K2P Evidence summaries use global research evidence to provide insight on public health priority topics that are ambiguous and have important uncertainty. This short document informs policymakers and other stakeholders by synthesizing the best available evidence and presenting its relevance to local contexts. Evidence summaries do not provide recommendations but rather articulate evidence in a clear, objective and factual manner.
Evidence Summary

+ Included
  Synthesis of evidence on a priority question or topic
  Local context

× Not Included
  Does not provide recommendations
K2P Evidence Summary

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Merit Review
The K2P Evidence Summary undergoes a merit review process. Reviewers assess the evidence summary based on merit review guidelines.

Citation
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Key Messages

Currently, there is considerable international debate around school closure/reopening and the role of schools in community transmission of COVID-19. This document synthesizes the latest evidence around the effect of school closure/reopening, existing school management practices on COVID-19 pandemic and countries' experiences in this regard. Findings can inform decisions of policymakers, schools and communities related to school reopening.

Impact of school closure on COVID-19 transmission

→ There is limited published information on the effectiveness of school closures during COVID-19 pandemic, with the majority of findings derived from modelling studies. While systematic reviews of the effects of school closure on influenza pandemics suggest that school closure can be an effective control measure, there are important differences in the transmission dynamic between influenza and COVID-19 to generalize the findings to the current pandemic

→ Currently available evidence on school closures during coronavirus outbreaks provided mixed results, ranging from little effect on reducing transmission to more considerable effects

→ While school closures reduced the reproductive number (R0) of COVID-19 and the total or cumulative number of cases, they did not impact R0 as much as other public health measures

→ One modelling study predicted that school closures alone would prevent only 2–4% of deaths which is less effective than using other social distancing measures

→ A combination of public health measures e.g. (school closure, restrictions on mass gatherings and physical distancing) were more effective in slowing down epidemic growth

Impact of school reopening on COVID-19 transmission

→ There is limited data on the effect of school re-opening on COVID-19 pandemic given that many schools have closed in response to the pandemic.

→ Emerging evidence from contact tracing in schools and observational data in several countries suggest that re-opening schools has not been associated with significant increases in community transmission. However, reopening of schools in the absence of any school measure to
curb the spread of COVID-19 is predicted to result in a resurgence of COVID-19

→ A strong correlation was found between the number of outbreaks in schools and regional COVID-19 incidence, emphasizing the importance of controlling the disease in the community to protect educational settings

**Impact of school management practices on COVID-19 transmission**

→ To date, no rigorous studies have been conducted on the effectiveness of school measures in reducing COVID-19 transmission in schools
→ Although limited, existing modelling studies supported reduced class density, transmission mitigation (e.g. use of masks, desk shields, frequent surface cleaning), and viral detection approaches in decreasing COVID-19 prevalence. Two studies favored initial opening of primary school as opposed to high schools

**Harm of school closure**

→ Prolonged school closure can lead to:
  → Negative impact on students’ educational achievement and learning
  → Negative impact on mental health and emotional well-being
  → Increased exposure to violence and exploitation
  → Limited access to school-delivered public health interventions
  → High economic cost due to short-term loss of key workers, as well as reductions to broader productivity due to parental absenteeism from work and in some cases, the need to pay for alternative childcare
→ While many school systems have offered home-based online learning modalities after school closure, it remains unclear how effective virtual education is as an alternative to regular school activities.
→ A recent study showed that the longer students of all levels are learning remotely, the more likely they will perform below what they would have in the classroom. For students from disadvantaged backgrounds, that gap is much wider.
→ Students from low socioeconomic families are more adversely affected by school closure compared to their peers from well-off families, thus exacerbating health and educational inequalities

**Overview of other countries’ experiences with school closure/reopening**

→ Strategies that have been adopted by countries concerning school closure/reopening can be grouped into the following:
  → Never closed schools
→ Totally suspended in-person classes
→ Re-opening schools at all levels
→ Partial school reopening strategies (opening some grade school; hybrid teaching models; reduced class size; alternate days/shifts)

→ Most commonly adopted strategies for school re-opening involved increasing physical distance between students, regulating recreational activities and mealtimes to limit interactions, wearing facemasks, increasing hygiene practices among students and staffs, intensifying cleaning and disinfection of school premises and reducing class size

→ Most countries initially reopened schools for specific ages or grades only with more schools reopening for younger than for older students.

→ A number of countries that have re-opened schools have adopted some degree of staggering the start, stop, and break times within the school or have rotated schedules, while a smaller number of countries have maintained relatively normal school schedules

→ Mixed evidence has been received from schools that have remained open during the pandemic or that have reopened recently, in terms of COVID-19 transmission among students and staff

→ Few countries in the Eastern Mediterranean Region have resumed their educational activities while the vast majority are still examining potential scenarios for the 2020-21 academic year.

