

EVIDENCE SYNTHESIS BRIEFING NOTE

TOPIC: COVID-19 TESTING STRATEGIES IN SCHOOLS

Information finalized as of March 26, 2021.^a This Briefing Note was completed by the Evidence Synthesis Unit (Research, Analysis and Evaluation Branch, Ministry of Health) in collaboration with a member of the COVID-19 Evidence Synthesis Network. Please refer to the [Methods](#) section for further information.

Purpose: To summarize the evidence on COVID-19 testing strategies for children and staff in schools.

Key Findings:

- A living rapid review (Mar 19, 2021) noted that while surveillance reports are identifying COVID-19 cases among staff, students, and children in schools and daycares, these commonly include single cases or a small number of cases typically less than five. A growing number of studies have randomly selected schools/classes/individuals to undergo testing for active infection (via RT-PCR) or antibodies; consistent across studies, few additional cases are detected, suggesting that widespread asymptomatic transmission is not commonly occurring in these settings.
- US and Canadian guidance generally recommends molecular tests for students and staff, with saliva/nasal samples, sample pooling, or rapid tests as options for more accessible and faster testing approaches. Community prevalence should guide testing frequency (e.g., once per week in areas of moderate-to-high community transmission).
- School testing strategies were identified from Winnipeg, Montreal, Saskatchewan, the US (e.g., Los Angeles, New York City, Massachusetts), England, and Berlin (Germany).
 - **Administration:** Strategies are implemented via collaborations within government, industry, hospitals, and/or research institutions. Testing teams include trained health care providers, support staff, or existing staff resources, with options for supervised self-administration.
 - **Frequency:** Testing ranges from weekly to twice-weekly with options for pooled or random sampling, and results are obtained within 15 minutes to 72 hours.
 - **Test Type:** Molecular PCR (nasal swab or saliva) or rapid tests, with the latter option most commonly used.
 - **Settings:** Testing is primarily conducted in K-12 schools, but other locations may include childcare centres, homes, community test centres, and mobile teams.
 - **Population Targets:** Primarily students, teachers, and other staff, but a few strategies only target staff or include parents/guardians/household bubbles of students participating in school-based learning.
 - **Outcomes:** The Rockefeller Foundation's COVID-19 Antigen Testing pilot program in six US states was the only initiative identified that reported outcomes on the first four months of planning and implementing rapid testing programs in K-12 schools. Weekly screening of all students and staff was found to reduce in-school infections by 50%, making it more effective than masking but less effective than social distancing. However, less frequent or widespread testing added limited value above and beyond other mitigation strategies. In communities that already have a robust testing program, schools should consider whether they need a school-based program or if they could encourage students and teachers to have regular testing at existing community sites.

Ontario Analysis: Guidance (Jan 21, 2021) from The Hospital for Sick Children and Unity Health Toronto recommends that robust testing and contact tracing of students alongside other infection prevention and control measures (e.g., screening, physical distancing) be implemented in order to resume in-person learning and keep schools open even when community transmission is high.

Implementation Implications: School testing strategies should be driven by the local context, including testing capacity, community prevalence, and vaccination status of students and staff. Screening and surveillance protocols should be piloted to test the feasibility, impact, and rapid scaling of such testing. Alongside testing, existing preventative practices should continue in schools (e.g., symptom screening, hand washing, masks, physical distancing, ventilation). Cost, access, logistics burden, and lag time in receiving test results may be key barriers to testing strategies.

^a This briefing note includes current available evidence as of the noted date. It is not intended to be an exhaustive analysis, and other relevant findings may have been reported since completion.

Supporting Evidence

[Table 1](#) lists and describes scientific evidence and jurisdictional best practices on COVID-19 testing strategies for children and staff in schools, including information on age groups, frequency, type(s) of tests, settings, and administration. In the Appendix, [Table 2](#) provides detailed summaries of Canadian and international guidance and best practices. The majority of the information presented is taken directly from the identified sources.

Table 1: Summary of Scientific Evidence and Jurisdictional Guidance on COVID-19 Testing Strategies for Children and Staff in Schools

Scientific Evidence	<p>School Testing Studies</p> <ul style="list-style-type: none"> • A living rapid review of 89 publications by the National Collaborating Centre for Methods and Tools (Mar 19, 2021) noted that there is a growing body of reports using national or regional surveillance data and comprehensive contact tracing and testing strategies to minimize the likelihood of underestimation of COVID-19 cases in schools. While surveillance reports are identifying cases among staff, students, and children in schools and daycares, these commonly include single cases or a small number of cases, typically less than five. <ul style="list-style-type: none"> ○ A growing number of studies have randomly selected schools/classes/individuals to undergo testing for active infection (via RT-PCR) or antibodies; consistent across studies, few additional cases are detected suggesting that widespread asymptomatic transmission is not commonly occurring in these settings. ○ The use of more rigorous data collection (e.g., random testing, comprehensive contact tracing/testing) and enhanced reporting of surveillance data (e.g., index cases, secondary transmission, overall prevalence) in future studies can provide more robust data for interpretation and improve the certainty of findings.¹ • The DETECT Schools Study (Feb 22, 2021) is a prospective observational cohort surveillance study investigating the incidence, transmission, and impact of SARS-CoV-2 in 79 public schools across Western Australia. There are three modules: 1) random spot-testing of 150 students and staff per month for three to six months to screen for asymptomatic SARS-CoV-2 in 40 schools; 2) enhanced surveillance of close contacts following the identification of any COVID-19 case to determine the secondary attack rate of SARS-CoV-2 in 40 schools; and 3) survey monitoring of school staff, students, and their parents to assess psycho-social wellbeing following the first wave of the COVID-19 pandemic in all 79 schools. Modules 1 and 3 are in progress, and Module 2 will be initiated as needed. <ul style="list-style-type: none"> ○ A combined oropharyngeal and anterior nasal (OP/Na) swab will be used,^b and PCR testing of all swabs for SARS-CoV-2 will be carried out using an in-house PCR platform. Testing
----------------------------	--

^b An OP swab (tonsillar beds and the back of the throat, avoiding the tongue) and subsequent Na swab (along the floor of the nasal cavity parallel to the palate to a depth of one to two centimetres before resistance is encountered at the nasal turbinates) will be taken sequentially with a single fine flexible shaft flocked swab (CITOSWAB Flocked Swab, Gaia Science, Singapore). This testing approach diverges from the nasopharyngeal sampling commonly used for COVID-19 testing in clinics, which is often uncomfortable, leading to a high rate of non-compliance. The DETECT Schools Study sampling method combines the collection of nasal and oral samples to maximize the sensitivity of testing while causing minimal discomfort. OP/Na swabbing aligns with the current recommendations from the Communicable Diseases Network Australia COVID-19 National Guidelines for Public Health Units (July 30, 2020), which states that for most patients with mild illness (this is the closest to asymptomatic), collection of OP/Na swabs is a low-risk procedure that can be performed with appropriate contact and droplet precautions. This approach has recently been employed in some health care settings for pediatric testing, and significantly increases the tolerability of testing. If accepted by the pediatric DETECT cohort, this validated testing approach could be repurposed in the event of

