same partnerships as SDUSD to operate a different testing program that is customized for its local context.

San Diego Unified is a large, socio-demographically diverse, urban district. Following county and state guidelines, as of December 2020 relatively few students were attending school in-person because of high community COVID-19 rates. Thus, in the fall of 2020, the district worked closely with UC San Diego Health to co-design a screening testing program for students and staff participating in in-person instruction in ten pilot schools in December 2020. The pilot (one week in December 2020 and one week planned for January 2021 after the winter break) was intended to work out the testing logistics in preparation for a rapid scale-up of the program throughout the district beginning in early 2021, or whenever local COVID-19 transmission rates allowed more students and staff to return for in-person instruction. In addition, students and staff who were symp-tomatic could access testing through the county health department, San Diego County Health and Human Services Administration (SDHHSA).

How does the testing program work?

In the fall of 2020, SDUSD launched its pilot screening testing program in partnership with UC San Diego Health. UC San Diego Health provides the staffing to administer tests; manages testing logistics, such as scheduling appointments; analyzes samples; and collects and reports testing data. UC San Diego Health's existing workflows supported testing at scale: Having parents and staff schedule testing appointments in advance allows their staff to prepare and label test kits and pre-populate necessary data forms, which helps testing days run more smoothly.

ABOUT THE TESTING PROGRAMS

Who: All staff and students in pilot schools who opt in
How often: Twice-monthly screening testing
Sample type: Nasal swab
Where and how analyzed: UC San Diego Health laboratories, PCR

"UC San Diego Health swoops in to administer the tests."

SDUSD launched the pilot program in December 2020 in ten schools located in vulnerable, under-resourced communities with high COVID-19 rates. UC San Diego Health staff perform the nasal swabs in pilot schools on the designated sample collection days and analyze the tests using PCR at their laboratories, relieving the district of these logistical burdens. As one district leader described it, "UC San Diego Health swoops in to administer the tests."

How are test results reported and acted on?

Individuals tested through UC San Diego Health receive their test results through the health system's online portal. UC San Diego Health staff call individuals with a positive test to ensure that they receive their results as quickly as possible and also report positive results to the county health department. In addition, participating staff and parents sign a waiver allowing UC San Diego Health to provide test results directly to the school district. District health services staff coordinate with SDHHSA to immediately call those with positive tests to conduct contact tracing and provide information about quarantine and follow-up care.

Investments needed to implement testing

SDUSD pays UC San Diego Health to run its testing program out of its district budget. The funding the district received through the CARES Act helped cover a portion of the costs.[39]

"If we build it, will they come?" How did the district engage its community?

SDUSD designed its testing program to alleviate stakeholder concerns about testing. Leaders mentioned clear, frequent communication as an important factor in helping families and staff understand the goal of testing and the role it plays in the district's overall COVID-19 response.

District leadership reported that restricting eligibility for testing to staff and students who were attending in-person incentivized participation in the voluntary program. When in-person learning is no longer optional, SDUSD is considering mandatory testing for staff and students while still offering a remote learning option for students who would prefer not to be tested or who prefer not to attend

A spotlight on partnerships

District leaders we spoke with described strong partnerships with SDHHSA and the San Diego County Department of Education that predated COVID-19. SDUSD's school district physician had worked closely with SDHHSA before the pandemic, and a former district nurse who has relationships with school nurses throughout the county now works at the Department of Education. As a result, according to the San Diego Unified leader, "We are lucky—we know all the local players . . . so we didn't have to build the partnerships [from scratch]." SDUSD leaders reported drawing on those existing relationships for ongoing technical assistance. For instance, SDUSD praised SDHHSA for its clear, accessible guidance about reopening schools and mitigating COVID-19 risk and found the communication materials SDHHSA created for districts (e.g., FAQs, flyers) particularly helpful. SDHHSA provided the opportunity for SDUSD to connect with a network of peers by convening weekly calls for school district staff, superintendents, and public health officials to share updated guidance, build relationships, and answer questions about testing. Another relationship that has been critical to successfully implementing testing has been the highly collaborative partnership between SDUSD and UC San Diego Health to co-design and execute a testing program to meet the district's needs. District leaders noted that frequent communication with UC San Diego Health has been essential because of the sheer number of important details to discuss. To illustrate this point, one district leader said, "We had a meeting every other day or twice a week with UC San Diego Health."

school in person for any reason. SDUSD staff cautioned, however, that mandatory testing in a public school district is uncharted legal territory. School districts in California cannot prevent students from accessing public education except in specific cases detailed in state law, such as not being in compliance with state vaccination requirements.

SDUSD staff used multiple approaches to communicate with families in the pilot schools about testing. Leaders sent

The view from a neighboring district

Del Mar Union School District (DMUSD), also in San Diego County, California, has accessed some of the same local resources and partners to customize its testing program. DMUSD is a smaller, more affluent district with lower COVID-19 community transmission rates than SDUSD. It has been offering in-person instruction throughout the fall 2020 semester. DMUSD collaborated with its teachers' association and SDHHSA to design and implement required screening testing for teachers, while limiting student testing to symptomatic individuals and close contacts. Asymptomatic staff receive nasal swabs at county testing sites, and county-run labs process the samples. However, DMUSD relies on UC San Diego Health to swab symptomatic students and staff at UC San Diego Health's testing sites and analyze their samples at the health system's labs. UC San Diego Health's turnaround time for results has been relatively fast (24–48 hours, compared with 4–5 days through the county) even as case numbers have risen, which has helped districts make more rapid quarantine decisions. In addition, like SDUSD, DMUSD has collaborated with UC San Diego Health and the county health department to strengthen their overall COVID-19 response and their outreach to parents and staff. For example, SDHHSA helped the district develop a COVID-19 Symptom Decision Tree that guides its stringent symptom screening program for students.[41] A district leader we interviewed commented, "Testing is not mandatory; however, without a test, the student may not return until ten days from the start of symptoms. We have not had any problems implementing this protocol because most of our parents do not want students to miss any school."

emails to parents and tasked school nurses with talking to parents directly and handing out testing consent forms at drop-off and pick-up times. The district also established an online FAQ page about the testing program in response to parent feedback. School nurses also leveraged their presence on social media to answer questions about testing

"We have not had any problems implementing this protocol because most of our parents do not want students to miss any school."

and pass common questions back to district staff for inclusion on the district's COVID-19 FAQ page.[40] SDUSD staff acknowledged that its approach of relying on online communications made contacting parents who did not have regular internet access challenging. To try to reach these parents, school staff worked to provide information about the testing pilot to parents when they dropped off or picked up their children.

What other challenges had to be overcome?

Facilitating convenient test registration and consent

In the first week of the pilot program, district leaders quickly realized that UC San Diego Health's scheduling and consent process presented some hurdles for families that they diligently worked to overcome. To ensure the correct individual is tested and the proper authorizations are in place, the process requires parents to register for an online portal, and then, each time their child is to be tested, to use the portal to schedule an appointment. Separately, they must sign a consent form and complete a HIPAA waiver. Many parents completed some of the necessary steps, but not all.

UC San Diego Health's testing process relied on preregistration of individuals to be tested and preparation of materials prior to the day of testing. When families who had not completed the process showed up for testing, the student was not on the schedule and materials were not prepared. In this situation, UC San Diego Health on-site testing staff tried their best to accommodate families who wanted their students to be tested. District staff mentioned that some parents may have found their communications efforts overwhelming: "Having staff and families understand the process—what do you do to sign up and when, how do you look for results—those are the big hurdles. We gave [families] so much information sometimes things got lost, things were not done, and people missed testing."

> **"Having staff and families understand the process—what do you do to sign up and when, how do you look for results—those are the big hurdles."**

SDUSD staff expressed concern that these challenges are particularly acute for parents in this large, diverse district who do not have access to technology or who are not well-versed in it, hindering equitable access to testing. To address this challenge that surfaced during the pilot, UC San Diego Health has been working closely with the district to modify the scheduling system to make the process as streamlined as possible for parents. UC San Diego Health has granted the school district staff access to the online portal to assist families with the registration and scheduling process, and the district will implement options such as electronic consenting and scheduling multiple appointments at a time when they become available. In addition, some schools are holding parent sign-up days, during which a school staff member sets up a laptop in the school parking lot and helps parents register for access to the portal. School health services staff are also providing information to parents at drop-off and pick-up about consenting for testing and the sign-up process.

What were the early results of the testing programs?

During the first week of the pilot screening program in ten schools, the district tested around 39 percent of staff members (109 out of 283) and around 7 percent of students (25 out of 353) who were attending school in person, with no COVID-19 cases identified among students or staff.

The last word

As an SDUSD representative put it, "Testing means increased safety and security for all staff and students coming on campus. The biggest challenge is to ensure that everyone has access to technology to sign up for a test. We want to make sure that we are being equitable when it comes to testing and providing resources and technology to staff and families that have challenges."

For more information:

San Diego Unified School District COVID-19 dashboard: https://datastudio.google.com/reporting/18b89718-e1f9-4fa3-adff-9457e210131c/page/uUJkB

San Diego Unified School District, "Phase One of Reopening Site: Health and Safety Overview for Principals/ Administrators," January 12, 2021: https://docs.google.com/document/d/19_hp25P-EcGDPxgCxJO1AeZ46kXkqegala7axpUsLMM/edit

Local partners enabling testing in Massachusetts
"Greater confidence and peace of mind"

Local Factors

Highlights

The district has benefited from preexisting testing programs in the city and has been able to enlist staff from a local ambulance provider and from a local nursing college.

Partnerships

Medford Public Schools' strong partnerships with Tufts University and the Broad Institute of the Massachusetts Institute of Technology (MIT) provide the backbone of its testing and reporting capacity.

About this district

Medford Public Schools (Middlesex County, Massachusetts)

- 8 schools; 395 full-time teachers; 4,232 students in grades PreK–12
- 29% eligible for free or reduced-price lunch; 26% Black or Hispanic
- Instructional model in fall 2020: Hybrid, with around half of students opting to attend in person

Overview and context

Medford Public Schools has successfully implemented robust COVID-19 testing efforts, building on earlier community-wide testing initiatives and with the support of key partners including city government officials, the Broad Institute of MIT and Harvard (a biomedical and genomic research center),[42] and a local university (Tufts University). In September 2020, Tufts University partnered with the City of Medford to provide free, asymptomatic testing for the local community—including teachers at select locations. Then, in late September 2020, the district entered into an agreement with its teachers union to expand this partnership with Tufts to provide free weekly PCR testing for teachers, conducted by first responders from Armstrong Ambulance, a local ambulance provider. By the end of October, Medford again expanded its voluntary testing program to include all school staff with in-person duties and, in late November, began weekly screening testing of students attending in person.

How does the testing program work?

Medford school staff administer tests on different days of the week to the two cohorts of students attending as part of the district's hybrid instructional model. High school and middle school students self-swab under supervision of a nurse; however, the nurse assists elementary students with their swabs. The school sends the swabs to the Broad Institute for analysis, and the Broad Institute emails results to families and staff within 24 to 48 hours. The Broad

Institute also reports results to the Board of Health, who then calls anyone with a positive test.

Medford Public Schools relies heavily on school nurses for testing operations and follow-up, adding to these staff members' responsibilities. Initially, on-site testing of all students within a school took an entire school day from start to finish; however, the district has brought on additional staff to help with logistics, and those conducting the tests have grown more efficient through practice, streamlining the process down to two to three hours per site. Between September 24 and December 22, 2020, the district administered 4,600 tests of school staff members, and between November 30 and December 22, 2020, it performed 3,400 student tests. In January 2021, Medford Public Schools began engaging trainees from a local nursing college to volunteer at the school testing sites.

ABOUT THE TESTING PROGRAMS

Who: All staff and students who opt in

How often: Weekly screening testing

Sample type: Nasal swabs

Where and how analyzed: Broad Institute laboratories, individual PCR testing initially but moved to pooled testing in January 2021

> **Initially, on-site testing of all students within a school took an entire school day from start to finish; however, the district has brought on additional staff to help with logistics, and those conducting the tests have grown more efficient through practice, streamlining the process down to two to three hours per site.**

How are test results reported and acted on?

As noted previously, the Broad Institute emails all students with their test results, and the City Board of Health or Medford Public Schools Health Services Department contacts students who test positive with instructions for isolation. Tufts University developed a technology platform that supports testing operations within Medford Public Schools, including scheduling testing appointments, submitting orders for the tests, printing labels for the collected samples, and tracking results in near real time.