**Implications**

→ As countries around the world grapple with the decision to reopen schools for in-person education during the fall of 2020, governments must balance the uncertainty and risks of reopening schools against the clear harms associated with prolonged closure. Socio-economic disparities and inequalities which could be amplified by school's closure and online learning need to particularly be taken into consideration.

→ If the decision to reopen in-person school education is taken, new public health measures should be introduced into the school setting to curb the spread of COVID-19. The measures should be led by a flexible approach in order to adapt to the local context in terms of epidemiological data and system capabilities.
الرسائل الرئيسية

يستمر النقاش الدولي القائم حول إبقاء المدارس مغلقة أم إعادة فتحها، وتأثير ممارسات الإدارة الحالية للمدارس على الجائحة، بالإضافة إلى استعراض بعض التجارب الدولية في هذا الإطار. يمكن للنتائج هذه ترشيد قرارات صانعي السياسات، والمسؤولين عن المدارس والمجتمعات، فيما يتعلق بإعادة فتح المدارس.

تأثير إغلاق المدارس على نقل فيروس كوفيد-19

إن الدراسات حول فعالية إغلاق المدارس أثناء جائحة كورونا متوفرة بشكل محدود واثنها مستمرة من دراسات متعلقة بإعداد النماذج. في حين، تشير المراجعة المنهجية لتأثير إغلاق المدارس على أوبئة الإنفلونزا، إلى أن إغلاق المدارس يمكن أن يكون إجراءًا فعالًا للسيطرة على الوباء، ولكن لا يمكن تعليم هذه النتائج على حالة كوفيد-19، نظرًا للالتباسات المهمة في ديناميكية الانتشار بين الإنفلونزا وكوفيد-19. تباينت الأدلة العلمية المتوفرة حالياً حول إغلاق المدارس أثناء تفشي فيروس كورونا. وتراوحت النتائج من إثبات تأثيرها الضعيف على عملية الحد من انتقال العدوى، إلى الإشارة إلى تأثير أقدر في هذا الصدد، بينما أدى إغلاق المدارس إلى خفض العدد الكثائي (R0) لـ COVID-19 والعدد الإجمالي أو التراكمي للحالات. إلا أنها لم تؤثر على R0 بنفس فعالية تدابير أخرى في الصحة العامة.

توقعت إحدى الدراسات المتعلقة بإعداد النماذج، أن إغلاق المدارس وحده، من شأنه أن يمنع 2-4% فقط من الوفيات وهي نسبة أقل بكثير من تدابير أخرى للتباعد الاجتماعي. مجموعة من تدابير الصحة العامة، على سبيل المثال (إغلاق المدرسة وفرض القيود على الاتصالات والتبادل الاجتماعي والممارسات الجسدية) كانت أكثر فعالية في إبطاء انتشار الوباء.

تأثير إعادة فتح المدرسة على نقل فيروس كوفيد-19

توجد بيانات محدودة حول تأثير إعادة فتح المدارس على جائحة كورونا، نظرًا إلى أن العديد من المدارس أغلقت أبوابها استجابةً للوباء. تشير الأدلة العلمية التي ظهرت من تبع المحافظين في المدارس، وبما في ذلك الحالات في العديد من البلدان، إلى أن إعادة فتح المدارس لم تترافق مع زيادة كبيرة في انتشار العدوى في المجتمع. ومع ذلك، لا يوجد في الوقت الحالي أي إجراء مدرسي لحد من انتشار كوفيد-19، إلى عودة ظهور الفيروس.
تم اثبات ارتباط وثيق بين عدد حالات تفشى كوفيد-19 في المدارس ونسبة حوادث حالات كوفيد-19 في المجتمع، مما يؤكد أهمية السيطرة على الوباير في المجتمعات، لحماية البيئة التعليمية.

تأثير الممارسات المدرسية على نقل فيروس كوفيد-19

حتى اليوم، لم يتم إجراء أي دراسة دقيقة ومعققة حول فعالية التدابير المدرسية في الحد من انتشار وباير كوفيد-19.

على الرغم من مدى حدود الدراسات المتعلقة بإعداد النماذج، أن خفض كثافة الحالات، والتخفيض من انتقال الفيروس (مثل إجراءات ارتداء الكمادات، والحواجز المكتبية، وتنظيف الأسطح باستمرار) ، واعتماد أساليب لكشف عن الفيروسات، مهمة تقليل انتشار كوفيد-19. وفضلت دراسات إعادة فتح المدارس للمرحلان الابتدائية، بدلاً من المرحلة الثانوية.