	<p>team members are trained in swab collection by a pediatric infectious disease specialist, as well as the use of the data collection database.</p> <ul style="list-style-type: none"> o This protocol is the product of an effective partnership between multiple stakeholders, including government, health service providers, researchers, and the community.² <p>School Testing Challenges</p> <ul style="list-style-type: none"> • A US research commentary (Dec 3, 2020) noted that available guidance documents typically instruct schools to gain access to testing by contacting local public health departments, and few schools appear to have solidified a strategy, especially one that extends beyond testing of symptomatic persons. Most reopening plans instead focus on screening for COVID-19 symptoms. While the commentary advocates for routine screening using rapid tests, it highlights why it is challenging for schools to implement: 1) access to testing because of financial barriers and K-12 schools are reliant on either public health departments or private contracting; 2) lag time in receiving test results, particularly with limited access to rapid diagnostic tests; and 3) logistics of implementing recommended responses to positive COVID-19 test results (e.g., isolation, quarantine, remote education delivery). These challenges also exacerbate pre-existing socioeconomic and racial inequities among schools. The commentary suggested that the federal government can help by continuing to fund development of novel tests, including rapid antigen and saliva-based tests, and by strengthening efforts to ensure swift, broad, and equitable distribution.³
<p>International Scan</p>	<p>Guidance</p> <ul style="list-style-type: none"> • Guidance was identified from the following US institutions: US Centers for Disease Control and Prevention (CDC) (Dec 4, 2020; Mar 19, 2021),^{4,5} US Department of Education (Feb 12, 2021),⁶ and Duke-Margolis Center for Health Policy and Johns Hopkins Center for Health Security (Oct 2020).^{7,8} o Administration: School administrators should collaborate with public health officials for implementing school-based testing strategies by trained health professionals. o Frequency: Dependent on the level of community transmission, but at least once per week for screening testing, especially in areas of moderate-to-high community transmission. o Test Type: Molecular or antigen tests for diagnostic and screening (random samples or pooled testing) purposes. o Settings: Schools and the community. o Population Targets: Use a tiered risk approach, for example: 1) symptomatic students, teachers, and staff; 2) close and potential contacts; and 3) asymptomatic individuals with possible exposure in the context of outbreak settings. o Consent: Should be required. o Challenges: These may include limited resources and training, high degree of coordination and information exchange, legal issues (e.g., privacy, consent, who administers tests), and efficacy of antigen tests. <p>Jurisdictional Strategies</p> <ul style="list-style-type: none"> • School testing strategies were identified from Los Angeles' (LA) Safe Steps to Safe Schools program,^{9,10} Massachusetts' (MA) Pooled Testing program,^{11,12,13} New York City's (NYC)

increased community transmission in Western Australia for rapid COVID-19 screening in other settings, including universities, childcare, and aged care facilities ([Mullance et al., Feb 22, 2021](#)).

	<p>initiative,¹⁴ the Rockefeller Foundation’s COVID-19 Antigen Testing pilot program in six US states,^{15,c} England’s asymptomatic testing program,¹⁶ and Berlin’s Testing Strategy.^{17,18,19}</p> <ul style="list-style-type: none"> ○ Administration: Strategies are implemented via collaborations within government, industry, hospitals, and/or research institutions in all jurisdictions. Testing teams include health care providers and support staff (LA, NYC, and Rockefeller) or existing staff resources (MA), with options for supervised self-administration for teachers and older students (MA and NYC). Self-administered testing kits are provided for home delivery or at community test sites (England). ○ Frequency: Weekly pooled testing with results within 24-48 hours (MA), random weekly testing of 20% of school population with results provided within 48-72 hours (NYC), weekly testing (Rockefeller), and twice-weekly testing (England). Routine testing, but no further information provided (LA and Berlin). ○ Test Type: PCR-RT nasal swab or saliva tests (LA), swab tests (NYC), and rapid tests (MA, Rockefeller, and England). ○ Settings: Tests are conducted in K-12 schools (LA, MA, NYC, and Rockefeller), childcare centres (England and Berlin), homes or local community test centres (England), and community test centres and mobile teams at schools (Berlin). Individuals can also get tested by their own care provider (LA). ○ Population Targets: Students, teachers, and staff in all jurisdictions, and parents, guardians, or household bubbles of students participating in school-based learning (LA and England). There are options to target smaller subsets of schools, grades, students, or staff (MA). ○ Consent: Consent is required (LA, MA, NYC, and Rockefeller), and those who do not wish to participate must continue online learning (LA, MA, and NYC). ○ Outcomes: The Rockefeller Foundation’s pilot program was the only initiative identified that reported outcomes on the six sites’ first four months of planning and implementing rapid point-of-care antigen testing programs in K-12 schools. Weekly screening of all students, teachers, and staff was found to reduce in-school infections by 50%, making it more effective than masking but less effective than social distancing. However, less frequent or widespread testing added limited value above and beyond other mitigation strategies. Many teachers, students, and parents felt more comfortable returning to in-person learning if they knew that their school would provide testing. In communities that already have a robust testing program, school leaders should consider whether they need a school-based program or if they could encourage students and teachers to have regular testing at existing community sites.
<p>Canadian Scan</p>	<p>Guidance</p> <ul style="list-style-type: none"> ● Canada’s COVID-19 Testing and Screening Expert Advisory Panel recommended (Mar 12, 2021) testing and screening strategies in primary and secondary schools. <ul style="list-style-type: none"> ○ Administration: Shifting the screening and testing process to other trained individuals (e.g., paramedics, parents, secondary students) may reduce the strain on health care workers. ○ Frequency: Community prevalence should guide testing frequency. ○ Test Type: PCR tests as screening tests preferably, with swish-and-gargle, spit, or nasal sample collections and sample pooling to provide more accessible testing approaches.

^c The six pilot sites are: Central Falls, Rhode Island; Los Angeles, California; Louisville, Kentucky; New Orleans, Louisiana; Tulsa, Oklahoma; and Washington, District of Columbia). These pilots will provide real-world insights about best practices for schools across the US on how to effectively integrate testing into school settings for K-12 students and teachers ([Vohra et al., Jan 2021](#)).