Investments needed to implement testing

Medford Public Schools pays for testing through a combination of the City of Medford's CARES Act funding and financial support from Tufts University. School leadership initially projected costs for the school year to total $1.7 million but in practice found them to be significantly less, for a variety of reasons. First, the district plans to keep costs low by having trainees at the local nursing college assist with testing going forward, reducing the estimated personnel costs by $500,000. Second, Medford transitioned in January

The view from a nearby district

Strong partnerships have similarly enabled Cambridge Public Schools (CPS) to get COVID-19 testing off the ground in the district. In collaboration with the City of Cambridge, the Cambridge Public Health Department, the Cambridge Education Association, and the Broad Institute, Cambridge Public Schools has implemented twice weekly on-site testing for all teachers. The City of Cambridge has simultaneously implemented COVID-19 testing protocols in the community, which informs CPS decisionmaking. Specifically, CPS relies on metrics derived from community testing initiatives to determine whether instruction can occur in-person or must be remote. Two of the following three metrics must be below a certain threshold for 7 days before CPS will permit in-person learning: (1) 7-day averages of new confirmed cases per day per 100,000 people in Cambridge, (2) rate of positive COVID-19 tests in Cambridge over a 14-day span, and (3) level of COVID-19 detected in wastewater. The Cambridge Public Health Department provides additional health aides to assist school nurses with testing, and, as in Medford Public Schools, the Broad Institute conducts PCR testing on the samples.

2021 from PCR testing on individual nasal swab samples to testing pooled samples, using a protocol developed by Tufts University in collaboration with the Broad Institute.[43] This approach will allow them to test more individuals at a fraction of the cost of testing individual samples. The district now estimates a total cost of $600,000 to run the testing program from January to June 2021.

"If we build it, will they come?" How did the district engage its community?

The Medford Public Schools superintendent and other district leaders conveyed to us how thoughtful they tried to be with their messaging around testing. Testing needed to be seen as *important* for safety to get engagement from parents. However, if testing was advertised as *necessary* for safety but the testing program was not yet operational, students, parents, and staff might be less likely to return to school. The district leaders found, however, that once they were able to implement testing, students and

staff expressed less anxiety about returning for in-person instruction. The superintendent records regular video messages for the school community and posts them online, in which she describes the benefits of testing—highlighting evidence of low rates of transmission in schools.[44] The district also experienced a local surge of COVID-19 cases when it was launching its student testing, which motivated many parents to consent for their child to participate.

What challenges had to be overcome?

This section describes several challenges Medford Public Schools faced in implementing its testing program and how school leadership addressed these challenges.

Obtaining consent for student testing

The logistics of hybrid learning made obtaining consent on paper difficult. Because students were only coming in two days per week, if they did not return their consent form on the second in-person day, they would be unable to participate in testing until the following week. District staff considered, but have yet to identify, a way to obtain digital signatures.

Overcoming concerns about incorrect or missing data

Medford Public Schools' testing program generates a large amount of data each week. Staff stated that it was too time-consuming to comb through the information line-by-line and ensure that it was 100 percent correct. For example, if a student's phone number was incorrect in the system, it would only present a problem if the student tested positive and the lab could not notify the family. However, because almost all students were testing negative, the district leaders commented that they believe the time required to find and correct these minor data errors could be better spent on other aspects of the school's COVID-19 response.

Logistics and time required for on-site testing

At first, testing every classroom in the school took almost the entire day and detracted from learning—staff were unfamiliar with processes and struggled to locate necessary equipment. As noted previously, with staff becoming more familiar with the processes and supplies well stocked, the time spent testing students has decreased to about two to three hours total per school, which corresponds to an average of four minutes per classroom, according to a district

leader. Additionally, staff now test students during lunch period, reducing time away from the classroom. However, the district is still using a hybrid learning model, with only about 40 percent of the staff and students on campus at any given time. Staff expressed concern about how testing will work if schools were to return to 100 percent capacity.

What were the early results of the testing program?

Around 90 percent of approximately 1,900 students and 400 staff who attend in-person participate in weekly screening testing.

- 18 out of 30 staff cases reported to the district since September (60 percent) were identified through the school's testing program.

- 17 of 22 of student cases reported to the district since November (77 percent) were identified through the school's testing program.[45]

The last word

In describing the benefits of testing, one school administrator said that it "helped to cultivate greater confidence and peace of mind within our school communities. The investment is about both reducing the spread of the virus and lessening the anxiety and stress that this pandemic has caused."

For more information:

Medford Public Schools website:
https://www.mps02155.org

A testing program supporting schools in Colorado

"Until you get the dance steps down"

Highlights

Partnerships

Many interdependent partners had to clearly define their roles, responsibilities, and procedures for effective coordination.

Logistics

COVIDCheck Colorado's technical assistance and on-demand support have made the complex logistics of COVID-19 testing possible.

About the district

Westminster Public Schools (Adams County, Colorado)

- 20 schools; 515 teachers; 9,277 students in grades PreK–12
- 79% eligible for free or reduced-price lunch; 77% Black or Hispanic students
- Instructional model in fall 2020: In-person initially, then transitioned to remote

Overview and context

Westminster Public Schools in Colorado, in partnership with COVIDCheck Colorado (CCC; see sidebar on the following page), is conducting screening testing of school staff and students every two weeks, using a PCR test on samples collected by nasal swab. This district was one of the first in Colorado to return to in-person instruction. Westminster Public Schools committed to offering an in-person option, knowing that it would need to have all the necessary protocols in place. District leadership noted that they would have gone back in the fall in-person regardless of the partnership with CCC, which began around the start of the academic year in August 2020. The availability of testing "added an element of safety and security for all the adults working in the system." In the words of one district administrator, testing "didn't drive our decision to reopen, but it certainly enhanced our ability to reopen." District leaders view the level of participation in testing as evidence of the program's success; they feel that the value of testing is that it allows them to identify and isolate asymptomatic individuals "that would have been in our buildings."

How does the testing program work?

Westminster Public Schools has worked with CCC to offer a variety of testing locations to maximize convenience for families. The district praised CCC's willingness to problem-solve around a common goal of providing "testing where testing needs to be done." CCC has set up drive-through testing sites in school parking lots or other designated locations in the area that are open to the local community, which helps engage families of students and staff. CCC also supports testing at local health clinics to which the district can send staff and students.

The district reports that participation in testing has been high. At CCC's first pop-up testing event in the community, it conducted 400 tests in a single day. The district appreciated working closely with CCC's communications department to help convey to the community the benefits of COVID-19 testing and to make sure individuals knew where they could receive a test.

ABOUT THE TESTING PROGRAMS

Who: All staff who opt in; students, family members, and individuals from the community can also access the testing

How often: Twice-monthly screening testing

Sample type: Nasal swabs

Where and how analyzed: Various off-site laboratories, PCR

About COVIDCheck Colorado LLC

COVIDCheck Colorado (CCC; https://covidcheckcolorado.org) is a social benefit enterprise of Gary Community Investments, a philanthropic organization dedicated to increasing opportunity for underserved families in Colorado. Since July 2020, CCC has been supporting COVID-19 testing in K–12 schools and in other settings, such as universities and workplaces. As of mid-December, COVIDCheck Colorado was partnering with more than 30 public school districts and more than 40 additional charter or independent schools across the state.

Each partner district or school collaborates with CCC to design a testing program that meets its individual needs. CCC then supports them to make the logistics possible "from soup to nuts." It helps districts and schools set up drive-through testing sites in a school parking lots (the most common approach), pop-up sites in the school's hallway, referrals to local health clinics for testing, and one-time community testing events. Regardless of the arrangement, as of December 2020 CCC's testing sites collect nasal swab samples and send them to several partner laboratories to run the PCR tests. (They are gradually transitioning to saliva samples as the more cost-efficient option). Most of CCC's testing in schools has been of staff, generally every two weeks or more frequently if needed. Some of CCC's partners plan to begin screening asymptomatic students starting in January 2021.

The on-campus school testing sites are not just for the school community; they are also open to family members and the local community. CCC contracts with Primary.Health (https://primary.health), an end-to-end online testing platform, to schedule appointments, send reminder messages, and report results in a HIPAA-compliant fashion to the individual who tested positive, the designated school and district officials who are authorized to receive protected health information, the local public health department, as well as to CCC so that it can connect the individual to a clinician for a telehealth visit.

According to a CCC representative, it has "had to prove itself" as a viable partner for testing efforts in Colorado. "We were a new entity [in the public health space] trying to solve a new problem." A state public health leader noted that "CCC was developed independently of anything official." CCC and other partners have learned and adjusted as they go to ensure that CCC's service coordinates with state and local health departments' K–12 testing efforts and that participants in their testing programs "are not faced with unexpected costs for something that should be free."

As the district leaders we quote throughout this profile demonstrate, CCC's services have been very well received, and its roster of education partners is growing by the week as more districts and schools see the value of outsourcing the logistics of COVID-19 testing to an entity like CCC. A leader from Westminster Public Schools, the focus of this profile, noted that CCC is "with us shoulder to shoulder" and is very responsive to Westminster's needs. CCC can also coordinate across multiple vendors, each of which handles a different part of the testing workflow (e.g., test equipment, waste disposal, data management and reporting). According to district leaders, CCC is committed to providing timely responses to their questions, even if the answer is that it does not yet know the answer and is working on it.

How are test results reported and acted on?

Westminster Public Schools decided that the superintendent, the chief operating officer, and the chief of staff in HR would be the only individuals at the district level who would receive test results. The tested individual and CCC also receive the results, and CCC reports them directly to the local public health department. Westminster provides a public dashboard with number of tests performed and aggregate results at each testing site.

District leadership constantly monitor data they receive from CCC. The data feed is updated daily, and positive results are flagged. If a test is positive, the district's HR department reaches out to the employee and discusses with the principal or supervisor how to proceed. The chief operating officer's team launches the contact tracing process. The district works with legal counsel to ensure that they, as a HIPAA-covered entity, are sharing information appropriately, since it is a new situation for them to receive test results linked to individuals.

If teachers receive a positive test and feel well enough to continue teaching, the class switches to remote learning but the teacher continues to teach; this shift is feasible because children carry laptops to and from school. If the teacher is

unable to teach because of COVID-19 symptoms, substitute teachers are available even in a remote environment.

Investments needed to implement testing

CCC was initially funded through a $2 million investment from Gary Community Investments. As CCC added K–12 partners, the Colorado Department of Public Health and Environment (CDPHE) committed additional funding to expand school-specific testing sites so they could serve the surrounding community. As of December 2020, CHPHE had provided CCC over $15 million for community-based testing, significantly offsetting costs.

"You can template a lot of this. HIPAA is HIPAA."

Around the time of our interview with CCC, it had been charging districts $10 per test to cover operational costs, and its affiliated laboratories were billing testing costs to individuals' health insurance providers. However, this process introduced some challenges, because billing for tests conducted on asymptomatic individuals at mass testing events was uncharted territory. Furthermore, although CCC and school districts stated that the tests would be free of charge, districts noted that some staff who received standard "Explanation of Benefits" form letters from their insurance companies misunderstood the letter as a billing statement. Other staff were concerned that their insurance premiums would be affected the following year because of the large number of procedures that laboratories were billing to their insurance carriers. Still others were concerned that insurance companies could start rejecting claims for asymptomatic testing at some point in the future.

In light of these challenges, both the CDPHE representative and CCC staff we interviewed underscored that the state's commitment to fund CCC's testing operations has been absolutely critical to its success, and CDPHE emphasized the importance of bringing third-party payers and state insurance commissioners to the table to problem-solve together. By late December 2020, CDPHE and CCC had entered into a new agreement, in which the state contracts with CCC to deliver testing. CCC-affiliated laboratories bill CCC directly, CCC sends CDPHE the number of tests completed per week, the state pays CCC per test, and CCC passes on those funds to the labs. Thus, insurance companies are not currently involved in the process. In short, CCC views funding as the biggest barrier to implementation and

The view from another district partnering with CCC

According to a district leader from Aurora Public Schools, a district in the Denver suburbs,

> Some people felt like [testing] was "Big Brother" at first. But once people saw it was easy, they were getting results back quickly, that eased their concerns. [Encouraging participation was about] helping people understand how the data are used, and that it really is about keeping schools safe and we want to do this in the name of being able to protect each other. That "everybody in" mindset has been part of the district's messaging, especially around free asymptomatic testing, and how important it was to take advantage of that. One thing that's important is that principals are [participating in] testing. Schools that have high participation rates, that comes from the principal, who cultivates buy-in among staff.

stressed that the state government's emphasis on expanding access to asymptomatic community-based testing has been a key enabler of success for testing programs in Colorado districts and schools.

According to another district partnering with CCC, Aurora Public Schools, costs to screen staff twice monthly and test symptomatic students, from August 2020 to early January 2021, including equipment and materials but not labor, have been about $110,000.

What other challenges had to be overcome?

This section describes additional challenges that Westminster Public Schools faced in implementing its testing program and how they were addressed.