عواقب إغلاق المدارس

إغلاق المدرسة المطول يمكن أن يؤدي إلى:
- التأثير السلبي على التحصيل التعليمي للطلاب ومستوى تعلمهم.
- تأثير سلبي على الصحة النفسية والعاطفية.
- زيادة التعرض للعنف والاستغلال.
- محدودية الوصول إلى خدمات الصحة العامة التي تقدمها المدارس.
- تكلفة اقتصادية عالية بسبب خسارة فائض المدي للعاملين الرئيسيين، فضلاً عن انخفاض الإنتاجية على نطاق أوسع بسبب تغييب الأهل عن العمل.

في حين أن العديد من الأنظمة المدرسية قدمت طرقًا للتعلم عبر الإنترنت من المنزل بعد إغلاق المدرسة، إلا أنه لا يزال من غير الواضح مدى فعالية التعليم عن بعد كديبل للأنشطة المدرسية العادية.

أظهرت دراسة حديثة أنه كما طالت مدة تعليم الطلاب عن بُعد (في مختلف المراحل التعليمية)، كلما زادت احتمالية تراجع مدى اكتسابهم للمعلومات، بمقارنة مع إجراء الدروس بشكل طبيعي. بالنسبة للطلاب من بيئة اقتصادية منخفضة، فإن هذه الفجوة أوسع بكثير.

يتأثر الطلاب من الأُسر ذات المستوى الاجتماعي الاقتصادي المنخفض بصورة أشد، مما يؤدي إلى تعاقب أوجه عدم المساواة في الصحة والتعليم.
Evidence Summary


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لا نظرة شاملة على تجارب بلدان أخرى مع إغلاق / إعادة فتح المدارس

يمكن تصنيف الاستراتيجيات التي تم تنفيذها من قبل بعض الدول فيما يتعلق بإغلاق / إعادة فتح المدارس على الشكل التالي:

- عدم إغلاق المدارس إطلاعا
- التعليق الكامل للدورات داخل الحرم المدرسي
- إعادة فتح المدارس على جميع المستويات

استراتيجيات إعادة فتح المدارس الرئيسية (فتح بعض المدارس الابتدائية ; نماذج التدريس المختلطة ; تقليل عدد الطلاب في الصف ; تكثيف خطة زمنية متناسقة)

ضمت النماذج الأكثر شهرة لإعادة فتح المدارس في بعض البلدان على تحديد المساحة الزمنية بين الطلاب، وتوزيع الأنشطة الترفيهية وأوقات الراحة للحد من التفاعلات، وإرساء الاستدامة، وبناء ممارسات ممارسات النظافة بين الطلاب والموظفين، وتنفيذ إجراءات التنظيف وتعقيم المباني المدرسية وقليل عدد الطلاب في الصف

أعادت معظم البلدان في البداية فتح المدارس للأعمار أو صفوف محددة فقط، مع إعادة فتح المزيد من المدارس بمرور الوقت والتعليمية الأصغر من الطلاب الأكبر سناً.

اعتمد عدد من البلدان التي أعادت فتح المدارس، درجة معينة من تحديد أوقات البدء والانهاء من الدروس والاستراحة داخل المدرسة أو حددوا جداول زمنية متناوبة، بينما دافعت عدد أقل من البلدان على جداول المدرسة العادية نسبيًا.

تم تسجيل عدد أعمليات متفاوتة من المدارس التي لم تغلق أبوابها خلال الوباء أو التي أعيدت فتحها مؤخرًا فيما يتعلق بانتشار فيروس كوفيد-19 بين الطلاب والموظفين.

استنادًا عدد قليل من البلدان في إقليم شرق المتوسط إنطلقت نماذج التعليمية الرئيسية، تزال غالبية البلدان تدرس السيناريوهات المحتملة لعام الدراسى 2020-2021.

الإنهتراعات

في الوقت الذي تكافح فيه البلدان في جميع أنحاء العالم من أجل فرار إغلاق المدارس لترنت التعليم حضورياً خلال خريف 2020، يجب على الحكومات أن تحقق التوازن بين الشكوك المطلقة ومخاطر إعادة فتح المدارس والمخاطر المرتبطة بإغلاقها الطويل. يجب الأخذ في الاعتبار، القواعد الاجتماعية والاقتصادية وأوجه عدم المساواة التي يمكن أن تتضمن في حال استمر إغلاق المدارس والتعميل على بعد.