	<ul style="list-style-type: none"> ○ <u>Settings</u>: Primarily in communities with high prevalence of COVID-19. ○ <u>Population Targets</u>: Children, teachers, and staff.²⁰ <p>Jurisdictional Strategies</p> <ul style="list-style-type: none"> ● School testing strategies were identified from Winnipeg’s Fast Pass pilot program,^{21,22} Montreal’s pilot project in two high schools,²³ and Saskatchewan’s Rapid Testing program.²⁴ <ul style="list-style-type: none"> ○ <u>Administration</u>: Testing strategies are implemented by researchers (Montreal), medical companies (Winnipeg), and government (Saskatchewan). In all jurisdictions, tests are administered by trained individuals. ○ <u>Frequency</u>: Test bookings are made through an appointment system with results provided within eight hours (Winnipeg), and asymptomatic volunteers are chosen at random weekly with results available within 15 minutes (Montreal). Testing parameters are to be determined in Saskatchewan. ○ <u>Test Type</u>: Rapid tests (Winnipeg, Montreal, and Saskatchewan). ○ <u>Settings</u>: Tests are conducted in two high schools (Montreal), a central community location so potentially symptomatic people are not entering schools (Winnipeg), and in all K-12 schools (Saskatchewan). ○ <u>Population Targets</u>: Only teachers and other staff in schools, childcare centres, family/group childcare homes (Winnipeg), and students, teachers, and staff (Montreal and Saskatchewan).
<p>Ontario Scan</p>	<ul style="list-style-type: none"> ● <u>Guidance</u> (Jan 21, 2021) from The Hospital for Sick Children and Unity Health Toronto, with contributions and endorsements from other hospitals and providers, recommends that robust testing and contact tracing of students alongside other infection prevention and control measures (e.g., screening, hand hygiene, physical distancing, cleaning) be implemented in order to resume in-person learning and keep schools open even when community transmission is high. <ul style="list-style-type: none"> ○ <u>Administration</u>: Early partnership with schools and testing partners is recommended to minimize organization and logistical burden on schools. ○ <u>Frequency</u>: Targeted large-scale, one-time surveillance (i.e., point prevalence) programs for pre-symptomatic or asymptomatic children are not generally recommended, but exceptions may be considered for situations where the pre-test probability of SARS-CoV-2 infection is higher (e.g., moderate-to-high prevalence settings and in schools with outbreaks identified). Routine (e.g., twice-weekly) testing of asymptomatic students prior to entering the school may be considered during periods of moderate-to-high community transmission; however, it is not currently recommended or feasible with the available testing options. This recommendation should be re-evaluated as new tests become available taking into consideration test availability, properties, and testing priorities. ○ <u>Test Type</u>: Decisions about which PCR or rapid tests to use should consider test properties and practical aspects, such as sensitivity, specificity, purpose (diagnosis vs. surveillance), ease of collection and processing, and the time required to obtain test results. Laboratory-based molecular tests are preferred for symptomatic or asymptomatic children, given its high sensitivity and capacity. The nasopharyngeal swab is the preferred specimen type, but alternatives (e.g., saliva, buccal-nares swab testing) may be considered as they minimize discomfort, allow for ease of testing, and require less human resources. ○ <u>Settings</u>: On-site mobile testing and/or targeted surveillance initiatives are recommended.²⁵

Methods

The COVID-19 Evidence Synthesis Network is comprised of groups specializing in evidence synthesis and knowledge translation. The group has committed to provide their expertise to provide high-quality, relevant, and timely synthesized research evidence about COVID-19 to inform decision makers as the pandemic continues. The following member of the Network provided evidence synthesis products that were used to develop this Evidence Synthesis Briefing Note:

- McMaster Health Forum. (March 23, 2021). Email Communications.

Search Methods

Individual peer-reviewed articles and review articles were identified through PubMed, COVID-19 Evidence Network to support Decision-making (COVID-END), and Google Scholar. Grey literature was identified through Google and relevant government websites. The search was limited to English sources and therefore may not capture the full extent of initiatives in non-English speaking countries. Full-text results extracted were limited to those available through Open Access or studies made available to the Ministry by our partners. There was a limited amount of time available to perform this literature search, and as a result, this Evidence Synthesis Briefing Note may not have captured all of the information available.

The following keywords were used to identify relevant articles and documents for this Evidence Synthesis Briefing Note: “child*”, “COVID-19”, “policy”, “program”, “SARS-CoV-2”, “school”, “strategy”, “teacher”, and “testing”.

For more information, please contact the [Research, Analysis and Evaluation Branch \(Ministry of Health\)](#).

Appendix

Table 2: Summary of Jurisdictional Guidance and Best Practices on COVID-19 Testing Strategies for Children and Staff in Schools

Jurisdiction	Best Practices and Recommendations
<p>Canada</p> <p>Government of Canada – Canada’s COVID-19 Testing and Screening Expert Advisory Panel^{26,d}</p> <p>(Mar 12, 2021)</p>	<p>The Advisory Panel’s report provides recommendations for testing and screening strategies in primary and secondary schools. The report aims to support ongoing operation of in-person learning while continuing to minimize community transmission of COVID-19. These recommendations are supported by case studies. While a robust body of evidence is not currently available, the case studies serve as an example of how a screening test strategy could be implemented for schools where warranted. The Panel’s recommendations focus on five priority areas for action:</p> <ul style="list-style-type: none"> ○ Ensure the design of testing and screening strategies for schools addresses equity. ○ Make diagnostic tests for symptomatic students and staff a priority. ○ Let community prevalence guide screening test strategies and testing frequency. ○ Establish innovative partnerships to address staffing requirements for screening. ○ Undertake further research to evaluate and inform testing and screening strategies for: improving sample collection for children, pooling samples to increase the number of specimens tested when appropriate, and evaluating screening test strategies. ● Administration: Shifting the screening and testing process to other trained professionals presents an opportunity to reduce the strain on health care workers. The following are human resource and task-shifting recommendations for schools: <ul style="list-style-type: none"> ○ Use a wide variety of professionals (e.g., pharmacists, paramedics) to collect samples. ○ Train parents to collect samples from primary school students using techniques and kits at home. ○ Train secondary students to collect their own samples using techniques and kits without the need for health care professional supervision. ○ Consider the use of third-party professionals to undertake systematic testing and screening. ○ Establish innovative partnerships and collaborations to address staffing requirements to implement screening programs. ● Frequency: Community prevalence should guide testing frequency. ● Test Type: PCR tests are the preferred method for screening. Lower sensitivity tests, such as rapid antigen tests, can be used to complement this capacity. Swish-and-gargle, spit, or nasal sample collections may be more accessible testing approaches for children.^e Sample pooling may be used to increase the number of specimens for testing at one time. ● Settings: Recommendations are focused primarily on communities with high prevalence of COVID-19 (as defined by each jurisdiction). For this reason, they should not be interpreted as being prescriptive, nor as a one-size-fits-all approach. In low-prevalence communities, school closures are less likely. ● Population Targets: Children, teachers, and staff.

^d In November 2020, the federal Minister of Health established the COVID-19 Testing and Screening Expert Advisory Panel. The Panel provides evidence-informed advice to the federal government on science and policy related to existing and innovative approaches to testing and screening ([Government of Canada, Mar 12, 2021](#)).

^e In swish-and-gargle, the person swishes and gargles salt water before spitting the sample into a tube; however, young children may find it hard to gargle or may dislike the taste of the salt-water solution. Spit sample collection (called “neat saliva” collection) involves spitting into a funnel or straw. Unlike nasopharyngeal swabs, nasal swabs do not require a swab to be inserted as far into the nose ([Government of Canada, Mar 12, 2021](#)).