Figuring out complex logistics

District leadership from Westminster Public Schools described a very "steep learning curve" around COVID-19 testing in their schools as they tried to find "the appropriate balance between public health and our mission of educating children." Fortunately, Westminster launched testing in August 2020, when community transmission was relatively

Spotlight on supporting districts and schools with logistics

To support districts and schools in implementing testing, CCC has six client managers who manage education partnerships and help tailor the testing service to the unique needs of each client, while also using consistent processes to maximize efficiency. Aurora Public Schools leadership notes that "COVID Check has done an excellent job of responding [to our questions and concerns]." The districts and schools have ongoing, on-demand access to CCC for support and questions. One district leader described texting daily with the district's client manager. Similarly, a Denver Public Schools leader reported holding daily phone calls with CCC to check in on everything from tactical issues to testing locations, HR issues, how results are processed, and how to manage data on district employees. They have kept up those daily calls "even as we've become more experienced with testing." As one district leader from Denver Public Schools put it, "We can't do it without COVIDCheck. I don't know how a district could do it without a partnership. It's a lot to manage." A critical element of success is that CCC's client managers strive to understand how testing actually works in schools. Therefore, they frequently visit clients to problem-solve in-person. For schools, this has meant that, as a district leader from 27J District notes, "It requires staff and time to monitor and manage the partnership and test results with COVIDCheck."

low. The district's leadership noted that they were able to "crawl then toddle"—in that they could figure out how to deal with a few cases here and there and refine their protocols when things were still relatively calm. In the initial stages of implementation, Westminster and CCC held weekly check-in meetings, which evolved into a weekly or biweekly update to CCC over email; if Westminster leaders have specific questions, they reach out to the client manager for assistance. In addition, the superintendent meets weekly with other area superintendents. Everyone brings their questions to the group, and they troubleshoot together. These supports help mitigate the challenge of making tough decisions that superintendents have never faced before.

From CCC's perspective, its client managers identified numerous opportunities to avoid reinventing the wheel with each new partner, streamlining testing logistics significantly. For example, CCC created a templated agreement for each new test site that defines roles and responsibilities, a standardized consent form, social media toolkits, talking points, templated FAQs, and flyers. According to a CCC representative, "You can template a lot of this. HIPAA is HIPAA." On the other hand, given how quickly the pandemic is evolving, a CCC representative acknowledged that, "Just when we refine our process, things change. There is no autopilot."

> ## "We can't do it without COVIDCheck. I don't know how a district could do it without a partnership. It's a lot to manage."

Determining the appropriate public health response to a positive test

District leaders have adapted their approach to assisting the local health department with contact tracing. In the beginning, school leaders cast a very wide net and quarantined people who might not have met the criteria for duration of exposure to an individual with COVID-19. Then Westminster Public Schools worked closely with its local health department and with CCC to narrow the scope of the impact of a positive test. District leaders were able to implement other restrictions so that they did not have to "shut down the school" when there was a positive test. For instance, "Teachers had to learn really fast that you can't go have lunch together" because a positive test in that group would "take a lot of teachers out of commission." In other words, "Testing helped tell us that our past behavior can't be our future behavior."

What were the early results of the testing program?

Among 515 teachers in Westminster Public Schools, there have been 96 total cases reported as of December 2020. Data on the proportion of those cases identified through school-based screening were not available. Between July 2020 and late December 2020 and across all of its clients (including non-educational partners), CCC reported more than 250,000 tests performed.

The view from another district partnering with CCC

In the Mapleton School District, principals call the families of students who must quarantine after exposure to a case. A district leader observed how much parents appreciate a personal phone call from the principal: "That's been one of our successes, the amount of personal contact that principals have with families."

The last word

According to a district leader from Westminster Public Schools, "Never have I seen a time where there's been so much cross-coordination across various agencies to meet the needs of our community. . . . In years to come I hope we look back and remember what it felt like to have that shared and united purpose that kept us all going."

Home-grown innovation in Illinois

"Wow, if we didn't have this ..."

Highlights

Partnerships

La Grange 102 shared technical assistance and lab capacity with neighboring districts, helping them to establish testing programs.

Logistics

Implementing an "in-house" testing program required a substantial commitment by staff, volunteers, and district leaders.

Community Engagement

Districts are using a variety of strategies to help ensure widespread community participation in the testing programs.

About the districts

Four collaborating districts: La Grange 102, La Grange 105, Glenn Ellyn 41, and Riverside 96 (Cook and DuPage counties, Illinois)

- The districts each have 5 or 6 schools, 119–224 teachers, and 1,338–3,549 students in grades PreK–8
- 16–40% eligible for free or reduced-price lunch; 16–42% Black or Hispanic
- Instructional model in fall 2020: Hybrid

Overview and context

La Grange 102 began COVID-19 testing in August 2020 after Edward Campbell, La Grange 102's school board vice president and a molecular biologist with a laboratory at Loyola University Chicago, consulted with other laboratories in Wisconsin and Colorado to develop a saliva test for their schools to use. During the time Campbell was developing the test, there were no other established models of saliva testing in schools on which to draw. La Grange 102 made space in its science center to test the saliva samples that students and staff provided on collection days.

After La Grange 102 administrators shared details of their approach with peers, other districts began to collaborate with them and Campbell to procure testing kit supplies and have their saliva samples tested in the La Grange 102 science center lab. When La Grange 102 no longer had capacity to support these other schools, Campbell formed a business—SafeGuard Surveillance, LLC (https://www.safeguardscreeningllc.com)—to provide test kit supplies to other school districts and add more laboratory capacity to what La Grange 102 could offer. La Grange 102 administrators have shared their consent form with other districts, and they have also shared a testing protocol detailing how to manage the testing process, including what the lab at La Grange 102 or SafeGuard handles versus what districts have to do themselves (e.g., assemble test kits, notify families of results).

How does the testing program work?

The district's approach to test administration and analysis is unique in its reliance on an RT-LAMP-based saliva test developed by Campbell. His lab procures the necessary supplies for testing kits through different vendors. School staff, including individuals newly hired to support testing, and volunteers assemble the test kits with supplies provided by La Grange 102 and Campbell's lab. Assembling the test kits, which consist of a tube and pipette in a labeled envelope, is relatively simple; however, it still requires a greater investment of staff or volunteer time than would be required if districts were able to acquire pre-assembled kits to distribute. School staff distribute assembled test kits to consented students and staff, who provide their saliva samples at home or at school and return the tubes to the

ABOUT THE TESTING PROGRAMS

Who: All staff and students who opt in

How often: Once- or twice-weekly screening testing, depending on the district

Sample type: Saliva

Where and how analyzed: La Grange 102's science center laboratory, RT-LAMP assay

school district according to each district's testing schedule and sample collection method. The districts use various approaches to collecting samples (e.g., at student drop-off, at the classroom door) and then send them to the La Grange 102 or SafeGuard lab for testing. Both labs typically return results within 24 hours.

How are test results reported and acted on?

Lab staff report positive results to a contact person or person(s) within the district. Presumptive positive results are termed "results of clinical significance," since the RT-LAMP assay is not FDA-approved to confirm a diagnosis of COVID-19. At La Grange 102, lab staff report student results to the school nurse and staff results to the head of HR. At other school districts, lab staff report positive results to the school nurse, a superintendent, or other designated staff member. That individual then adds results of clinical significance and confirmed cases to the district COVID-19 dashboard and shares the RT-LAMP results with the tested family or staff member by phone, instructing them to seek a confirmatory diagnostic test. The nurse, head of HR, or other staff member also instructs the individual with a result of clinical significance about public health guidelines for returning to school.

Investments needed to implement testing

Through December 2020, school districts were paying $11 per test, in addition to the cost of the supplies the district needs to create the kits. Supplies include the test kits themselves, as well as bags and labels. In addition to testing costs, superintendents in this collaboration cited the person-hours required to implement testing as a necessary investment. As one superintendent said, "The amount of work and communication could be a full-time job in and of itself." At each district, the necessary staffing included those who assemble, distribute, and transport test kits to the lab, as well as those who track who has returned their samples, identify who needs to be reminded to do so, and follow up on results of clinical significance.

Districts took a variety of approaches to securing more person-hours to devote to testing. District leaders described regularly expanding existing staff roles to include new testing responsibilities. For instance, in La Grange 102, the interoffice mail courier began transporting the saliva samples to the lab for analysis, the administrative assistant in the main office ordered the test supplies, and the information technology staff member was tasked with creating labels for tracking saliva samples. One staff member noted the importance of being flexible: "You have to accept that your schedule will not be normal for the year." In some cases, additional staff were hired to support testing, including six employees hired to work in La Grange 102's lab. In other cases, existing staff took on new roles (e.g., La

Grange 102 tasked two substitute teachers with assembling test kits). Additionally, districts sometimes relied on volunteers (e.g., one superintendent noted that volunteers had assembled 1,000 kits the night before our interview; another mentioned a huge group of parent volunteers that distributed tests to students when testing first began, before the district hired additional staff).

> ## "The amount of work and communication could be a full-time job in and of itself."

Despite expanding the roles of existing staff, the help of volunteers, and hiring new staff, those with central roles in the testing program had to work evenings and weekends to make the program operational. The La Grange 102 HR director and school nurse explained that they regularly needed to be "on call" in the evenings to communicate test results and field questions. The districts were largely able to find funding through their existing budgets to absorb the cost of testing and, in some districts, the expense of hiring additional staff, sometimes supplemented by pandemic relief funds. The superintendent from La Grange 105

Spotlight on communication strategies

Communication strategies mentioned by staff across the collaborating school districts included:

- district administration consulting with medical professionals and sharing learning publicly to assure parents and the public that decisions are evidence-based
- regular meetings among the COVID-19 testing team staff, teachers, and families about the testing approach and how to interpret results
- superintendents and other district/school leaders communicating at least weekly with parents to provide updates on testing (e.g., via prerecorded robocalls and online newsletters)
- superintendents and principals collaboratively developing testing-related messages to parents to ensure consistency
- displaying banners and posters encouraging students and staff participation in testing
- actively posting on social media (e.g., publicizing the school districts' COVID-19 testing dashboard with updated results).

described how the district's change in spending due to the pandemic freed up some funds for testing: "When we looked at our priority—being in school safely, we thought about all the money we're not spending. We don't have active bus routes, not as many clubs, so we shifted money."

"If we build it, will they come?" How did the districts engage their communities?

Superintendents noted that communication and education for the community were critical to the success of their testing strategy. They described key issues to address, such as building awareness of why screening testing is important, trying to avoid oversaturating the school community with information, correcting misinformation, and reassuring staff and parents that their DNA was not being used for reasons other than COVID-19 testing.

Because La Grange 102 has been involved in testing longer than the other districts, it has had time to build community confidence in the testing strategy. Participation rates were 68 percent in the first month of testing at La Grange 102 and have increased gradually since then. Part of La Grange

102's success appears to be the involvement of many committed staff—from its superintendent and Campbell to the head district nurse—who are in constant communication with other staff and parents to make sure they understand the value of testing and details of its approach.

La Grange 102's staff developed a communication strategy regarding their voluntary COVID-19 screening program (i.e., both symptom screening and saliva-based testing); it was intentionally framed as "screening" instead of "testing" to reduce anxiety among members of their school communities. In the words of one staff member, "A communication campaign is important. We've heard about districts without participation. They didn't have a communication campaign ahead of it. The amount of time we spent with district and community members answering questions . . . made us so successful." The district's communication campaign emphasized frequent meetings for the community to respond to questions, including presentations by Campbell about the testing program. Presentations about the purpose of testing, the logistics, and how privacy was being protected were designed to assuage parent and community concerns. The La Grange 102 staff with whom we spoke emphasized that Campbell is a dedicated champion who inspires trust in the process. Family liaisons already employed by the district also played an important role in distributing consent forms and answering families' questions about the testing process.

The district superintendents also reported developing FAQs regarding testing,[46] as well as consent forms with input from legal counsel. The FAQs were likely helpful in communicating the testing approach to families and alleviating their fears about their child's DNA being collected through saliva samples, a fear noted by several superintendents we interviewed.

Finally, two staff members at La Grange 102 emphasized that once members of the school community realized that the testing program was detecting asymptomatic cases of COVID-19, they noticed significantly more engagement in testing.

What were the early results of the testing programs?

In La Grange 102

La Grange 102 was able to offer hybrid instruction continuously throughout the fall, due in part to its robust screening testing program. As of December 2020, 82 percent of the approximately 3,300 teachers and students in the district were participating in weekly testing. Sixty-three percent (53 out of 84) of all cases reported at district schools since September 2020 were identified (and isolated) as a result of the screening testing program, reducing the risk of silent transmission of COVID-19.