إذا تم اتخاذ قرار بإعادة فتح المدارس لاستئناف الدروس، فيجب تحديد ودعم تدابير جديدة للصحة العامة ملائمة للبيئة المدرسية للحد من انتشار كوفيد-19. ينبغي أن تكون هذه التدابير مرنة من أجل التكيف مع السياق المحلي من حيث البيانات الوبائية العلمية ووفق قدرات النظام الصحي.
Content
Preamble

Worldwide, governments have temporarily closed educational institutions as part of broader efforts to control the spread of SARS-CoV-2. According to the United Nations Educational, Science and Cultural Organization (UNESCO), 193 countries had implemented country-wide school closures by April 1st 2020, affecting around 1.6 billion learners worldwide (more than 90% of the global student population) (UNESCO, 2020).

As governments look beyond containment to reopening economies and easing lockdown measures, the topic of school reopening has taken center-stage. Currently, there is considerable international debate around school closure/reopening and the role of schools in community transmission of COVID-19.

This document is the second in the COVID-19 Supplement on School Re-opening launched as part of K2P COVID-19 Series. The purpose of the document is to synthesize the latest evidence around the effect of school closure/reopening, existing school management practices on COVID-19 pandemic and countries’ experiences in this regard. Findings can inform critical decisions of policymakers, schools and communities related to school reopening.

The Evidence Summary is divided into the following sections:

- Impact of school closure on COVID-19 transmission
- Impact of school reopening on COVID-19 transmission
- Impact of school management practices on COVID-19 transmissions
- Harm of school closure
- Overview of other countries’ experiences with school closure/reopening

Search Strategy

We ran the following search on PubMed (September 2020):


We also searched Health Systems Evidence, Social Systems Evidence, Evidence Aid and Google Scholar using variations of the terms “COVID-19” “schools”. Overall, we have included 67 relevant studies and articles.
Impact of school closure on COVID-19 transmission

Although limited, currently available evidence on school closures during coronavirus outbreaks provided mixed results, ranging from little effect on reducing transmission to more considerable effects (Viner et al 2020a; Public Health Ontario, 2020; Iwata and Miyakoshi 2020; Auger et al 2020). The majority of data came from modelling studies.

A systematic review on school closure during coronavirus outbreaks including COVID-19, concluded that there is limited published information on the effectiveness of school closures during COVID-19 pandemic (Viner et al 2020a). While data from the SARS outbreak suggest that school closures did not contribute to controlling of infection transmission, modelling studies from the SARS outbreak provided mixed results. Five modelling studies on school closures during the COVID-19 outbreak in mainland China and Hong Kong supported the use of national school closure as part of a more comprehensive package of social distancing measures. However, the only study to examine school closures as a distinct intervention (separate from other measures) estimated that school closures alone would prevent only 2–4% of deaths, whereas single measures such as case isolation would be more effective, and a combination of measures would be the most effective (Viner et al 2020a).

Similar findings were reported in a more recent rapid review which identified additional modelling studies assessing the impact of school closure on COVID-19 pandemic (Public Health Ontario, 2020). The review found that school closures contributed to the overall effectiveness of broader public health measures in terms of reducing total number of cases, ICU bed use and deaths. And while school closures reduced the reproductive number (R0) of COVID-19 and the total or cumulative number of cases in most of the modelling studies, they did not impact R0 as much as other public health measures. A combination of public health measures were more effective in slowing down epidemic growth. In the vast majority of studies, school closure was implemented alongside other public health measures (e.g. physical distancing, hand hygiene, restrictions on group gatherings, shielding of the elderly, isolation and quarantine of

The bulk of literature on school closures is derived from influenza (Viner et al 2020a). Several systematic reviews of the effects of school closure on influenza outbreaks or pandemics suggest that school closure can be an effective control measure if implemented early and for a sufficient duration (Mangtani, 2014; Jackson et al 2014; Nafisah et al 2018; Rashid et al 2020).

While such information has been useful, there seems to be important differences in the transmission dynamic between influenza and COVID-19 to generalize the findings to the current COVID-19 pandemic. Systematic reviews of influenza outbreaks suggest that school closures are likely to have the greatest impact if the virus has low transmissibility (R<2) and if attack rates are higher in children than in adults. This does not seem to be the case with COVID-19 outbreaks with higher R values (≥2·5) and children appearing less likely to spread the virus compared to adults (Viner et al 2020a).
infected and confirmed cases, and closing of non-essential businesses). Please refer to Annex 1 for detailed findings.