<p>Ontario – The Hospital for Sick Children (SickKids) and Unity Health Toronto, with contributions/endorsements from other hospitals and providers²⁷</p> <p>(Jan 21, 2021)</p>	<p>Guidance recommends that robust testing and contact tracing alongside other infection prevention and control measures (e.g., screening, hand hygiene, physical distancing, cohorting, cleaning, ventilation) be implemented in order to resume in-person learning and keep schools open even when community transmission is high.</p> <ul style="list-style-type: none"> • Administration: Early partnership with schools and testing partners is recommended in order to minimize organization and logistical burden on schools to produce line lists and administrative set up in a short time frame that may be required for testing. • Frequency: <ul style="list-style-type: none"> ○ Targeted large-scale one-time surveillance (i.e., point prevalence) programs for presymptomatic or asymptomatic children are not generally recommended. Targeted surveillance may be reasonable in situations where the pre-test probability of SARS-CoV-2 infection is higher (e.g., moderate to high prevalence settings and in schools with outbreaks identified), and may be considered in discussion with local public health units. ○ Routine (e.g., twice-weekly) testing of asymptomatic students, prior to entering the school, is a screening strategy that could be considered during periods of moderate to high community transmission. However, it is not currently recommended or feasible with the available testing options. This recommendation should be re-evaluated as new tests become available taking into consideration test availability, properties, and testing priorities. • Test Type: Decisions around which tests to use (PCR, or rapid testing such as rapid molecular or antigen detection tests) should take into account test properties such as sensitivity and specificity, purpose (diagnosis versus surveillance) and practical aspects including ease of collection (site being sampled and its acceptability to those being tested), ease of processing, and the time required to obtain test results. <ul style="list-style-type: none"> ○ Laboratory-based molecular tests are preferred for symptomatic or asymptomatic children, given its high sensitivity and capacity. ○ Testing with a rapid molecular test may be considered for symptomatic children if accessibility to laboratory testing is a barrier, for example, due to geographic concerns (rural area). In these situations, a lower sensitivity test with rapid turnaround is preferred over limited or significantly delayed test results. ○ Testing with a rapid antigen test is not recommended for symptomatic or asymptomatic children. ○ The nasopharyngeal swab is the preferred specimen type for SARS-CoV-2 testing. Alternative specimens, including saliva, buccal-nares swab, or throat-nares swab, may be considered (in discussion with local laboratory partners), as this will likely increase cooperation among children and promote willingness for future testing among households. • Settings: Use of on-site mobile testing capacity for exposed cohorts and/or a targeted surveillance initiative is recommended. Saliva or buccal-nares swab testing would be ideal for this purpose (if available) as it minimizes discomfort and allows for ease of testing within a school environment with less human resources need. • Population Targets: School-aged children and youth.
<p>Winnipeg, Manitoba – Fast Pass Pilot Program^{28,29}</p> <p>(Jan 18, 2021)</p>	<p>This pilot program offers appointment-based rapid tests for teachers and other school staff, thus providing a dedicated testing stream to people working in schools so as to quickly identify any cases of COVID-19, enable faster contact tracing, and help reduce COVID-19 spread in schools and community.</p> <ul style="list-style-type: none"> • Administration: The rapid test sites are managed by Dynacare, an Ontario-based medical company, while the tests will be administered by people trained through a new program at Red River College, using the lab-based Songbird Hyris bCUBE rapid test. • Frequency: Appointments system, with results received within eight hours on the same day of receiving a test. • Test Type: Songbird Hyris bCUBE lab-based rapid test (deep nasal swab). • Settings: A centralized location (1066 Nairn Ave.) instead of schools so symptomatic people are not entering schools to be tested. • Population Targets: Teachers and school staff (e.g., bus drivers, custodians) working directly with students, and individuals working in licensed childcare centres, nursery schools, and family/group childcare homes, including eligible early child development specialists or

	autism applied behaviour analysts/consultants. Eligible individuals include those who are symptomatic, identified as close contacts as a result of exposure at a school/childcare setting, or have a symptomatic household member.
<p>Montreal, Quebec – Pilot Project at Pensionnat du Saint-Nom-de-Marie in Outremont and Calixa-Lavallée in Montreal North³⁰</p> <p>(Jan 2021)</p>	<p>Rapid testing for COVID-19 has started in two Montreal schools to see if it has any added value in terms of outbreaks in school settings, in addition to screening. This pilot project will last for six months, and may potentially be implemented in other schools.</p> <ul style="list-style-type: none"> • Administration: Dr. Caroline Quach, pediatric infectious diseases specialist at Ste. Justine Hospital, is the lead researcher. • Frequency: Asymptomatic volunteers are tested weekly at random, with results available within 15 minutes. • Test Type: Rapid antigenic detection test. • Settings: Within two high schools. • Population Targets: Staff and students. • Consent: 25% of students have consented and 25% of staff have consented.
<p>Saskatchewan – Rapid Testing Program³¹</p> <p>(Mar 22, 2021)</p>	<p>K-12 schools across the province are being shipped 100,000 rapid tests, with rapid testing in schools to begin as early as the week of Mar 22, 2021.</p> <ul style="list-style-type: none"> • Administration: The School Testing Deployment Plan for COVID-19 is being implemented by the Saskatchewan Ministry of Education and the Ministry of Health, in collaboration with the Saskatchewan Health Authority. Teachers and school staff are not expected to administer the tests. The test can be administered by laypeople who have completed a training program through the Saskatchewan Health Authority lab. • Frequency: Schools will work with their local medical health officers to determine when testing is appropriate. • Test Type: Rapid antigen test with short nasal swab. A positive test requires confirmation by a PCR test provided by the Saskatchewan Health Authority. A negative test does not need to be confirmed as long as the individual has no symptoms of COVID-19. • Settings: K-12 schools in the province. • Population Targets: Students, teachers, and school staff. • Consent: Schools will work with parents and caregivers to ensure consent is in place.
United States (US)	
<p>Centers for Disease Control and Prevention (CDC) – Interim Considerations for Testing for K-12 School Administrators and Public Health Officials^{32,33}</p> <p>(Dec 4, 2020; Mar 19, 2021)</p>	<p>This guideline is meant to supplement any federal, state, tribal, territorial, or local health and safety or privacy laws, rules, regulations, and policies with which schools must comply. The decision to implement testing in schools should be guided by what is feasible, practical, and acceptable. Testing to diagnose COVID-19 is part of a comprehensive strategy and should be used in conjunction with promoting behaviours that reduce spread (e.g., mask use, social distancing, hand hygiene); maintaining healthy environments (e.g., cleaning and disinfection, ventilation); maintaining healthy operations (e.g., scheduling, virtual learning, class sizes); and preparing for when someone gets sick.</p> <ul style="list-style-type: none"> • Administration: This guidance is intended for K-12 school administrators working in collaboration with their state, tribal, local, and territorial (STLT) public health officials. While these considerations were developed with public schools, including charter schools, in mind, private schools may also find these considerations useful. A checklist of considerations for implementing school-based testing strategies, related to feasibility, logistics, and ethics, are provided here. • Testing Priority: Schools that have opened for any in-person classes (including hybrid, which includes combination of in-person and virtual classes) can benefit from developing a testing strategy. Other indicators for prioritizing which schools to test include: <ul style="list-style-type: none"> ○ Schools in communities disproportionately affected or that lack access to testing. ○ Schools in communities with moderate, higher, and highest risk of transmission. ○ Schools with an active outbreak. • Eligibility: School-based testing may be considered for: <ul style="list-style-type: none"> ○ People in a school setting who show signs or symptoms consistent with COVID-19 while at school.