Figure 4 compares trends in COVID-19 case numbers and test positivity rates in schools within the La Grange 102 district versus in the surrounding community, illustrating differences in their testing approaches and populations tested. At La Grange 102 district schools, positivity rates were lower than in the community, potentially reflecting the lower likelihood of infection in younger children and the fact that the district's testing targets asymptomatic individuals. The district's case numbers periodically spiked and then declined sharply as cases were identified and isolated. Because of widespread testing, the district likely has a better sense of the "true" infection rate among all students and staff in its schools.
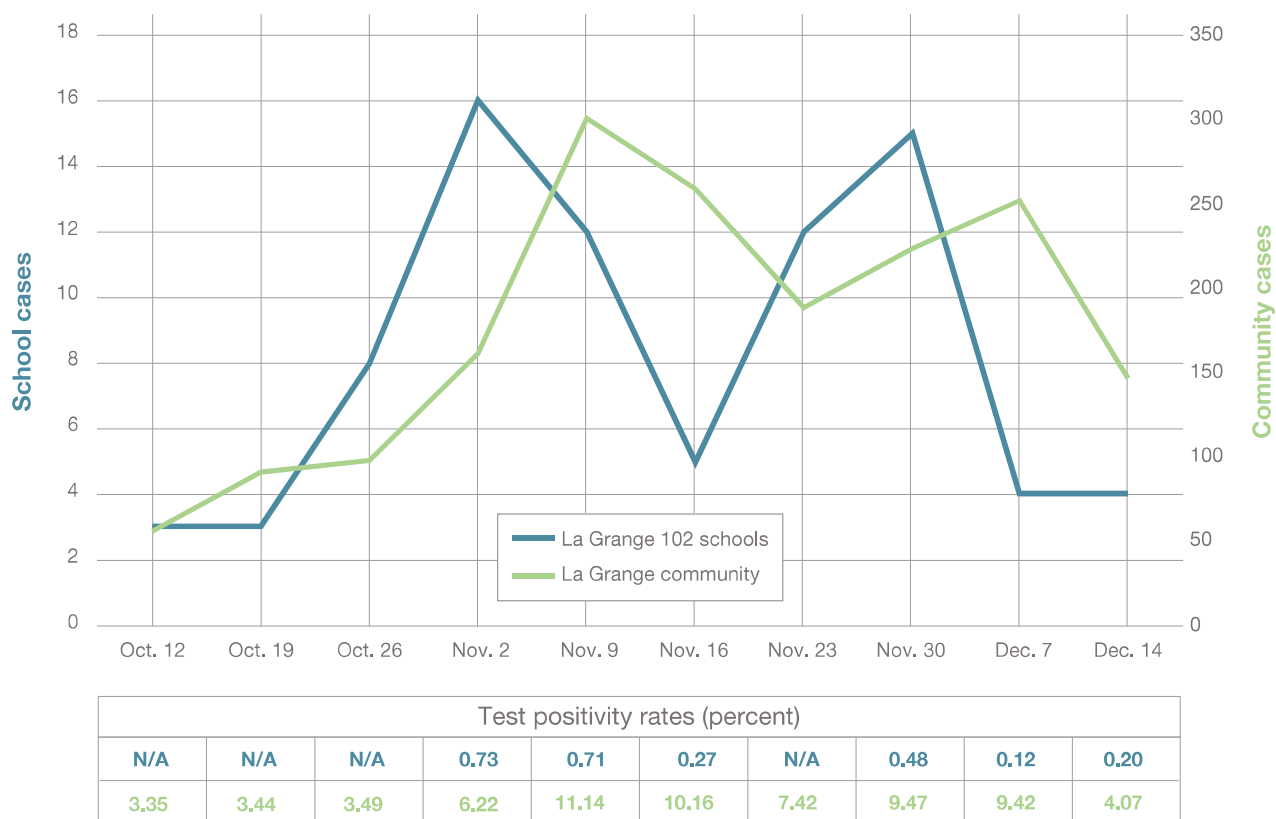
In contrast, testing in the surrounding community was more ad hoc and likely included a larger proportion of individuals who sought out testing because they had symptoms consistent with COVID-19. Positivity rates were higher, but the true rate of community-wide infections was less clear. Nevertheless, the district and the community trends appear to move in tandem, as expected, given that schools are not isolated from the wider community.

Figure 4 also shows that testing in La Grange 102 may have identified trends in infection rates earlier than other public reporting of test results. The district's trend in cases consistently foreshadowed the community's trend by about a week. One potential contributor to this pattern is that the district's screening testing program, with its high participation rate, may have captured individuals earlier in their disease process (i.e., when they are pre-symptomatic). Alternatively, if the community-wide case reporting had a slight lag, this delay could also have contributed to the observed trends. Either way, testing within the La Grange 102 school district may be providing staff and families with a more timely view of COVID-19 infection trends than if they relied on community case reporting alone.

FIGURE 4

Comparative Trends in Weekly Confirmed Positive Cases and Test Positivity Rates for the La Grange 102 District and the La Grange Community from October 2020 to December 2020

Test positivity rates (percent)									
N/A	N/A	N/A	0.73	0.71	0.27	N/A	0.48	0.12	0.20
3.35	3.44	3.49	6.22	11.14	10.16	7.42	9.47	9.42	4.07

NOTES: La Grange community reflects data for ZIP codes 60525 (La Grange, Illinois) and 60526 (La Grange Park, Illinois). Cases in the community reflect weekly totals through the Friday of the school week beginning each Monday, with cases over the weekend assigned to the subsequent week. Community data are from Enigma Forensics,[47] and school data are from La Grange District 102. School cases reflect cases among members of the school community detected through the school-sponsored saliva testing program and through outside testing.

Neighboring districts

Districts that have modeled their programs after La Grange 102 have begun to see similar results:

- In La Grange 105, approximately 60 percent of approximately 1,400 teachers and students participated in weekly or twice-weekly screening testing. Since the program began in October, 32 percent (25 out of 77) of all cases reported to the district have been identified through the school's screening testing program.

- In Glen Ellyn 41, approximately 43 percent of staff and 62 percent of students participate in weekly testing, out of approximately 230 teachers and 3,500 students. Since the program began in late November, 29 percent (14 out of 48) of all cases reported to the district have been identified through the screening testing program.

- In Riverside 96, approximately 65 percent of approximately 130 teachers in the district were tested weekly in December when staff were in-person but almost all students were remote. Student screening testing will begin in January 2021, coinciding with an anticipated return to in-person instruction. In two weeks of staff screening, there were two cases, both identified through school-based screening.

The last word

As a La Grange 102 staff member put it, "When we started picking up clinically significant findings, teachers think, 'Wow, if we didn't have this, this kid would be in my class with COVID.' That's when people thought, 'This will work.'"

For more information:

La Grange 102 website:
https://www.dist102.k12.il.us/

La Grange 105 website:
https://www.d105.net/

La Grange 105, "COVID-19 Assistance/Stats," webpage:
https://www.d105.net/Page/4640

Glen Ellyn 41 website:
https://www.d41.org/

Glen Ellyn 41, "Coronavirus Updates," webpage:
https://www.d41.org/domain/1043

Glen Ellyn 41, COVID-19 dashboard:
https://www.d41.org/domain/1109

Riverside 96 website:
https://www.district96.org/

Riverside 96, "D96 COVID-19 Information & Resources," webpage:
https://www.district96.org/apps/pages/COVID-19

Riverside 96, "District 96 COVID-19 Dashboard: Staff/Student Positivity Metrics," webpage:
https://www.district96.org/apps/pages/covid-dashboard

NPR interview with Ed Campbell:
NPR, "How a Chicago Dad Developed a Coronavirus Testing Program for His Son's School," September 26, 2020:
https://www.npr.org/2020/09/26/917185895/how-a-chicago-dad-developed-a-coronavirus-testing-program-for-his-sons-school

Resourcefulness in a charter school in Wisconsin

"That we're actually doing it is a big win"

Highlights

Local Factors

As a small charter school, One City Schools was able to involve its entire school community in deciding to require testing for in-person instruction.

Community Engagement

Researchers, school officials, and parent champions worked together to build trust and address concerns regarding the testing program.

Partnerships

Researchers conducted a pilot study at the school, providing technical assistance, guidance, and the confidence to implement testing.

About this public charter school

One City Schools (Madison, Wisconsin)
- 11 teachers, 140 students in grades PreK–2 (with new grades to be added each year)
- 46% eligible for free or reduced-price lunch; 80% Black or Hispanic
- Instructional model in fall 2020: In-person instruction, with an option for remote learning

Overview and context

In the summer of 2020, school leaders at One City Schools, a charter school in Madison, Wisconsin, serving a primarily African American population, decided that it had to operate in-person to meet its students' needs. In addition to planning how to implement recommended mitigation measures (e.g., physical distancing in classrooms, face coverings), the school investigated options for frequent screening testing that would be more convenient and accessible for its school community than the free testing offered in the Madison area at the time. In November 2020, the school participated in a five-week pilot research study conducted by the University of Wisconsin–Madison that examined a voluntary, experimental saliva-based assay in students and staff who opted into the study. The university completed the research study, and after school leaders, with input from the broader school community, deemed the testing approach feasible and acceptable, One City Schools took over the testing program. The school now requires students and staff to undergo twice-weekly saliva testing in order to attend in-person classes. If they decline testing, they must participate in remote learning. No staff members have declined testing, and nearly all of the student body is attending in person. "Results of clinical significance" have to be confirmed by a PCR test in a health care setting, because the experimental assay is not yet FDA-approved and can only give a presumptive positive result. As of mid-December, One City Schools was the only Madison public school operating fully in person.

How does the testing program work?

One City Schools, which does not operate school buses, has a staggered drop-off and pickup schedule in which each classroom of students has a set drop-off time between 7:30 and 8:30 a.m. This strategy helps to reduce congestion and congregating outside of the building. At afternoon pickup, a school staff member escorts the student to their parents' car and sends multiple test kits home with the parents for the child to use in the coming weeks. The children provide the saliva sample at home, and on Mondays and Thursdays they hand their sample to a staff member who meets every child at morning drop-off to perform a symptom screening checklist and take their temperature. Staff also provide their saliva samples at home and

ABOUT THE TESTING PROGRAM

Who: All staff and students (required for in-person instruction)

How often: Twice-weekly screening testing

Sample type: Saliva

Where and how analyzed: On-site RT-LAMP assay

drop them off in a centrally located cooler on designated testing days.

Then, two staff members at One City Schools (the Administrative Manager of External Affairs and the School Wellness and Improvement Manager, who had health care and laboratory backgrounds) spend the rest of the day running the RT-LAMP assays (i.e., a molecular test similar to RT-PCR that detects viral RNA). According to One City school leadership, "any willing adult" can perform the test with the right training: "It is doable. This test is not hard. Anyone can learn how to do it. Takes some money, some training, but that's it." The university researchers trained the school personnel to process the samples and One City Schools has transformed the loading bay in the back of the school into a pop-up lab, as shown in Figure 5. The school is currently using leftover, unused materials from the university-led research study that it was allowed to keep but had to purchase its own equipment to run the samples at a cost of $5,000. The school has also discovered that some logistics that initially seemed "tricky" were not actually that difficult. For instance, it found a local company that handled the disposal of its biohazardous waste.

How are test results reported and acted on?

After consenting to participate in the testing program, each student or staff member receives a unique identification number. After performing the test on a submitted saliva sample, the school staff member records the result by hand in a testing log, which does not include names, only identification numbers of those participating in testing. The assay takes about two hours to run, so running all the samples takes an entire day, according to the school leader we interviewed.

FIGURE 5
One City Schools' Pop-Up Laboratory for Processing Saliva Samples

Because the University of Wisconsin developed the test that One City Schools uses and it has not yet received FDA approval, school staff do not report negative results to the individual, but they do report a "positive" result as a "result of clinical significance" that must be confirmed with a PCR test in a health care setting. Staff contact individuals with these results of clinical significance on the same day that they were tested. In the event of a confirmed positive test, the school nurse is in close contact with the local Department of Public Health, which supports the school with contact tracing and determines the appropriate public health response. Individuals who isolate or quarantine must receive a negative PCR test before they can return to the building.

To date, the school has had to quarantine three classrooms (i.e., cohorts) because of positive tests, but because each classroom is a "closed system," meaning the students and staff in each cohort have very limited interaction with those outside their cohort, school leaders feel that testing is working well in concert with other mitigation measures, such as physical distancing and mask-wearing.