Three additional single studies found mixed results (Iwata and Miyakoshi 2020; Auger et al 2020; Stage et al 2020). In Japan, time series analyses found that school closure did not appear to decrease the incidence of coronavirus infection (Iwata and Miyakoshi 2020). In contrast, a cross-sectional study conducted in USA found that school closure was temporally associated with decreased COVID-19 incidence and mortality, with the largest relative reduction in incidence and mortality reported in states that closed schools earlier. However, the authors noted that some of the reduction may have been related to other concurrent non-pharmaceutical interventions (Auger et al 2020). In northern European countries (Denmark, Norway, Sweden, and Germany), Stage et al compared the growth rates in daily hospitalizations or confirmed cases under different interventions and found that the growth rate of COVID-19 cases declined approximately 9 days after implementation of school closures (Stage et al 2020).
Impact of school reopening on COVID-19 transmission

There is limited data on the effect of school re-opening on COVID-19 pandemic especially that many schools have been closed in response to the pandemic.

Emerging evidence from contact tracing in schools and observational data in several countries suggest that re-opening schools has not been associated with significant increases in community transmission (ECDC, 2020; Ismail et al 2020; Public Health Ontario 2020; NCIRC, 2020). For example, compiling the data from four studies of school exposures, a total of 28 child and teacher index cases exposed 2,093 contacts to COVID-19 with only 2 transmissions (0.01% attack rate) (Public Health Ontario 2020). It is worth noting that community transmission was low when these countries resumed in-person educational activities, with adequate controls and protections in place to restrict the spread of the virus in school settings.

Several modelling studies have predicted a resurgence of COVID-19 upon reopening of schools in the absence of any school measure to curb the spread of COVID-19; however, the effects can be mitigated by implementing additional non-pharmaceutical interventions in schools (e.g., contact reduction measures, reduced class sizes; hygiene measures; testing symptomatic people) and society (e.g. contact tracing; lowering community transmission) (Public Health Ontario 2020; Panovska-Griffiths et al 2020; Stage et al 2020; Head et al 2020; Di Domenico et al 2020) (see section below for details).

On the other hand, a strong correlation was found between the number of outbreaks in schools and regional COVID-19 incidence (0.51 outbreaks for each SARS-CoV-2 infection per 100,000 in the community; p=0.001), emphasizing the importance of controlling the disease in the community to protect educational settings (Ismail et al 2020; ECDC 2020).
Impact of school management practices on COVID-19 transmission

To date, no rigorous studies have been conducted on the effectiveness of school measures in reducing COVID-19. Most of the data on school measures comes from modelling studies, mostly related to other infectious diseases such as H1N1.

A recent systematic review could not identify any data on school management practices during coronavirus outbreaks (Viner et al 2020a). A 2018 systematic of school practice during H1N1 pandemic identified the following potential school practices: suspending affected classes or year groups; shortening school week; staggering school start and break times across year groups or classes; keeping students in the same class groups or classrooms; increasing spacing between students in classes; closing playgrounds, and cancelling non-essential activities and meetings. The most frequently identified school practices were cancelling or postponing after-school activities, cancelling classes or activities with a high rate of mixing/contact that occur within the school day, and reducing mixing during transport (Uscher-Pines et al 2020).

Findings from three modelling studies on COVID-19 (Landeros et al 2020; Head et al 2020; Di Domenico et al 2020) and five modelling studies on H1N1 (identified by a systematic review) (Uscher-Pines et al 2020) are summarized in Table 1.

Overall, the modelling studies supported the implementation of a range of alternative school-based interventions (to complete school closure) to mitigate viral transmission in simulated school setting

Findings from COVID-19 studies supported use of reduced class density, transmission mitigation (e.g. use of masks, desk shields, frequent surface cleaning), and viral detection approaches in controlling COVID-19 transmission. Two studies favoured opening of primary school as opposed to high schools. School reopening without any precautions was predicted to yield substantial risk for students, staffs and parents.

Findings from H1N1 modelling studies supported targeted and gradual approach to school closure (i.e. starting class by class, whole grade, county/district-level closure etc.) as opposed to national closure at the same time as basic strategy for mitigating influenza outbreaks. However, a recent report on COVID-19 suggested that reactive school closures following community outbreaks, and cases or outbreaks in schools are unlikely to be timely enough to have a significant impact on the dynamics of the local epidemic (ECDC, 2020).
Table 1 Findings from modelling studies