- Schools in a community where public health officials are recommending expanded testing on a *voluntary basis*, including testing of a sample of asymptomatic individuals, especially in areas of moderate to high community transmission.
 - If a school is implementing a testing strategy, testing should be offered on a voluntary basis. It is unethical and illegal to test someone who does not want to be tested, including students whose parents or guardians do not want them to be tested. It is not recommended to retest individuals who have tested positive and do not have symptoms for COVID-19 for up to three months from their last positive test. Data currently suggest that some individuals test persistently positive due to residual virus material but are unlikely to be infectious. Parents or guardians may request documentation from their health care provider to indicate the date and type of the student's most recent COVID-19 test.
- If the school is experiencing an outbreak, the school should immediately notify public health officials and collaborate to facilitate increased testing and contact tracing, as necessary.
- **Test Type:** Molecular (nasal or throat swabs, and saliva or sputum tests) and antigen (nasal or throat swab) tests.
- **Settings:** Schools (classrooms, lunchrooms, athletic teams, extracurricular activities, after-school care) and community.
 - In some schools, school-based health care professionals (e.g., school nurses) may perform COVID-19 antigen testing in school-based health centres if they receive a Clinical Laboratory Improvement Amendments (CLIA) [certificate of waiver](#). It is important that school-based health care professionals have access to, and training on the proper use of PPE.
 - Not every school or school-based health care professional will have the resources or training to conduct testing. Public health officials should work with schools to help link students and their families, teachers, and staff to other opportunities for testing in their community.
- **Population Targets:** Once public health officials determine the school's risk category, public health officials working in collaboration with school administrators can prioritize which staff, teachers, and students should be offered school-based testing using a tiered approach:
 1. Students, teachers, and staff with symptoms.
 2. Students, teachers, and staff who have had contact with someone with COVID-19.
 - *Close Contacts:* Students, teachers, and staff who were within six feet apart from the individual with COVID-19 for a total of 15 minutes or more beginning two days before the individual with COVID-19 became symptomatic (or, for asymptomatic individuals, two days prior to specimen collection) until the time of isolation.
 - *Potential Contacts:* Students, teachers, and staff in the same classroom/cohort/pod as the person with COVID-19 who always kept six feet distance between persons (e.g., students, teachers, or staff in the same hallway, but not sharing a classroom or bathroom; students who took the same bus but were farther than six feet apart from other riders at the same time as a person with COVID-19).
 3. All students, faculty, and staff with possible exposure in the context of outbreak settings.
 - Asymptomatic staff, teachers and students who are not close contacts should also be considered for testing in schools where the risk of transmission is moderate to high.
- **Diagnostic Testing:**
 - *Waiting on Test Results:* Schools can provide options to separate students with COVID-19 symptoms or suspected or confirmed COVID-19 diagnoses by, for example, placing students in isolation room/areas until transportation can be arranged to send them home or seek emergency medical attention.
 - *Symptomatic People:* Teachers, staff, and students are advised to stay home if they are sick or if they have been exposed to COVID-19.
 - *Asymptomatic People:* Close contacts and other potentially exposed persons can be tested and either isolated for 10 days (if they have COVID-19) or quarantined for 14 days (if they are a close contact without symptoms or a negative test result).
 - *Outbreak:* Classrooms or schools may temporarily suspend in-person instruction when experiencing an active outbreak. The local health department will facilitate contact tracing and testing for schools with an active outbreak.

	<ul style="list-style-type: none"> ○ <i>Repeat testing and/or expanded testing</i>: In schools where the risk of transmission is moderate to high, public health officials working collaboratively with school administrators can determine the appropriateness of offering repeat testing to randomly-selected asymptomatic teachers, staff, and students at the school. Testing teachers and staff should be prioritized over students in any sampling strategy, and older students prioritized over younger students. Persons who have recovered from COVID-19 in the past three months should be excluded from random selection. ○ <i>Indicators for Transmission</i>: At low levels of community transmission (blue), schools should refer students, teachers, and staff with symptoms or recent history of close contact with a confirmed case for diagnostic testing to identify or rule out SARS-CoV-2 infection. At moderate (yellow), substantial (orange), and high (red) levels, and at low (blue) levels for teachers and staff, referral to diagnostic testing is combined with screening testing to monitor any increases in infection rates.^f ● Screening Testing: For schools that implement it, screening testing should be offered at moderate (yellow), substantial (orange), and high (red) levels of community transmission, to students, teachers, and staff, and at low (blue) levels to teachers and staff, at least once per week. Schools may consider using a random sample of at least 10% of students or pooled testing as a screening testing strategy for students.^g <ul style="list-style-type: none"> ○ For low (blue) and moderate (yellow) levels of community transmission, testing for high-,intermediate-, and low-risk sports should be at least once per week. ○ For substantial (orange) and high (red) levels of community transmission, testing for high-risk sports should be at least twice a week, and once a week for intermediate- and low-risk sports. ● Consent: School-based testing should never be conducted without consent from a parent or legal guardian (for minor students) or from the individual him or herself (for adults). Assent may also be considered for minor students. ● Challenges: These may include: <ul style="list-style-type: none"> ○ Not every school system will have the resources or training to conduct school-based antigen testing. Public health officials should work with schools to help link students and their families, teachers, and staff to other opportunities for testing in their community. ○ School-based testing may require a high degree of coordination and information exchange among health departments, schools, and families. ○ There may be legal factors to consider with onsite school-based testing regarding who will administer the tests, how tests will be paid for, and how results will be reported. Such legal factors include local or state laws defining the services school nurses and other school-based health professionals are permitted to provide. ○ The benefits of school-based testing need to be weighed against the costs, inconvenience, and feasibility of such programs to both schools and families. ○ Antigen tests usually provide results diagnosing an active SARS-CoV-2 infection faster than molecular tests, but antigen tests have a higher chance of missing an active infection even in symptomatic individuals and confirmatory molecular testing may be recommended.
--	---

^f The indicators for community transmission of COVID-19 for total new cases per 100,000 persons in the past seven days are: blue (low; 0-9), yellow (moderate; 10-49), orange (substantial; 50-99), and red (high; 100+) ([CDC, Mar 19, 2021](#)).

^g Pooled testing involves mixing several samples from different individuals together in a “batch” or pooled sample, then testing the pooled sample with a diagnostic test. This approach increases the number of individuals that can be tested and reduces the need for testing resources. This approach may be particularly helpful in schools using cohorts. Because of the complexities of acting on a positive result, pooled testing is best used in situations where the number of positives is expected to be very low. Cohorts could be established in grade groups, such as all students in a particular grade or in similar grades (for example, K–grade 2; grades 3–5). If a confirmed positive case is found, close contacts of anyone in that cohort should be quarantined and tested ([CDC, Mar 19, 2021](#)).