Investments needed to implement testing

One City Schools does not charge families for the required test. Instead, it is actively fundraising from local businesses to cover the costs, which One City Schools estimates to be about $150,000 for the period from January to July 2021. The school official we interviewed estimated that the cost per test is about $5 to $7; this includes materials to run the assay and assemble the saliva collection kits, as well as PPE for those collecting samples and running tests. This figure does not include staff time to conduct the test, so "the true cost is higher." About 120 people are tested twice a week, so the costs associated with 240 tests per week add up rapidly. If the school is not able to secure funding to cover its testing program, it might need to transition to the BinaxNOW rapid antigen tests. As described in other profiles in this report, the state provides these tests free of cost, but schools and districts must meet several requirements, such as obtaining a CLIA certificate of waiver, to be eligible to apply for tests from the state's limited supply.

"If we build it, will they come?" How did the school engage its community in testing?

Because testing began as a pilot research study, the school's approach to engaging students, staff, families, teachers, and leadership was unique. Prior to the study's launch, the university researchers had to address a number of questions from parents about the research. One City Schools also addressed concerns of parents and staff as transparently as possible. "It wasn't the easiest," they reported; there was substantial hesitancy about participating in a research study given past mistreatment of African

"There's no leadership around any of this stuff. You're totally in the woods and by yourself on this. No statewide effort, no county-, no district-wide effort to do testing. Certainly nothing at the federal level. This whole pandemic has been on you, all the time. No matter what."

American research participants in this country. School leaders had to reassure parents and staff that the school and the researchers from the University of Wisconsin were only using the saliva samples for COVID-19 testing and that the samples would be subsequently discarded.

One City Schools has the benefit of a very active parent community. Many parents meet through a parent council at least once a month, and three parents serve on the school's board of directors. One of the parent board members, an epidemiologist, was able to communicate with other parents about the benefits and limitations of testing. This parent champion was critical to addressing parents' concerns, and the school leader we interviewed indicated that while community engagement was certainly a challenge, the school has been successful in conveying the value of testing in allowing the school to continue with in-person instruction.

What other challenges had to be overcome?

This section describes additional challenges One City Schools faced in implementing its testing program and how they were addressed.

Logistics of sample collection

The school initially had children provide saliva samples at morning drop-off but later moved to home sample collection. The five-week pilot study allowed the school community to work out the steps involved in sending home the test kits (Figure 6) and getting them back on schedule. At first, there were challenges with having families return their child's sample. Some families forgot to collect the saliva sample at home or the child left the sample in their backpack. Other families misplaced the sample collection kits or struggled to follow the instructions, despite the school attempting to provide a streamlined guide to collecting samples. With time, practice, and multiple reminders, the process has gotten smoother.

FIGURE 6

One City Schools' instructions and materials for collecting saliva samples at home

Spotlight on another pilot research study in a public school district

In November 2020, the Omaha Public School District (OPS) launched a pilot COVID-19 testing program in three South Omaha schools in collaboration with the University of Nebraska Medical Center (UNMC). Weekly screening with saliva-based PCR tests is required for staff, while students can opt in. UNMC analyzes the samples and shares results with the district and with tested individuals using an online reporting system they developed. UNMC and OPS tried different testing procedures to minimize disruptions during the school day. Initially, a trained volunteer (e.g., from UNMC or another local medical college) brought a cart with testing supplies around to each classroom. When this approach proved too disruptive, UNMC helped the pilot schools set up a "testing hub" in a low-traffic area of each school. On testing days, each class is excused to go to the testing hub at a designated time where volunteers assist with collecting samples. The pilot will ramp up to include three additional schools in North Omaha in January 2021, with the goal of gradually scaling up throughout the district. In addition to this screening testing pilot, UNMC is conducting a study that involves regular sampling of air, wastewater, and surfaces within the pilot schools. The aim of this research is to understand the extent to which testing these sources can contribute to understanding COVID-19 transmission risk in schools.

Legal considerations, liability concerns, and HIPAA compliance

The school official we interviewed reported being "hungry for any guidance that [they can] get." In this official's words, "There's no leadership around any of this stuff. You're totally in the woods and by yourself on this. No statewide effort, no county-, no district-wide effort to do testing. Certainly nothing at the federal level. This whole pandemic has been *on you*, all the time. No matter what." Fortunately, the university research team had worked out many of the legal and liability details so the school did not have to start from scratch when it took over testing. However, the school consulted its own legal counsel to ensure that the testing program was correctly designed and was HIPAA-compliant. A school representative noted that "We're taking a risk here. Doing something that other people aren't doing. You're asking people to bring a biosample to your building . . . setting up a lab in the loading bay of your school. It's all scary stuff." However, through the school's participation in the research study and the resulting experience gained through that pilot, the One City School official said they "feel very safe about it" and it is "very worth it."

What were the early results of the testing program?

The school has tested all 114 students and 11 teachers twice-weekly since November 2020. During that time, there were three cases reported among staff and three cases reported among students, all identified outside the school's screening program.

The last word

According to a One City Schools representative, "We're actually doing this. There are a million reasons not to do this. It's an incredible time suck. That we're actually doing it is a big win."

For more information:

One City Schools website:
https://www.onecityschools.org

One City Schools, "One City Offering Free COVID-19 Testing Alternative," webpage, November 16, 2020:
https://www.onecityschools.org/event/one-city-offering-free-covid-19-testing-alternative#

University of Wisconsin–Madison, "Parental Informed Consent for a Minor to Participate in Research and Authorization to Use Protected Health Information for Research," September 8, 2020:
https://uploads-ssl.webflow.com/5ec86458d0fb9b1b9ca10a32/5faf1e6e025d1454a610e46e_Parental%20Informed%20Consent%202020-1142_Sept23_Final.pdf

University of Wisconsin–Madison, "Consent to Participate in Research and Authorization to Use Protected Health Information for Research," September 8, 2020:
https://uploads-ssl.webflow.com/5ec86458d0fb9b1b9ca10a32/5faf1e5cedd531414e7ff4eb_Consent%20Form%202020-1142%20Sept23_final.pdf

ADAPTABILITY IN AN INDEPENDENT SCHOOL IN NEW YORK

"ALL PROTOCOLS ARE SUBJECT TO CHANGE"

Highlights

Local Factors
A multidisciplinary medical committee developed the school's comprehensive and evidence-based reopening plan for fall 2020.

Logistics
The school piloted, and over time, refined its testing protocols and data management and reporting tools.

Community Engagement
School leaders communicated frequently to gradually build engagement and chose a less invasive test to increase acceptability.

About this independent school

Rye Country Day School (Rye, New York)
- 142 teachers, 930 students in grades K–12
- 10% Black or Hispanic
- Instructional model in fall 2020: In-person for PreK through grade 5; hybrid for grades 6–12 (one week on campus, one week remote); remote option available

Overview and context

Rye Country Day School (RCDS) offers on-campus and remote learning options for the 2020–2021 school year. PreK–grade 5 attend daily in-person instruction, while grades 6–12 are on a rotating hybrid schedule (one week on campus, one week off campus). Starting in September 2020, the school required weekly COVID-19 testing of all students and staff who are on campus, as well as students who are on their "off campus week." To facilitate testing, the school launched an opt-in saliva-based pooled testing program, which has tested more than 1,200 individuals each week since its launch. Students and staff may choose to participate in the school's testing program or may obtain a test independently and submit the results to the school. RCDS provided in-person instruction for the entire fall 2020 semester.

How does the testing program work?

RCDS contracted with Mirimus Clinical Labs (http://mirimus.com) to obtain the test kit supplies and analyze the tests. It sends samples to the lab via medical courier. The testing schedule is as follows:

- Mondays: During homeroom, school staff distribute saliva-based test kits to students and staff to collect their saliva samples at home.

- Wednesdays: Students in PreK–grade 5 return their samples to the homeroom teacher.

- Thursdays: Staff and students in grades 6–12 return samples to designated on-campus drop-off locations.

In the hybrid instruction model for upper grades, the students receive kits during their "on campus" weeks. Then, during their "off campus" weeks, they return their samples on Wednesday evening after traditional school hours. Thus, testing occurs weekly for all students who attend in-person, even when students are on their "off-campus" week. The school's policy requires individuals who do not submit a test by the cut-off time to obtain an alternate COVID-19 test and submit the negative result in order to return to campus the following week.

ABOUT THE TESTING PROGRAM

Who: All staff and students (required for in-person instruction)
How often: Weekly screening testing
Sample type: Saliva samples, which are then pooled
Where and how analyzed: Mirimus Clinical Labs, PCR assay

How are test results reported and acted on?

When the testing program first launched, RCDS hired a third-party consultant to assist with linking test barcodes to students and staff, but this was a costly and a temporary solution. Subsequently, the school's information technology staff developed an in-house online tracking system to streamline the process of linking test barcodes. The school nurses scan the barcodes of each sample as they organize them for a courier service to pick up and deliver them to the lab.

At Mirimus Clinical Labs, if a pool of 24 samples returns positive, Mirimus reruns the samples using its SalivaClear protocol (https://www.salivaclear.com), eliminating negative pairs down to as few as two candidates within the pool who may be infected with COVID-19 and identified as "possible-positives." The lab provides the pooled results to the school's medical committee within 24 hours. The test results from the lab are automatically linked using unique barcodes to staff and student names in the school's online tracking system. After the medical committee reviews the results, a school nurse communicates the test result to the possible-positive individuals (i.e., staff and the families of students). Each possible-positive individual must obtain a diagnostic test as soon as possible and remain in quarantine while awaiting results. Mirimus can run a diagnostic PCR test on the original saliva sample using the Yale School of Public Health's SalivaDirect protocol,[48] and the lab now allows individuals to consent online to the diagnostic test. Mirimus contracts with a third-party physician group to provide immediate approval for the diagnostic test. Positive diagnostic tests are reported to the local health department, close contacts of a COVID-19 case are informed immediately, and the school's COVID-19 case data appear on New York state's school COVID-19 dashboard.[49] The school also alerts the school community of each case reported to the state dashboard.

The school closed one full grade level for a day to complete contact tracing and manage staffing coverage due to a COVID-19 infection but has not needed to close the entire school, as of December 2020. In addition, some grade-level cohort closures occurred because of limited staffing (e.g., teachers and substitutes in quarantine) rather than cases within the cohort.

Investments needed to implement testing

The RCDS representative we interviewed flagged cost as a significant challenge. Trustee donations paid for the saliva tests and laboratory costs during the initial three-week pilot. After the pilot, families who pay full tuition and opt in to the school's testing program pay a flat fee of $250 per semester for COVID-19 testing. RCDS absorbs the costs of testing for all staff and for students receiving financial aid. In addition,

Although the lab began pre-assembling test kits for schools, RCDS still had to hire two part-time nurses to manage the testing program.

initially the school's testing program relied on staff and older student volunteers to assemble the saliva test kits, distribute them, assist with on-site sample collection, and track test results. Although the lab began pre-assembling test kits for schools, RCDS still had to hire two part-time nurses to manage the testing program.

"If we build it, will they come?" How did the school engage its community in testing?

RCDS formed several task forces to guide its reopening, including a medical committee that led the health and safety planning. The committee consisted of the Head of School, two health professional trustees, the school nurses, an administrative assistant, and a pediatric infectious disease consultant. The medical committee considered the Broad Institute's recommendation of testing twice a week but deemed it too expensive and logistically difficult.[50] In addition, families, especially those of younger students, had reservations about testing in general (e.g., nasal swabs were seen as invasive; because the FDA approved the saliva test roughly one month before the school planned to use it, parents expressed concerns about test performance), and some students and staff were fearful of returning to campus, even with testing and other measures in place.

What other challenges had to be overcome?

This section describes an additional challenge RCDS faced and how the school addressed it.

Sample collection logistics

Initially, school volunteers had to assemble the saliva test kits, but as the lab accelerated its processes, it began pre-assembling the test kits. The first week of the pilot launched before school reopened. Families and staff went through a carpool line during designated times to pick up a sample kit, provide the saliva sample in their car, and hand it to

a volunteer. In week two of the pilot, when campus officially reopened, the school began sending test kits home with students and staff and having them return their saliva samples according to the schedule described previously. However, hybrid-schedule students who were on their "off-campus" week came to school to pick up their test kit and submitted their samples in person during the pilot. Initially, members of the medical committee sat at outdoor tables to oversee this process.

As COVID-19 community risk increased and the weather grew colder, RCDS determined that it could streamline its sample collection processes for students on the hybrid schedule. The school transitioned to providing students with two test kits during their "on-campus" week, requiring them to save one and submit their "off-campus week" sample to the campus drop-off location the following week. According to the school representative we interviewed, collecting samples at home has generally gone smoothly, and the head of school periodically includes reminders about providing samples in regular communications to the school community.

What were the early results of the testing program?

The school conducts weekly testing of all students and staff who opt in (of 930 students and 142 staff total). Twelve of 33 student cases reported to the school since September (around 36 percent) were identified through the school's screening testing. Three of ten staff cases detected since September (30 percent) were detected through the school's screening testing.