<table>
<thead>
<tr>
<th>School Practice</th>
<th>Effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced class density, transmission mitigation, and viral detection</td>
<td>A combination of reduced class density, transmission mitigation (e.g. use of masks, desk shields, frequent surface cleaning), and viral detection approaches will considerably decrease COVID-19 prevalence. Reducing class density and implementing rapid viral testing (even with imperfect detection), have greater impact than moderate measures for transmission mitigation (Landeros et al 2020)</td>
</tr>
<tr>
<td>Maintenance of cohorts</td>
<td>Compared to direct measures that mitigate transmission risk, while opening at full capacity, reopening schools at half capacity, by running either two rotating cohorts of in-person learning or two parallel cohorts of in-person and remote learning is likely to have a greater impact in controlling COVID-19 spread (Landeros et al 2020)</td>
</tr>
<tr>
<td>Classroom restriction, hall restriction, schoolyard restriction, lunchroom restriction, different classroom schedules</td>
<td>Non-disruptive interventions were found to be effective in reducing contact rates among children in simulation school settings. Classroom restrictions (i.e. children must remain seated while in their classroom) were the best single strategy in settings where transmission probabilities are low; whereas employing staggered classroom schedules (i.e., different schedules whereby each classroom follows one of three different schedules put forth by the school) were the best single strategy at higher transmission rates (Ridenhour et al., 2011).</td>
</tr>
<tr>
<td>Closing the common areas at certain levels of infections</td>
<td>Compared to requiring symptomatic students to leave school or school to be closed entirely, closing playground and other common areas when 5% of students were symptomatic considerably decreased the total number of infected students and avoided adverse economic and social consequences (Lofgren et al., 2008).</td>
</tr>
<tr>
<td>Reduced schedule</td>
<td>Employing a 3-day weekend (compared to a 2-day weekend) could be effective at reducing the peak attack rate by almost 60% for mild epidemics similar in severity to the 2009 H1N1 pandemic. Although the benefits of a 3-day weekend may only be effective for mild epidemics, this intervention is less detrimental to the educational process than sustained permanent school closure (Cooley et al., 2016)</td>
</tr>
<tr>
<td>Gradual class by class, reactive school by school and county-level closures (versus national school closure at the same time)</td>
<td><strong>Gradual</strong> (i.e., closure by class, whole grade followed by entire school), <strong>Reactive</strong> (i.e. closure of entire school whenever a certain threshold related to absent students in the school itself is reached), and <strong>County-wide</strong> closure (i.e., if a school has been closed reactively, then all schools in the same county get closed) give comparable outcomes in terms of optimal infection attack rate reduction, peak incidence reduction or peak delay; while <strong>national closure</strong> of all schools of the country at the same time was not able to reach same levels of mitigation (Fumanelli et al., 2016).</td>
</tr>
<tr>
<td><strong>School Practice</strong></td>
<td><strong>Effectiveness</strong></td>
</tr>
<tr>
<td>---------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td><strong>Targeted class and grade closure</strong></td>
<td>Two-day class closure carried out day after 10% absenteeism rate (compared to no class closure or two-day or three-day closures carried out ≥2 days after a 10% absentee rate) is effective for mitigating influenza outbreaks in elementary school; it was highlighted that school actions should be conducted at the class level as a basic strategy for mitigating influenza outbreaks in elementary school (Sugisaki et al., 2013). While closing one class resulted in a smaller mitigation effect than closing the entire elementary school, closing the corresponding grade (two classes) led to reductions of large outbreak probability and epidemic size similar to those obtained by closing the entire elementary school (Gemmetto, Barrat &amp; Cattuto, 2014).</td>
</tr>
<tr>
<td><strong>Re-opening high schools versus elementary schools</strong></td>
<td>Safely reopening high schools may require combining multiple strict contact reduction measures, including staggering school days, halving class sizes or maintaining small cohorts; while safely reopening elementary schools may be achieved with a more limited set of interventions (Head et al 2020). While no substantial difference in the epidemic risk is predicted between progressive and prompt reopening of primary schools, full attendance in middle and high schools was not recommended. Reopening would require large-scale trace and testing to promptly isolate cases, in addition to moderate social distancing interventions (Di Domenico et al 2020).</td>
</tr>
<tr>
<td><strong>No precautionary measures in place</strong></td>
<td>Under the lowest risk scenario examined (moderate community transmission, 79% of infected children as asymptomatic carriers, and low susceptibility of children relative to adults), school reopening without any precautions will yield substantial risk for students (an additional 3% of students across all grades levels infected over the fall semester), family members of students (an additional 1.4% infected), and teachers/staff (an additional 10.3% across all grade levels) (Head et al 2020).</td>
</tr>
</tbody>
</table>
Harms of School Closure