	<p>Although antigen tests have not been authorized for use in asymptomatic individuals, FDA and Centers for Medicare and Medicaid Services have allowed the use of these tests in situations where a rapid result is needed.</p>
<p>US Department of Education – COVID-19 Handbook Volume 1: Strategies for Safely Reopening Elementary and Secondary Schools³⁴</p> <p>(Feb 12, 2021)</p>	<p>This handbook provides practical strategies and examples for safely operating schools during the pandemic. It is the first volume of a series intended to support the education community as schools reopen. This series will provide tools to aid educators in implementing the CDC’s <i>Operational Strategy for K-12 Schools</i>. In addition to five COVID-19 mitigation strategies (i.e., masks, physical distancing, handwashing, cleaning, and contact tracing), screening testing is also important but not a prerequisite for safe school reopening.</p> <ul style="list-style-type: none"> • Administration: Schools can partner with local health departments to provide necessary testing to students and families, as appropriate, and in compliance with applicable privacy laws. • Frequency: No information identified. • Test Type: No information identified. • Settings: No information identified. • Population Targets: No information identified. • Consent: No information identified.
<p>Duke-Margolis Center for Health Policy, Johns Hopkins Center for Health Security, and The Rockefeller Foundation – Risk Assessment and Testing Protocols for Reducing SARS-CoV-2 Transmission in K-12 Schools^{35,36}</p> <p>(Oct 2020)</p>	<p>The report provides a detailed framework to provide guidance to America’s school administrators on how best to screen for, and stop or reduce the spread of, COVID-19 in their schools. Testing protocols should be customized for individual school districts based on a risk assessment and community priorities, as well as test availability and budget. Pilot tests of screening and surveillance protocols should be implemented, both to test the feasibility and impact of such testing, and to build best practice implementation guides to allow rapid scaling if these approaches work.</p> <ul style="list-style-type: none"> • Administration: No information identified. • Frequency: To reduce transmission within schools, testing frequency and quick turnaround time for test results (in addition to reasonable test accuracy) are more important than a highly accurate test alone. Districts that determine their risk to be moderate or high would benefit from a regular screening program to prevent infections from spreading within the school, if they choose to reopen. • Test Type: Molecular, rapid, or pool testing options. <ul style="list-style-type: none"> ○ For example, the US Department of Health and Human Services and The Rockefeller Foundation have signed an agreement to identify and share effective approaches for using rapid point-of-care antigen tests to screen for COVID-19 in communities, with a focus on safely reopening K-12 schools. Approximately 120,000 Abbott BinaxNOW diagnostic tests were sent to pilot sites. These pilots will provide real-world insights about best practices for schools across the country on how to effectively integrate testing into school settings for K-12 students and teachers (see next row in this Table). • Settings: Schools. • Population Targets: Students and staff. • Consent: Schools should expect that some students and staff may refuse to take a test or may not be transparent about their test results, especially if they are asymptomatic. Schools should have plans in place for this scenario by anticipating and understanding the refusal and potentially addressing those underlying reasons.
<p>The Rockefeller Foundation – COVID-19 Antigen Testing Program Pilot³⁷</p> <p>(Jan 2021)</p>	<p>The Rockefeller Foundation partnered with Duke-Margolis Center for Health Policy, Johns Hopkins University, and schools in six pilot sites to pilot the implementation of COVID-19 testing in schools based on their Risk Assessment and Testing Protocols for Reducing SARS-CoV-2 Transmission in Selected K-12 Schools. This report discusses early learnings and recommendations generated by pilot sites in their first four months of planning and implementing testing programs, based on a review of sites’ documentation, key informant interviews, and agent-based modeling, a statistical modeling approach used to examine the potential effectiveness of testing programs on in-school infections and in-person learning.</p>

	<ul style="list-style-type: none"> • Administration: Pilot sites are taking four key steps to initiate their school-based testing programs: 1) program planning and design; 2) mobilization and set-up; 3) operations; and 4) evaluation. All sites began designing and planning their testing programs in October 2020 and began to mobilize and set up the resources necessary to implement them shortly thereafter. School-based antigen testing requires more than just a supply of tests; to be feasible at a large scale, it also requires significant support and coordination from local, state, and national education and public health authorities. <ul style="list-style-type: none"> ○ The logistical and regulatory requirements for conducting point-of-care antigen testing in schools are complex, and beyond what school officials are accustomed to dealing with. ○ Trained health care workers are needed to administer tests, and additional staff are required to read test results, communicate them to tested individuals, and report them to public health authorities. • Frequency: The pilot program found that weekly screening of all students, teachers, and staff can reduce in-school infections by 50%, making it more effective than masking but less effective than social distancing. However, less frequent or widespread testing adds limited value above and beyond other mitigation strategies. • Test Type: Rapid point-of-care antigen tests for diagnostic, screening, or surveillance purposes. Approximately 20,000 Abbott BinaxNOW diagnostic tests were sent to each pilot site. • Settings: K-12 schools at six pilot sites (Central Falls, RI; Los Angeles, CA; Louisville, KY; New Orleans, LA; Tulsa, OK; and Washington, DC). These pilots will provide real-world insights about best practices for schools across the US on how to effectively integrate testing into school settings for K-12 students and teachers. <ul style="list-style-type: none"> ○ In communities that already have a robust testing program, school leaders should consider whether they need a school-based program or they could encourage students and teachers to have regular testing at existing community sites. • Population Targets: Students, teachers, and staff. <ul style="list-style-type: none"> ○ Many teachers, students, and parents felt more comfortable returning to in-person learning if they knew that their school would provide testing. • Consent: Used existing staff and tools to develop informed consent procedures quickly, and planned to collect written consent.
<p>Los Angeles Unified School District – Safe Steps to Safe Schools Program^{38,39}</p> <p>(Aug 17, 2020)</p>	<p>The District is proactively testing the school community regardless if they have been exposed to or are experiencing symptoms of COVID-19.</p> <ul style="list-style-type: none"> • Administration: Los Angeles Unified has contracted with SummerBio and Clinical Reference Laboratory to provide test kits. Many partners have made this program possible, including UCLA, Stanford University, the Johns Hopkins University, Cedars Sinai Medical Center, Health Net, Anthem Blue Cross, Microsoft, Clinical Reference Laboratory, and SummerBio. Testing teams will include a health care provider and support staff. Students will receive communication from their principal or administrator (email, phone call, or letter) to make an online appointment. There is no charge for the testing. • Frequency: All employees and students have the opportunity to participate in baseline testing prior to the time schools reopen for in-person instruction; this will help determine the prevalence of the virus in the school community and help guide decision-making around school opening. A second, return-to-school baseline, test will be offered to all students and staff who will be returning for learning and work at school campuses and facilities; this is required in order to return to school campuses and facilities. Test results are available within 24-36 hours via text and email. <ul style="list-style-type: none"> ○ Upon reopening schools for on-site instruction, periodic testing will be conducted for both staff and students. Plans with respect to the frequency of periodic testing are being developed in consultation with the District's research partners. • Test Type: PCR-RT test, either nasal swab or saliva test. • Settings: Early education centres, elementary schools, middle schools, and high schools. People can also be tested by their own health care provider and then submit the results to the district within three days of testing.