The last word

An RCDS leader said, "Keeping school open during the pandemic required planning and foresight with no playbook on the right way to keep schools safely open. The weekly [screening] testing provided one additional layer of risk mitigation. . . . Most importantly, by testing regularly, it offered some peace of mind for the teachers and families alike."

More on community engagement

RCDS, in partnership with its medical committee, used multiple strategies to engage the school community in testing. First, school leaders launched a three-week pilot testing program to ease the school community into the process. Testing was offered at no cost (made possible by trustees' donations). Then, to sustain engagement, the school provided clear and consistent communication and updates to the school community, such as grade(s) and cohorts with positive pooled samples and follow-up diagnostic test results. These updates include reminders about the school's testing policy and sample collection instructions, and the head of school's October 22, 2020, communication to the school community encouraged patience and understanding, noting, "All protocols are subject to change." RCDS has been flexible with its testing requirement by allowing students and staff to obtain an FDA-approved individual test independently (e.g., if they opt out of pooled testing or miss the weekly sample drop-off). Individuals who choose off-site testing must still submit weekly test results to the school in order to be on campus. Lastly, RCDS chose saliva tests over nasal swabs because they are less invasive and opted for pooled testing because of cost.

For more information:

Rye Country Day School website:
https://www.ryecountryday.org/

Rye Country Day School, "Rye Country Day School Reopening Plan," webpage:
https://www.ryecountryday.org/reopening

Rye Country Day School, "Communication Archive," webpage:
https://www.ryecountryday.org/reopening/key-dates

Rye Country Day School, "Pool Testing & Health Information," webpage:
https://www.ryecountryday.org/reopening/testing-faq

Parent-led testing in an elementary school in New York

"I'm awed by what these parents have done"

Local Factors

Highlights

A group of committed parent champions developed and operate a testing program for their children's school that has garnered national attention.[51]

Logistics

The parent champions researched options and figured out the logistical requirements for testing, such as the test itself, the laboratory, and an app to manage results.

Community Engagement

The parent champions host a weekly evening information session over Zoom for the school community. Parent "pod champions" engage with other parents to address testing-related concerns.

About this public school

Hunter College Elementary School (New York City)
- 30 full-time teachers, 342 students in grades K–6
- 7% eligible for free or reduced lunch; 20% Black or Hispanic
- State-funded, selective admission; affiliated with the City University of New York
- Instructional model in fall 2020: Approximately half of students attended in-person.

Overview and context

After weeks of discussions, information-gathering, and planning, an entirely parent-led saliva PCR pooled testing program launched at Hunter College Elementary School (HCES) in October 2020. A core group of five parents, several of whom have medical and research backgrounds, presented a plan for a testing program they named the Anonymous COVID-19 Testing (ACT) program, to the HCES administration and to the school's Parent Teacher Association (PTA). The administration was supportive but made it clear that the initiative needed to be spearheaded by the parents and would not receive any financial backing from the school; financial support would have required multiple layers of approval, including leadership of the other Hunter College–affiliated schools, the City University of New York, and the New York state government. The PTA voted to approve the plan. The parents we interviewed noted that an "official" testing initiative led by the school would likely not have been as agile or able to launch as quickly. However, close coordination with a supportive HCES administration was critical, for instance, to gain permission for the collection bins to be located on the sidewalk just outside the school entrance and for the main office to hold the samples for less than an hour until the courier picks them up to deliver to the lab. The parent champions noted that they had the "tacit approval of the administration," and a school administrator confirmed this view, commenting that they were "deeply grateful for what ACT has developed" and that the "forward thinking" parent champions have "made the

program work by virtue of their deep commitment. That's what we're beneficiaries of."

How does the testing program work?

All staff and students who opt in to the program download the NewNorm app (https://www.zaka.io/newnorm), which the parent champions selected after considering various options. Every Monday and Thursday morning, students provide a saliva sample in test tubes that parent volunteers (assisted by school staff) had previously distributed. The parents collect their child's saliva sample the night before or in the morning, scan the bar code on the tube's label through the NewNorm app on their phone, sanitize the tube with an alcohol wipe, and put the tube in a small

ABOUT THE TESTING PROGRAM

Who: All staff and students who opt in	
How often: Initially weekly, then became twice-weekly screening testing	
Sample type: Saliva	
Where and how analyzed: Mirimus Clinical Labs, PCR pooled testing	

The "forward thinking" parent champions have "made the program work by virtue of their deep commitment."

plastic bag. The bag with the saliva sample is dropped into a collection bin at the school entrance. If students forget to collect their saliva samples at home, they can provide a sample when they arrive at the school entrance, if they arrive with their guardian. The parent volunteers move all test tubes from the collection bins into a Clinical FedEx box and send them by a prearranged courier to Mirimus Clinical Labs (https://mirimus.com) in Brooklyn, New York. Mirimus runs the PCR tests to detect three sequences of viral RNA on pooled saliva samples using the SalivaClear protocol (https://www.salivaclear.com), with 24 samples per pool. If the pool tests positive, Mirimus then retests individual samples within that pool to identify the positive sample using its SalivaDirect protocol (see the Rye Country Day School profile).

How are test results reported and acted on?

Protecting participants' privacy was one of HCES's most important considerations during the planning process, aside from the cost (see following page). One of the key logistical guiding principles, according to the parent leaders we interviewed, was that the NewNorm app should report test results directly to the parent or staff member and no one else. Because the ACT program was a completely PTA-led initiative, rather than an "official" program operated by the school, the parent leaders who developed the program were in a position to decide that the app would not report test results to school administrators, the school nurse, or a public health entity, to comply with HIPAA law and to avoid becoming a HIPAA-regulated entity by accessing that or any other HIPAA-protected information. As a result, the parent leaders only have data on how many tests have been performed; they do not know the results of those tests.

The app handles the consent process to request and receive an individual's test results, and NewNorm, coordinating with Mirimus Labs, guarantees a turnaround time of 48 hours for results. Turnaround time is typically less than 24 hours and sometimes only 12 hours because the NewNorm and Mirimus teams are expecting the samples.

More about reporting results

Some parents were doubtful that members of their school community would report positive COVID-19 test results from the ACT program. However, the parent leaders countered that when testing occurs in the community, the school also relies on individuals to report their results. Furthermore, because a positive test is managed by a physician, it is reported to the appropriate public health authorities just like any other test. The parent leaders felt it was essential that test results go directly to those tested, while keeping the normal reporting infrastructure in place—that is, positive tests, regardless of where they were conducted, are to be reported to the Hunter Campus COVID Liaison, who then reports the case to the local health department, and through the Everbridge App, which is used at all City University of New York buildings to screen anyone who enters by asking whether they have tested positive for COVID-19 (as well as other travel and symptom-related questions)—if the answer is yes, they are denied entry to the building. Reporting positive results through official channels helped avoid rumors and allowed the school to communicate a clear message to its community.

The result of the pooled testing is reported to the individuals in the pool via the NewNorm app, but if an individual sample has contributed to a positive pool, then the NewNorm app informs that individual to call Mirimus Labs (the other negative individuals are only informed of their negative pool results). During that phone conversation, the positive individual is advised to seek a physician's advice and is provided with the option of a physician contact who works with Mirimus to order the SalivaDirect diagnostic test. That phone call and communication with the physician is the only time the patient identity is knowable and protected by the physician according to HIPAA.

Investments needed to implement testing

The PTA covers a $10 per user per month fee to use the NewNorm app. The test itself is free to staff and students: The Mobilizing Foundation, a foundation established in partnership with Mirimus, subsidizes the cost of the laboratory testing, approximately $7 per test, and the PTA pays

Spotlight on parent champions

Implementing an entirely parent-led testing program requires specialized expertise and the privilege to be able to devote a significant amount of time to developing and supporting program operations. We do not present this model with the expectation that this level of parental involvement is expected, generalizable, or sustainable. The parent champions recognize that their level of investment to fill a critical need for their children's school is not the way testing programs should have to work. Nevertheless, the ACT program offers important implementation lessons for other schools that may have fewer resources and whose communities do not enjoy the same privileges. For instance, one option for schools and districts to overcome privacy concerns is to limit who automatically receives COVID-19 test results. Importantly, the ACT program illustrates just how much HCES parents valued testing and how far they were willing (and able) to go to make it feasible. It demonstrates the power of parent champions to encourage other parents to have their children participate in testing.

the remainder, approximately $8 per test ($192 for a pool of 24). The PTA's annual operating budget comes entirely from parent donations. Initially, there was considerable discussion about spending the PTA funds for this program, and families who have opted to have their children learn remotely have expressed some opposition to spending funds to support the testing of those who opted for in-person learning. However, the parent champions have tried to emphasize that the program benefits everyone—the entire school community and beyond. In a *Wall Street Journal* article from early December 2020, a parent leader estimated that given how many individuals were participating in this voluntary program, and the negotiations with the app developer to reduce the price, the PTA had spent about $5,300 per month since its launch—a cost that reflected the initial cadence of weekly testing.[52] The parent with whom we spoke indicated they expected the monthly cost to increase because the ACT program's parent leaders had recently decided to shift to twice-weekly testing given rising community case rates. The PTA remains committed to providing COVID-19 testing free of charge to all participants through its annual operating budget. As one of the parent leaders told us, "We're not currently considering any model that would involve parents paying" for testing.

"We're not currently considering any model that would involve parents paying."

In addition to the funds provided by the PTA, the ACT program requires an immense amount of parental involvement, with some support by school staff. For example, the school's public safety officers work with the many parent volunteers and help out on collection days to remind children who are coming to school to drop off their samples on their way in the door. As another example, some parents who worked in different parts of New York City area found it difficult to drop the saliva samples off at school if their children were not old enough or reliable enough to drop off their sample. To overcome this hurdle, HCES parents arranged an informal shuttle service, driving all over Manhattan to pick up each other's samples and dropping them at the school.

"If we build it, will they come?" How did the school engage its community in testing?

At first, some parents mistakenly believed that the test was not FDA-approved, that they would be responsible for the cost, that the testing would be mandatory, or that the PTA would receive the test results. The parent champions worked hard to address these misunderstandings, both collectively and through one-on-one conversations, which helped encourage participation in the ACT program. However, some parents have persistent concerns. Some have declined to have their child participate because, as one of the champions told us, "they believe that the parent champions who implemented the program are receiving kickbacks"; others do not believe that the results are truly anonymous; still others are uncomfortable with their child submitting a saliva sample outside of a health care setting.

In addition to addressing the specific concerns noted above, parent leaders at HCES have devoted a considerable amount of time to educating the school community about COVID-19 testing in general—providing information and answering questions on weekly Monday evening webinars and town halls. The parent leaders have also created "pod champions"—parents who agree to serve as the point person for the testing program for their child's learning pod (which is what HCES calls each cohort of students and staff who mostly only interact with each other, thereby reducing COVID-19 transmission risk). Parent leaders have also developed a handbook with guidance for these champions

"It has to be part of a lot of behavior change asks . . . to modulate your risks outside of the school."

on how to respectfully address concerns of school community members. For instance, they have suggested helpful phrases to reframe the conversations (e.g., "100 percent community participation" instead of "100 percent compliance").

These champions framed participation in ACT as a shared social responsibility to keep the school community, and community at large, safe; to reduce anxiety about attending school in-person; and, ultimately, to mitigate the risk of COVID-19 transmission. HCES parents are in constant contact through WhatsApp text messaging groups for each grade, enabled by the small size of the school. Parents in the kindergarten class have spontaneously started posting screenshots of their negative test results to nudge other families to participate and to take precautions as a community, including outside of school. Beyond the core team of five parents, there are many volunteers, almost more than what is needed, on each sample collection day. Overall, the parent leaders note that the program has "created a lot of goodwill."

An important piece of this shared social responsibility is recognizing that testing is only one part of a complete COVID-19 strategy that includes other mitigation measures both inside the school and out in the community. So, like many schools, HCES is working to get everyone aligned around how to reduce exposure risk when not at school. As one parent leader put it, paradoxically, "Our testing strategy is actually a detriment to our staying open, because it may detect more asymptomatic cases that may have been missed. It has to be part of a lot of behavior change asks . . . to modulate your risks outside of the school."

What other challenges had to be overcome?

This section describes additional challenges HCES faced with implementing its ACT program and how they were addressed.

Logistics of sample collection

Some parents had difficulty downloading the app, scanning the QR code, and returning the samples on the correct day.

Multiple options for testing

Staff and students at HCES have other options for COVID-19 testing in addition to the ACT program. While a school administrator estimated that by mid-January 2021, "nearly all" of the in-person students were participating, the staff had had more reservations about participating in a PTA-run program, and some had expressed a desire to be tested using what they considered the "gold standard": nasal swabs. Therefore, if staff prefer, they have priority access to a NYC Health and Hospitals–run program that conducts weekly screening testing using nasal swab specimens for which the school arranged special extended hours for staff. The administrator with whom we spoke said that they are committed to providing "layers" of different options for testing so that individuals can select whichever makes them most comfortable.