The harms related to prolonged school closure are well documented (Viner et al. 2020b). School closures and reduced instruction time can have a profound negative impact on students’ educational achievement and learning, both in the short and long term; their labour market prospects and the long-term social inequality (Cai et al., 2020; Eyles et al., 2020; Public Health Ontario 2020). They can also negatively influence mental health and well-being due to social isolation, reduced social support, increased exposure to violence and exploitation and limited access to school-delivered public health interventions. Indirect harms to broader society include short-term loss of healthcare and other key workers, as well as reductions to broader productivity due to parental absenteeism from work. Students from low socioeconomic families are more adversely affected by school closure compared to their peers from well-off families, thus exacerbating health and educational inequalities (Cai et al., 2020; Doyle, 2020; Montacute, 2020; Eyles et al., 2020; Aucejo et al., 2020; Armitage & Nellums, 2020).

Many school systems have offered home-based online learning modalities after school closure due to COVID-19 pandemic (Cai et al., 2020). However, it remains unclear how effective virtual education is as an alternative to regular school activities especially for younger children and their teachers that have minimal experience in online instruction and given the large gaps in technology access that exists in many parts of the world (Cai et al., 2020; Kuhfeld et al., 2020). Existing studies comparing online to traditional learning included college students, used a convenience sample and presented a wide range of participants, duration of intervention and course domain; the effects on students' performance were mixed, and hybrid approaches appeared more beneficial for educational performance compared to full online (Magalhães et al 2020; Means et al 2009; Ni 2013).

The most recent insight on educational performance among school student comes from a paper commissioned by the Federal Government, the Centre for International Research on Education Systems (CIRES) and Mitchell Institute at Victoria

<table>
<thead>
<tr>
<th>Home learning challenges</th>
<th>confronted by schools and governments (CIRES, 2020):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material divide: gaps in basic resources of families needed to support home learning</td>
<td></td>
</tr>
<tr>
<td>Digital divide: gaps in information and communications technology resources and know how</td>
<td></td>
</tr>
<tr>
<td>Skills and dispositions divide: some students are not personally equipped/built for home learning</td>
<td></td>
</tr>
<tr>
<td>Parental support divide: some parents are not well prepared and not able to manage or cope</td>
<td></td>
</tr>
<tr>
<td>Adjustments divide: learning adjustments used by schools for some students are not suited to home learning arrangements</td>
<td></td>
</tr>
</tbody>
</table>
University which modelled the impact of online learning during COVID-19. The modelling shows that the longer students of all levels are learning remotely, the more likely they will perform below what they would have in the classroom. For students from disadvantage backgrounds, that gap is much wider (CIRES, 2020).

An overview of the key harms associated with prolonged school closure is provided in Table 2.

**Table 2  Harms associated with prolonged school closure**

<table>
<thead>
<tr>
<th>Educational performance</th>
<th>Mental health and emotional well-being</th>
</tr>
</thead>
<tbody>
<tr>
<td>• COVID-19 pandemic has caused unprecedented disruptions to students' academic experiences (Aucejo et al., 2020), which is exacerbated by the fact that different schools have different capacities to instruct children remotely (Radwan &amp; Radwan, 2020; Eyles et al., 2020). This difference is expected to greatly affect students' educational performance, further widen the inequality gaps in learning capabilities and skills among students (Doyle, 2020; Montacute, 2020), delay graduation timelines, decrease the probability of students enrolling in more desirable university programs in the future (Cai et al., 2020) and negatively impact their labor markets prospects (Cai et al., 2020; Eyles et al., 2020).</td>
<td></td>
</tr>
<tr>
<td>• Projections of COVID-19-related learning loss show that students are likely to return in fall 2020 with approximately 63-68% of the learning gains in reading relative to a typical school year and with 37-50% of the learning gains in math (Kuhfeld et al., 2020).</td>
<td></td>
</tr>
<tr>
<td>• While many school systems have offered home-based online learning modalities after school closure due to COVID-19 pandemic (Cai et al., 2020), it remains unclear how effective virtual education is as an alternative to regular school activities especially for younger children and their teachers that have minimal experience in online instruction and given the large gaps in technology access in many parts of the world (Cai et al., 2020; Kuhfeld et al., 2020).</td>
<td></td>
</tr>
<tr>
<td>• A study modeling the impact of online learning during COVID-19 found that, compared to learning in classroom, students face up to a 25% annual decline in mathematics learning and a 10% decline in English learning when studying remotely. The gaps are much wider when adjusting for disadvantaged students, reaching a 23-33% decline in numeracy learning and a 15-22% decline in reading for year 5s and year 9s, compared to classroom-based learning (CIRES, 2020).</td>
<td></td>
</tr>
<tr>
<td>• Students from low socioeconomic families who live in conditions that make home schooling difficult are more adversely affected by school closure and/or shifting to remote learning approaches compared to their peers from well-off families in terms of learning quality and skills (Cai et al., 2020; Doyle, 2020; Montacute, 2020; Eyles et al., 2020; Aucejo et al., 2020; Armitage &amp; Nellums, 2020; Van Lancker &amp; Parolin, 2020).</td>
<td></td>
</tr>
<tr>
<td>• Schools provide children with stable daily routines, structures, physical activity, social connections, and extra-curricular activities</td>
<td></td>
</tr>
</tbody>
</table>