	<ul style="list-style-type: none"> • Population Targets: Students, teachers, staff, and parents/guardians of students participating in school-based learning. There is no age limit as to who can be tested. • Consent: Consent must be provided before testing. Students who do not wish to participate in the testing program will not be permitted to return to school campuses and will be required to continue online learning.
<p>Massachusetts Department of Elementary and Secondary Education (DESE) – Pooled Testing Program^{40,41,42}</p>	<p>DESE initiated COVID-19 screening testing using a pooled strategy for in-person learning. Pooled testing involves mixing several test samples together in a "batch" or "pool" and then testing the pooled sample with a PCR test for detection of SARS-CoV-2.^h</p> <ul style="list-style-type: none"> • Administration: DESE introduced this initiative in collaboration with the Department of Public Health. Participating districts and schools will receive the test kits, support from a testing service provider, and the testing software to track results, all at no cost to them, until April 18, 2021. In most cases, districts and schools will administer the tests using existing staff resources. Following the funded period, districts and schools may continue using pooled testing by purchasing the tests and any other accompanying testing materials, software, or support from a statewide contract using their own funding. Districts are also able to change their Pooled Testing Services Provider or add/remove additional services after April 18th, 2021 if needed. <ul style="list-style-type: none"> ○ The cost for a district is estimated to be about USD \$50.00 per pool (approximately USD \$5.00 per individual swab in a pool size of 10). There are also additional costs such as secondary PCR tests in the event all tests return negative, a monthly administrative fee, and a one-time start-up fee. ○ The Emergency Use Authorization (EUA) received for the Abbott BinaxNOW test allows it to be administered by a variety of trained professionals, including, though not limited to, school nurses. All staff administering Abbott BinaxNOW test kits within a school or district must complete all Abbott BinaxNOW training modules. To support training of school nurses, the Department of Public Health offers train-the-trainer educational activities to school nurse leaders. For staff and for students in grades two and above, the test may be conducted by self-administration and observed by trained staff. • Frequency: Once per week, with 24-48 hours to receive results. • Test Type: Abbott BinaxNOW rapid point-of-care antigen testing. • Settings: K-12 public schools and approved special education schools are invited to participate in this initiative by submitting an application. Private and parochial schools are not able to participate in the early launch, but they are able to purchase tests, materials, and software directly from testing services providers. As of Mar 4, 2021, 1,000 public schools have opted into the program. • Population Targets: Schools and districts are strongly encouraged to involve all students and staff in pooled testing, excluding any individuals who may opt out. However, districts or schools may choose to launch this program with a smaller subset of schools, grades, students, or staff and scale up to a school-wide or district-wide model. If districts or schools choose to only involve staff in a pool, however, they are limited to a maximum of five tests per pool and must have BinaxNOW tests available for immediate follow-up testing. • Consent: Staff and parent/guardian consent forms need to be completed once for participation in the program. These forms must provide consent to participate in pooled testing, consent to transmit student information via the technology platform, and consent for any necessary follow up tests, including administering and reporting Abbott BinaxNOW tests.
<p>New York City Department of Education⁴³</p>	<p>As of December 7, 2020, there is mandatory COVID-19 testing in all re-opened schools.</p> <ul style="list-style-type: none"> • Administration: The testing initiative is organized by the city's partners at NYC Health + Hospitals, the New York City Department of Health and Mental Hygiene, and the NYC Test & Trace Corps.

^h Pools that test negative clear everyone in them as presumably virus-free; only samples that end up in positive pools must be evaluated again, either in smaller pools or on an individual basis. The strategy substantially cuts down on manual labour and the costs of chemicals and laboratory supplies, and can stretch a lab's testing capacity several times over ([Wu, Mar 4, 2021](#)).

<p>(Dec 7, 2020)</p>	<ul style="list-style-type: none"> ○ Staff from the school or the testing team will visit the appropriate classroom to retrieve students from that class who have been selected to be tested that day; those students will be escorted to the testing area, tested, and then escorted back to their classroom. ○ Trained testers, including school nurses, city staff, and SOMOS, Bio Reference Laboratory, and Fulgent Genetics, visit each school to conduct the tests. Some of the test kits can be self-administered: in schools with these kits, some older students in may be able to self-administer their test if they choose, under the supervision of a testing provider or school staff member. ● Frequency: Random weekly testing, with results provided within 48-72 hours. ● Test Type: The test is a short, small swab (like a Q-Tip) that goes just in the front of the nose. The whole test takes about two minutes. In the future, it is possible that tests will be administered by collecting a small amount of saliva. ● Settings: Designated areas in schools. ● Population Targets: Randomly selected group of students and staff from grades one to 12. The number of people tested consists of 20% of a school's student and staff population each month. 3K, Pre-K, and Kindergarten students are excluded from random testing. <ul style="list-style-type: none"> ○ Exemptions will be granted for students who need a medical exemption that would make it unsafe to undergo testing (e.g., facial trauma, nasal surgery), or for students with disabilities who cannot be safely tested in school due to the nature of their disability. ● Consent: In order for children to return to in-person learning in a school building, parents must submit a consent form for in-school COVID-19 testing. Staff must also complete a consent form. Consents remain in effect until September 30, 2021; however, parents of children can withdraw consent at any time. <ul style="list-style-type: none"> ○ Parents will be notified by the school about two days before their children's school is scheduled to be tested. ○ Students without consent forms will be moved to fully remote instruction.
<p>United Kingdom and Europe</p>	
<p>England Department of Health and Social Care – Asymptomatic Testing⁴⁴</p> <p>(Mar 26, 2021)</p>	<ul style="list-style-type: none"> ● Administration: Test kits are provided by schools, nurseries, colleges, employers, or online ordering. Anyone 18 years or over can collect two packs of home test kits at a local collection point; each pack contains seven tests; or the kits are available for home delivery. ● Frequency: Twice-weekly tests (every three or four days apart). Results should be reported to NHS Test and Trace as soon as the test is completed, either online or by calling 119. ● Test Type: Rapid lateral flow tests. ● Settings: Home or local test site in community. ● Population Targets: Students, teachers, staff (e.g., school bus drivers), and household bubbles of students of schools, nurseries, and colleges. Children of primary school age or younger will not be asked to test. ● Consent: No information identified.
<p>Berlin, Germany – The Berlin Testing Strategy^{45,46,47}</p> <p>(May-Oct 2020)</p>	<p>Charité, a university hospital, developed a COVID-19 testing strategy in several settings (e.g., hospitals, nursing homes, transport services), including educational institutions. The strategy focuses on asymptomatic individuals to better understand the incidence of infection and maintain health and the working capacity of the population. After Oct 2020, school screening has been discontinued.</p> <ul style="list-style-type: none"> ● Administration: The Berlin Senate requested Charité to initiate the screening program, along with various partners within the public health care sector and government agencies. Data4Life managed data collection, which provided results digitally to participants via smartphones, tablets, or computers. Tests were free of charge. ● Frequency: Regular testing. No further information identified. ● Test Type: Tests detected only active SARS-CoV-2 infections. ● Settings: Various test centres in the community, as well as mobile teams conducting testing drives in schools. ● Population Targets: Asymptomatic staff from 12 primary schools, 12 secondary schools, and 24 childcare centres. ● Consent: Tests were voluntary.