The parent leaders developed a user's guide and an FAQ document for the app. One parent also served as a de facto real-time help desk.

The anonymous nature of the testing program

The decision to have the test results only go to the parents or staff through the NewNorm app, rather than be reported to school officials, had trade-offs. For instance, some families accidentally ignored, deleted, or closed the initial notification on their phones that results were available to view. Since no one else receives a notification, it was challenging to help troubleshoot.

Concern around how other school testing policies might affect ACT

In October 2020, after HCES launched its testing program, New York City's Department of Education (DOE) began mandating monthly (and later weekly) surveillance testing through a random sample of 20 percent of students and staff to guide school closure decisions. The HCES teachers' union requested that the school adopt this policy to align with the DOE's approach, despite HCES being exempt from the city's surveillance testing program. The rollout of the weekly, mandatory 20 percent random sampling, modeled after the DOE program, initially caused some confusion about how it would affect the parent-led ACT program. It was decided that a program aimed at testing everyone, including kindergarteners, who are excluded from the DOE

testing, and offered at no charge should continue and supplement the random weekly testing. Therefore, HCES students and staff currently have three opportunities for free testing: the ACT program, the chance to be selected for the random testing, and access to PCR testing at the local hospital.

What were the early results of the testing program?

About 50 to 80 percent of its 342 students and 60 to 70 percent of its 30 teachers have participated in the ACT program since October 2020. There have been three COVID-19 cases among staff, all identified outside of the ACT program. The program has not identified any student cases.

The last word

A parent leader of the ACT program said, "I'm constantly amazed, honored, and awed by what these parents have done to make this possible. I'm so moved by watching this whole team work."

For more information:

Hunter College Elementary School website: https://www.hunterschools.org/elementary-school

Appendix:
Additional Detail on Study Methods

In this appendix, we provide additional detail on our data collection and analysis.

National Scan to Identify Schools, Districts, and States That Had Implemented COVID-19 Testing

Media Scan

We conducted a systematic scan of several databases, including Nexis Uni, U.S. Major Dailies, and Google News Advanced Search, to identify news reports that mentioned schools or districts that had implemented COVID-19 testing as of early December 2020. We searched for articles within the timeframe from July 2020 to December 2020. In addition, we reviewed popular education reporting sources from the same timeframe, including Chalkbeat.org and the74million.org. This resulted in more than 1,500 relevant results, which informed our database of states, districts, and schools that appeared to have implemented COVID-19 testing in the 2020 fall semester.

Referrals from Professional Networks

We received background information from contacts at the following organizations, who also recommended schools and districts that, to their knowledge, had implemented at least some COVID-19 testing for staff and/or students:

- National Education Association

- Council of Chief State School Officers

- National Association of State Boards of Education

- School Superintendents Association

- National Association of Independent Schools

- National Association of Elementary School Principals

- National Association of Secondary School Principals

- National Alliance for Public Charter Schools.

Selection of Entities to Contact

We compiled the states, districts, and schools identified through the above methods into a database and abstracted standardized data elements from each entity, including data on the local context, the testing program characteristics, available documentation and online resources such as data dashboards and templated materials, and contact information for potential stakeholders to interview. We used this database to guide our selection of stakeholders to interview and entities to feature, to present a diversity of testing approaches, location, and school type.

Stakeholder Interviews

In December 2020, we conducted email and phone outreach to more than 100 individuals and completed more than 70 initial telephone interviews with stakeholders at the school, district, and state levels. We covered the following topics in these interviews, and requested additional testing program documentation and any quantitative data about their testing programs they were willing and able to share:

- details of their COVID-19 testing approach

- investments required to implement testing

- barriers to and facilitators of implementing testing

- advice for others seeking to launch a testing program.

Once we had narrowed our sample down to a list of entities we were considering including as a profile, we conducted nearly a dozen follow-up interviews to gather additional details, reviewed the factual accuracy of our write-ups with the stakeholders with whom we spoke, and selected ten to profile in our report. We took near-verbatim notes during these interviews.

Web-Based Survey

Also in December 2020, we fielded a web-based survey to districts and schools that we identified as likely early adopters of COVID-19 screening testing. We asked them about the details of their testing programs, the barriers to and facilitators of testing, and advice to others. To oversample independent schools that had emerged as the most frequent early adopters in other parts of our national scan, the National Association of Independent Schools distributed our survey to all 1,600 of its members.

Data Analysis

We performed descriptive analyses on our quantitative survey data and used a qualitative descriptive approach to organize, using Microsoft Word, the free-text survey responses, and our interview notes by topic (i.e., code), identified *a priori* from the facilitators of testing in our conceptual model. We further categorized these data into broader themes that inform our key findings and recommendations.

Summary of Sources for Profiles

In Table A.1, we summarize the interviews and other data that informed each of our profiles.

TABLE A.1
Sources of information for each profile

Profile	Sources
Testing in two pilot districts in Illinois	Profile is based on 3 interviews with 5 people total; review of district websites; documentation on the websites, and a checklist provided by the state.
State policies to encourage testing in Utah	Profile is based on interviews with 2 individuals working with UDOH, 2 individuals with HERO, and 1 individual at each of the Canyons School District and Davis School District, as well as document review.
Coordination across state agencies in Texas and Missouri	Profile of Texas is based on state-level guidance documents, interviews with four state-level staff across TEA and TDEM, and interviews with one leader each in the Austin Independent School District (ISD), Dallas ISD, and San Antonio ISD. Profile of Missouri is based on document review and interviews with four leaders of Missouri's COVID-19 testing program in K-12 schools.
Local resources supporting testing in California	Profile is based on interviews with two district leaders at SDUSD, one at Del Mar Union, and with one staff person at UC San Diego Health, as well as review of district and university documentation, websites, and data.
Local partners enabling testing in Massachusetts	Profile is based on document and website review and an interview with 5 district staff.
A testing program supporting schools in Colorado	Profile is based on document and website review and interviews with 3 individuals from COVIDCheck Colorado; an interview with a state official; 2 individuals from Westminster Public Schools, and 1 individual from each of the following: Denver Public Schools, Aspen Public Schools, Aurora Public Schools, Mapleton School District.
Home-grown innovation in Illinois	Profile is based on interviews with 6 individuals across the four districts profiled and review of district documentation in the form of FAQs provided to families and students, example consent waivers, and test protocols, and data from districts' COVID-19 dashboards or provided by staff.
Resourcefulness in a charter school in Wisconsin	Profile is based on document review and an interview with a school leader.
Adaptability in an independent school in New York	Profile is based on document review and an interview with a school leader.
Parent-led testing in an elementary school in New York	Profile is based on document review, news media reports, interviews with two parent leaders of the testing program, and an interview with a school leader.

Notes

[1] Melissa Kay Diliberti and Julia H. Kaufman, *Will This School Year Be Another Casualty of the Pandemic? Key Findings from the American Educator Panels Fall 2020 COVID-19 Surveys*, Santa Monica, Calif.: RAND Corporation, RR-A168-4, 2020 (https://www.rand.org/pubs/research_reports/RRA168-4.html); Megan Kuhfeld, James Soland, Beth Tarasawa, Angela Johnson, Erik Ruzek, and Jing Liu, "Projecting the Potential Impact of COVID-19 School Closures on Academic Achievement," *Educational Researcher,* Vol. 49, No. 8, November 2020, pp. 549–565.

[2] Heather L. Schwartz, David Grant, Melissa Kay Diliberti, Gerald P. Hunter, and Claude Messan Setodji, *Remote Learning Is Here to Stay: Results from the First American School District Panel Survey*, Santa Monica, Calif.: RAND Corporation, RR-A956-1, 2020 (https://www.rand.org/pubs/research_reports/RRA956-1.html).

[3] Melissa Kay Diliberti, Heather L. Schwartz, and David Grant, *Stress Topped the Reasons Why Public School Teachers Quit, Even Before COVID-19*, Santa Monica, Calif.: RAND Corporation, 2021.

[4] Margaret A. Honein, Lisa C. Barrios, and John T. Brooks, "Data and Policy to Guide Opening Schools Safely to Limit the Spread of SARS-CoV-2 Infection," *JAMA*, published online January 26, 2021; Dan Goldhaber, Scott A. Imberman, Katharine Strunk, Bryant Hopkins, Nate Brown, Erica Harbatkin, and Tara Kilbride, *To What Extent Does In-Person Schooling Contribute to the Spread of COVID-19? Evidence from Michigan and Washington*, Arlington, Va.: National Center for Analysis of Longitudinal Data in Education Research, CALDER Working Paper No. 247-1220, 2020; Sebastian Walsh, Avirup Chowdhury, Simon Russell, Vickie Braithwaite, Joseph Ward, Claire Waddington, Carol Brayne, Chris Bonell, Russell Viner, and Oliver Mytton, "Do School Closures Reduce Community Transmission of COVID-19? A Systematic Review of Observational Studies," *medRxiv*, January 4, 2021; Douglas Harris, Engy Ziedan, and Susan Hassig, *The Effects of School Reopenings on COVID-19 Hospitalizations*, New Orleans, La.: National Center for Research on Education Access and Choice and Education Research Alliance for New Orleans, 2021 (https://www.reachcentered.org/publications/the-effects-of-school-reopenings-on-covid-19-hospitalizations).

[5] Divya Vohra, Patricia Rowan, Ravi Goyal, John Hotchkiss, and So O'Neil, *Early Insights and Recommendations for Implementing a Covid-19 Antigen Testing Program in K–12 Schools: Lessons Learned from Six Pilot Cities*, Oakland, Calif.: Mathematica and Rockefeller Foundation, January 2021; Laura S. Hamilton, David Grant, Julia H. Kaufman, Melissa Kay Diliberti, Heather L. Schwartz, Gerald P. Hunter, Claude Messan Setodji, and Christopher J. Young, *COVID-19 and the State of K–12 Schools: Results and Technical Documentation from the Spring 2020 American Educator Panels COVID-19 Surveys*, Santa Monica, Calif.: RAND Corporation, RR-A168-1, 2020 (https://www.rand.org/pubs/research_reports/RRA168-1.html); Leah K. Gilbert, Tara W. Strine, Leigh E. Szucs, Tamara N. Crawford, Sharyn E. Parks, Danielle T. Barradas, Rashid Njai, and Jean Y. Ko, "Racial and Ethnic Differences in Parental Attitudes and Concerns About School Reopening During the COVID-19 Pandemic—United States, July 2020," *Morbidity and Mortality Weekly Report*, Vol. 69, No. 49, December 11, 2020, pp. 1848–1852.

[6] Diliberti et al., 2021.

[7] The White House, "President Biden Announces American Rescue Plan," January 20, 2021 (https://www.whitehouse.gov/briefing-room/legislation/2021/01/20/president-biden-announces-american-rescue-plan/).

[8] Everett M. Rogers, *Diffusion of Innovations*, New York: Simon and Schuster, 2010.

[9] The testing landscape is rapidly changing; unless otherwise stated, the data described in this report are current as of December 2020.

[10] The early adopters who contributed to this report did not include schools in six cities participating in a COVID-19 testing demonstration project supported by The Rockefeller Foundation and the Department of Health and Human Services. Participating schools in these six cities received BinaxNOW rapid antigen tests and have been using them in their broader testing strategies. Mathematica, which serves as a learning partner for this pilot effort, produced an interim report detailing early insights and recommendations from this work (Vohra et al., 2021—see note 5).

[11] New York Governor's Office, "Governor Cuomo Releases Guidelines on Testing Protocol for Schools to Reopen in Red or Orange Micro-Cluster Zones," October 30, 2020 (https://www.governor.ny.gov/news/governor-cuomo-releases-guidelines-testing-protocol-schools-reopen-red-or-orange-micro-cluster).

[12] Michael B. Henderson, Paul E. Peterson, and Martin R. West, "Pandemic Parent Survey Finds Perverse Pattern: Students Are More Likely to Be Attending School in Person Where Covid Is Spreading More Rapidly," *Education Next*, Vol. 21, No. 1, Winter 2021.

[13] Caitlyn Rivers, Christina Silcox, Christina Potter, Michelle Franklin, Rebecca Ray, Mira Gill, and Mark McClellan, *Risk Assessment and Testing Protocols for Reducing SARS-CoV-2 Transmission in K–12 Schools*, funded by The Rockefeller Foundation and the Margolis Center for Health Policy, 2020 (https://www.rockefellerfoundation.org/report/risk-assessment-and-testing-considerations-for-reducing-sars-cov-2-transmission-in-k-12-schools).

[14] A faceted taxonomy is a classification scheme that divides a concept, such as COVID-19 testing, into clearly defined, mutually exclusive categories of information (facets) that are combined to describe the concept (William Denton. "How to Make a Faceted Classification and Put It on the Web," Miskatonic University Press blog, March 28, 2009, https://www.miskatonic.org/library/facet-web-howto.html).

[15] The Rockefeller Foundation and the Skoll Foundation, *Covid-19 Testing in K–12 Settings: A Playbook for Educators and Leaders*, February 2021. As of March 1, 2021:

https://www.rockefellerfoundation.org/wp-content/uploads/2021/02/The-RockefellerFoundation-Covid-19-K-12-Testing-Playbook-for-Educators-and-Leaders.pdf

16 Gregory A. Aarons, Michael Hurlburt, and Sarah McCue Horwitz, "Advancing a Conceptual Model of Evidence-Based Practice Implementation in Public Service Sectors," *Administration and Policy in Mental Health and Mental Health Services Research*, Vol. 38, No. 1, January 2011, pp. 4–23.

17 Centers for Disease Control and Prevention, "Interim Considerations for Testing for K-12 School Administrators and Public Health Officials," December 4, 2020 (https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/k-12-testing.html).

18 According to the Centers for Disease Control and Prevention, the Clinical Laboratory Improvement Amendments of 1988 (CLIA) regulations ensure that clinical laboratory tests meet standards for quality and accuracy. Tests that are simple to perform, such that there is little chance of inaccuracy, may be granted CLIA waivers, meaning that they can be performed outside a laboratory. Entities wishing to use BinaxNOW tests must receive a CLIA waiver.

19 New York State Department of Health, "Interim Guidance on COVID-19 Testing Requirements for Public and Non-Public Schools Located in Areas Designated as 'Red' or 'Orange' Cluster Zones Under the New York State Cluster Action Initiative," December 4, 2020 (https://coronavirus.health.ny.gov/system/files/documents/2020/12/guidanceforschoolsinredandorangezones.pdf).

20 Wellesley Public Schools, "WPS Viral Testing Update," December 22, 2020 (https://wellesleyps.org/wp-content/uploads/2020/12/12.22.20-School-Committee-Viral-Testing-presentation.pdf).

21 Vohra et al., 2021.

22 Daniel B. Larremore, Bryan Wilder, Evan Lester, Soraya Shehata, James M. Burke, James A. Hay, Milind Tambe, Michael J. Mina, and Roy Parker, "Test Sensitivity Is Secondary to Frequency and Turnaround Time for COVID-19 Screening," *Science Advances*, Vol. 7, No. 1, 2021.

23 Wellesley Education Foundation, "Safer Teachers, Safer Students: Back-to-School Testing Collaborative Pilot Testing Program," webpage, undated (https://www.wellesleyeducationfoundation.org/testing-collaborative).

24 Synapse School, "Return to Campus Safely," 2020 (https://drive.google.com/file/d/19vHGNv7l37sHDhn0LbLMMyVZqL_REOxt/view).

25 The Rockefeller Foundation and the Skoll Foundation, 2021.

26 Rivers et al., 2020.

27 Although some entities may be using more than one type of test, we focus in these profiles on their primary approach.

28 District statistics for all profiles are from National Center for Education Statistics, "Common Core of Data, CCD Public School District Data 2018–2019," webpage, 2020 (https://nces.ed.gov/ccd/districtsearch); data on the proportion of students who are eligible for free or reduced-price lunch and the proportion of students who are Black or Hispanic are also derived from school level data from National Center for Education Statistics, 2020.

29 Illinois Department of Public Health, "Local Health Department BinaxNOW Allocation Guidance," October 21, 2020 (https://www.dph.illinois.gov/sites/default/files/20201207_IDPH_AntigenTestingBinaxNow.pdf).

30 University of Illinois System, "Shield Illinois Saliva Test," webpage, undated (https://www.uillinois.edu/shield).

31 University of Utah, "Utah Health and Economic Recovery Outreach," webpage, undated (https://eccles.utah.edu/utah-hero/). The HERO project is a team of researchers at the University of Utah that has been providing expert technical assistance and research support to inform the state's COVID-19 mitigation strategies.

32 This profile focuses primarily on the steps taken by UDOH. However, UDOH's work was coordinated with policy initiatives led by the governor's office and facilitated by key stakeholders at various organizations, including the Utah State Board of Education, local health departments, the Utah High School Activities Association, the Utah State Superintendents Association, the Utah School Nurse Association, researchers at HERO, and the Utah Charter School Association.

33 State of Utah, *COVID-19 School Manual*, December 2020 (https://coronavirus.utah.gov/education/school-manual).

34 State of Texas, *State of Texas Emergency Management Plan: K–12 School System COVID-19 Testing Support Guide*, revised December 1, 2020 (https://tdem.texas.gov/wp-content/uploads/2019/08/2020_12_01_K-12-COVID-Testing-Support-Guide.pdf).

35 See Magrielle Eisen, "Project: ACE IT—COVID Rapid Testing App End-User Demo," YouTube video, December 11, 2020 (https://youtu.be/AHIJdA_sYK8).

36 As of January 6, 2021, 678 school systems have opted into the state's testing program; 438 are public school systems and 240 are private school systems.

37 Missouri Department of Elementary and Secondary Education, "Missouri's BinaxNOW Antigen Testing Program for K–12 Institutions," December 17, 2020 (https://health.mo.gov/living/healthcondiseases/communicable/novel-coronavirus/pdf/binaxnow-guidance-education.pdf).

38 The Missouri Department of Elementary and Secondary Education's COVID-19 dashboard is at https://mophep.maps.arcgis.com/apps/opsdashboard/index.html#/131f31dbbd394e8aafca9657bd0e49c1.

39 The district was not able to share specific cost estimates of the program at this time.

[40] San Diego Unified School District, "COVID FAQ," webpage, undated (https://sandiegounified.org/covid-19_status/c_o_v_i_d_f_a_q).

[41] Del Mar Union School District, "Safe Reopening Plan 2020–21," webpage, undated (https://www.dmusd.org/Page/8942).

[42] Broad Institute, "COVID-19 Testing," webpage, undated (https://www.broadinstitute.org/covid-19-testing).

[43] Julie Flaherty, "Tufts Is Studying a Pilot COVID-19 Test That Could Help Neighboring Schools," TuftsNOW, February 5, 2021 (https://now.tufts.edu/articles/tufts-studying-pilot-covid-19-test-could-help-neighboring-schools).

[44] A superintendent update from December 11, 2020, is at https://medford.vod.castus.tv/vod/?video=592b4809-58d3-47e8-ad5b-e80fd4b32e8e&nav=search%2Fsuperintendent.

[45] Total number of cases for students and staff taken from Massachusetts Department of Elementary and Secondary Education, "Positive COVID-19 Case Studies in Schools" webpage, last updated February 10, 2021 (https://www.doe.mass.edu/covid19/positive-cases/#weekly-report).

[46] La Grange School District 102, "COVID-19 Screening FAQ's: 'Safety for All This Fall,'" undated, (https://drive.google.com/file/d/1_j1uG9PVL6XuUMO9wcqceaqasGE8PzwY/view).

[47] Enigma Forensics, "Illinois COVID-19 Statistics" webpage, undated (https://enigmaforensics.com/coronavirus-covid-19-data-tracking/us-coronavirus-covid-19-confirmed-positive-cases-trending/illinois-coronavirus-covid-19-statistics-by-county).

[48] Yale School of Public Health, "What Is SalivaDirect?" webpage, updated October 16, 2020 (https://publichealth.yale.edu/salivadirect/).

[49] Rye Country Day School, "COVID-19 Report Card: Rye Country Day School," webpage, undated (https://schoolcovidreportcard.health.ny.gov/#/schoolData;schBedsCodeId=661800997127;dsBedsCodeId=undefined;schoolType=Private%20School;redirectToHome=true).

[50] Broad Institute, "How the Broad Community Is Responding to COVID-19," webpage, undated (https://www.broadinstitute.org/coronavirus/covid-19).

[51] Sarah Krouse, "New York City School Debates How Best to Test for Covid-19," *Wall Street Journal*, December 10, 2020 (https://www.wsj.com/articles/new-york-city-school-debates-how-best-to-test-for-covid-19-11607605092).

[52] Krouse, 2020.

Glossary and Abbreviations

ACT	Anonymous COVID-19 Testing
CARES Act	Coronavirus Aid, Relief, and Economic Security Act
CCC	COVIDCheck Colorado
CDC	Centers for Disease Control and Prevention
CDPHE	Colorado Department of Public Health and Environment
CLIA	Clinical Laboratory Improvement Amendments
COVID-19	coronavirus disease 2019
Diagnostic testing	testing symptomatic individuals to detect clinical illness
FAQ	frequently asked question
FDA	Food and Drug Administration
HCES	Hunter College Elementary School
HERO	Health and Economic Outreach
HIPAA	Health Insurance Portability and Accountability Act of 1996
HR	Human Resources
ISD	Independent School District
K–12	kindergarten to grade 12
MIT	Massachusetts Institute of Technology
NAIS	National Association of Independent Schools
OPS	Omaha Public School District
PCR	polymerase chain reaction
PPE	personal protective equipment
PTA	Parent Teacher Association
QR code	quick response code
RCDS	Rye Country Day School
RT-LAMP	reverse transcription loop-mediated isothermal amplification
RT-PCR	reverse transcription polymerase chain reaction
screening testing	testing of asymptomatic individuals
SD	school district
SDHHSA	San Diego County Health and Human Services Administration
SDUSD	San Diego Unified School District
STRAC	Southwest Texas Regional Advisory Council
surveillance testing	testing a defined population in order to understand prevalence
symptom screening	detecting potential infections through self-reported symptoms
TDEM	Texas Division of Emergency Management
TEA	Texas Education Association
UC	University of California
UDOH	Utah Department of Health
UNMC	University of Nebraska Medical Center

Acknowledgments

TABLE 5
Organizations we consulted for this report

CA	Del Mar Union School District	IL	Marshall Community Unit School District C-2	MO	Missouri Department of Elementary and Secondary Education
CA	Keys School	IL	Office of the Governor of Illinois	MO	Missouri Department of Health and Senior Services
CA	Rancho Santa Fe School District	IL	Prairie-Hills Elementary School District 144	NC	Highlands Cashiers Health Foundation
CA	San Diego Unified School District	IL	Riverside School District 96	NE	Omaha Public Schools
CA	San Domenico School	LA	St. Helena Parish School District	NE	University of Nebraska Medical Center
CA	Synapse School	MA	Boston Children's Hospital	NJ	Joseph Kushner Hebrew Academy/Rae Kushner Yeshiva High School
CA	UC San Diego Health	MA	Broad Institute	NJ	The Pingry School
CA	The Branson School	MA	Cambridge Public Schools	NV	The Meadows School
CO	27J Schools	MA	CoVerified	NY	Hunter College Elementary School
CO	Aspen School District	MA	Ellis Memorial School	NY	Riverdale Country School
CO	Aurora Public Schools	MA	Ginkgo Bioworks	NY	Rye Country Day School
CO	Colorado Department of Public Health and Environment	MA	Massachusetts COVID-19 Response Command Center	NY	The Calhoun School
CO	COVIDCheck Colorado	MA	Massachusetts Department of Elementary and Secondary Education	OH	Cincinnati Children's Hospital Medical Center
CO	Denver Public Schools	MA	Massachusetts Department of Public Health	OH	Cincinnati Public Schools
CO	Mapleton Public Schools	MA	Massachusetts Institute of Technology	OH	Interact for Health
CO	Westminster Public Schools	MA	Medford Public Schools	TX	Austin Independent School District
CT	Greenwich Academy	MA	Neighborhood Villages	TX	Dallas Independent School District
DC	St. Patrick's Episcopal Day School	MA	Newton Country Day School of the Sacred Heart	TX	San Antonio Independent School District
DC Area	Association of Independent Schools of Greater Washington	MA	The Park School	TX	Texas Division of Emergency Management
GA	The Westminster Schools	MA	Watertown Public Schools	TX	Texas Education Agency
IL	Glen Ellyn School District 41	MA	Wellesley Public Schools	UT	Canyons School District
IL	Illinois Department of Public Health	MD	McLean School	UT	Davis School District
IL	Illinois State Board of Education	MD	Washington Episcopal School	UT	Utah Department of Health
IL	La Grange School District 102	MO	Joplin Health Department	WI	Edgewood Campus School
IL	La Grange School District 105	MO	Joplin Schools	WI	One City Schools

About This Report

RAND Education and Labor is a division of the RAND Corporation that conducts research on early childhood through postsecondary education programs, workforce development, and programs and policies affecting workers, entrepreneurship, and financial literacy and decisionmaking. For more information, contact educationandlabor@rand.org.

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