References

- 1 National Collaborating Centre for Methods and Tools. (March 19, 2021). [Living Rapid Review Update 13: What is the specific role of daycares and schools in COVID-19 transmission?](#)
- 2 Mullane, M. J., Thomas, H. M., Epstein, M., Mandzufas, J., Mullan, N., Whelan, A., Lombardi, K., Barrow, T., Ang, S., Leahy, A., Cameron, E., Lester, L., Cooper, M., Stevenson, P., Hartman, M., McKenzie, A., Mitrou, F., Zubrick, S. R., Coffin, J., Cross, D., ... Gething, P. (Feb 22, 2021). [DETECT Schools Study Protocol: A Prospective Observational Cohort Surveillance Study Investigating the Impact of COVID-19 in Western Australian Schools](#). *Frontiers in public health*, 9, 636921.
- 3 Rafiei Y, Mello MM. (Dec 3, 2020). [The Missing Piece - SARS-CoV-2 Testing and School Reopening](#). *N Engl J Med*. 383(23):e126.
- 4 Centers for Disease Control and Prevention. (Dec 4, 2020). [Interim Considerations for Testing for K-12 School Administrators and Public Health Officials](#).
- 5 Centers for Disease Control and Prevention. (Mar 19, 2021). [K-12 School Operational Strategy](#).
- 6 US Department of Education. (Feb 2021). [ED COVID-19 Handbook Volume 1: Strategies for Safely Reopening Elementary and Secondary Schools](#).
- 7 Rivers et al. (Oct 2020). [Risk Assessment and Testing Protocols for Reducing SARS-CoV-2 Transmission in K-12 Schools](#). *Duke-Margolis Center for Health Policy, Johns Hopkins Center for Health Security, and The Rockefeller Foundation*.
- 8 US Department of Health & Human Services. (Oct 1, 2020). [HHS Teams Up with The Rockefeller Foundation to Share Best Practices for Increased COVID-19 Testing](#).
- 9 Los Angeles Unified School District. (2021). [Testing Program Information](#).
- 10 Los Angeles Unified School District. (2021). [Frequently Asked Questions About COVID-19 Testing](#).
- 11 Massachusetts Department of Elementary and Secondary Education. (2021). [Pooled Testing in K-12 Schools](#).
- 12 Massachusetts Department of Elementary and Secondary Education. (Updated Mar 12, 2021). [Pooled Testing Program: Frequently Asked Questions](#).
- 13 Wu, K.J. (Mar 4, 2021). [Massachusetts Actually Might Have a Way to Keep Schools Open](#). *The Atlantic*.
- 14 The New York City Department of Education. (Dec 7, 2021). [COVID-19 Testing for Students and Staff](#).
- 15 Vohra, D., et al. (Jan 2021). [Early Insights and Recommendations for Implementing a Covid-19 Antigen Testing Program in K-12 Schools: Lessons Learned from Six Pilot Sites](#). *The Rockefeller Foundation and Mathematica*.
- 16 UK Government. (Mar 26, 2021). [Households and bubbles of pupils, students and staff of schools, nurseries and colleges: get rapid lateral flow tests](#).
- 17 Charité. (June 4, 2020). [Berlin's testing strategy – Charité starts screening program for staff from childcare centers and school-based study](#).
- 18 Charité. (2020). [Berlin's Testing Strategy at the Charité](#).
- 19 Data4life. (n.d.). [COVID-19 screening in Berlin schools and kindergartens](#).
- 20 Government of Canada. (Mar 12, 2021). [Priority strategies to optimize testing and screening for primary and secondary schools](#).
- 21 Manitoba Government. (Jan 18, 2021). [Rapid Testing](#).
- 22 CBC News. (Jan 14, 2021). [Rapid COVID-19 testing for some Manitoba teachers, school staff starts Monday](#).
- 23 Carpenter, P. (Jan 26, 2021). [Coronavirus: Rapid testing for COVID-19 starts at two Montreal high schools](#).
- 24 Government Of Saskatchewan. (Mar 22, 2021). [Government Of Saskatchewan Providing 100,000 Rapid Tests To Schools](#).
- 25 The Hospital for Sick Children (SickKids). (January 21, 2021). [COVID-19: Guidance for School Operation during the Pandemic](#).
- 26 Government of Canada. (Mar 12, 2021). [Priority strategies to optimize testing and screening for primary and secondary schools](#).
- 27 The Hospital for Sick Children (SickKids). (January 21, 2021). [COVID-19: Guidance for School Operation during the Pandemic](#).
- 28 Manitoba Government. (Jan 18, 2021). [Rapid Testing](#).
- 29 CBC News. (Jan 14, 2021). [Rapid COVID-19 testing for some Manitoba teachers, school staff starts Monday](#).
- 30 Carpenter, P. (Jan 26, 2021). [Coronavirus: Rapid testing for COVID-19 starts at two Montreal high schools](#).
- 31 Government Of Saskatchewan. (Mar 22, 2021). [Government Of Saskatchewan Providing 100,000 Rapid Tests To Schools](#).
- 32 Centers for Disease Control and Prevention. (Dec 4, 2020). [Interim Considerations for Testing for K-12 School Administrators and Public Health Officials](#).
- 33 Centers for Disease Control and Prevention. (Mar 19, 2021). [K-12 School Operational Strategy](#).
- 34 US Department of Education. (Feb 2021). [ED COVID-19 Handbook Volume 1: Strategies for Safely Reopening Elementary and Secondary Schools](#).

-
- ³⁵ Rivers et al. (Oct 2020). [Risk Assessment and Testing Protocols for Reducing SARS-CoV-2 Transmission in K-12 Schools](#). *Duke-Margolis Center for Health Policy, Johns Hopkins Center for Health Security, and The Rockefeller Foundation*.
- ³⁶ US Department of Health & Human Services. (Oct 1, 2020). [HHS Teams Up with The Rockefeller Foundation to Share Best Practices for Increased COVID-19 Testing](#).
- ³⁷ Vohra, D., et al. (Jan 2021). [Early Insights and Recommendations for Implementing a Covid-19 Antigen Testing Program in K-12 Schools: Lessons Learned from Six Pilot Sites](#). *The Rockefeller Foundation and Mathematica*.
- ³⁸ Los Angeles Unified School District. (2021). [Testing Program Information](#).
- ³⁹ Los Angeles Unified School District. (2021). [Frequently Asked Questions About COVID-19 Testing](#).
- ⁴⁰ Massachusetts Department of Elementary and Secondary Education. (2021). [Pooled Testing in K-12 Schools](#).
- ⁴¹ Massachusetts Department of Elementary and Secondary Education. (Updated Mar 12, 2021). [Pooled Testing Program: Frequently Asked Questions](#).
- ⁴² Wu, K.J. (Mar 4, 2021). [Massachusetts Actually Might Have a Way to Keep Schools Open](#). *The Atlantic*.
- ⁴³ The New York City Department of Education. (Dec 7, 2021). [COVID-19 Testing for Students and Staff](#).
- ⁴⁴ UK Government. (Mar 26, 2021). [Households and bubbles of pupils, students and staff of schools, nurseries and colleges: get rapid lateral flow tests](#).
- ⁴⁵ Charité. (June 4, 2020). [Berlin's testing strategy – Charité starts screening program for staff from childcare centers and school-based study](#).
- ⁴⁶ Charité. (2020). [Berlin's Testing Strategy at the Charité](#).
- ⁴⁷ Data4life. (n.d.). [COVID-19 screening in Berlin schools and kindergartens](#).