### Increased exposure to violence and exploitation

- Due to school closure, family members spend much more time at home, leading to a surge in domestic abuse cases associated with health emergencies (Radwan & Radwan, 2020; Cluver et al., 2020). Women and children are particularly more likely to be subjected to violence, where families try to cope with additional stress and economic challenges (Radwan & Radwan, 2020; Cluver et al., 2020).
- Many child protection advocates have raised alarm bells about the risk of rising rates of substance use, domestic violence and child maltreatment during the pandemic (Freeman et al., 2020; Armitage & Nellums, 2020).

### Limited access to school-delivered public health interventions

School closure threaten the exclusion of children from school-delivered public health interventions (e.g., vaccination and feeding programs) and the exclusion of the most vulnerable students from social safety nets operating through schools (Viner et al 2020b; Public Health Ontario, 2020).

<table>
<thead>
<tr>
<th>Challenges with distance learning</th>
<th>High economic cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Access to reliable internet service, or material hardware such as laptops/computers, may be a barrier for some families (CIRES, 2020).&lt;br&gt;- Increased online activity can also put children at heightened risk of online sexual exploitation, cyberbullying, online risk-taking behavior, and exposure to potentially harmful content (UNICEF 2020b; Public Health Ontario, 2020)&lt;br&gt;- Many studies have expressed concerns that online education may raise extra challenges for disadvantaged students who might have limited access to online learning resources due to the digital divide and the inadequate distribution of internet infrastructure (Cai et al., 2020; Armitage &amp; Nellums, 2020; Van Lancker &amp; Parolin, 2020).&lt;br&gt;- Furthermore, students’ negative experiences with online teaching (due to the abruptness of the transition and technical difficulties) also has adverse implications on the willingness of students to take online classes in the future (Aucejo et al., 2020).</td>
<td>- As a result of school closure, parents reported workplace absenteeism, reduced productivity, wage loss and the need to pay for alternative childcare during the prolonged school closure period (Cai et al., 2020; Radwan &amp; Radwan, 2020; Owusu-Fordjour et al., 2020; Bayham et al 2020; O'Sullivan et al 2009; Chen et al., 2011; Fuchs-Schündeln et al 2020). Projected substantial losses of health-care</td>
</tr>
</tbody>
</table>
staff to childcare duties during closures might reduce any benefit to health systems and populations brought by closures of schools, highlighting the need to integrate alternative child-care arrangements as part of the school closure plan (Bayham et al 2020; O’Sullivan et al 2009).

- With lower levels of learning and higher numbers of dropouts, students affected by COVID-19 will probably be less skilled and therefore less productive than students from generations that did not experience a similar gap in learnings (Dorn et al., 2020). A GDP loss of $173 billion to $271 billion a year (a 0.8 to 1.3% hit) was estimated for the United States considering that by 2040, most of the current K–12 cohort will be in the workforce (Dorn et al., 2020).

- In the United Kingdom, average lifetime earnings could be lowered by up to 3% amounting to an annual loss of £900. Over a working lifetime of about 45 years this could theoretically amount to lifetime lost earnings of up to £40,000 in younger children (Psacharopoulos et al., 2020). Another study estimated that the total cost of the resources lost in each week of state school closure is more than £1 billion in England (Eyles et al., 2020).

- In Norway school closure was quantified and estimated to be of NOK 2.2 billion (US$213.8 million) for the 5% of students whose progression was delayed, in addition to NOK 1.7 billion (US$165 million) for each day schools and kindergartens remain closed (Psacharopoulos et al., 2020).

- In the USA, a modelling study estimated that the cost to the United States in future earnings of four months of lost education is $2.5 trillion which represents 12.7% of annual GDP. Extrapolating to the global level, these data suggest the world could lose as much as $10 trillion over the coming generation because of school closures today (Psacharopoulos et al., 2020).
Overview of other countries’ experiences with school closure/reopening

Given the impact of COVID-19 pandemic on the academic year 2019-2020 and on educational achievements, countries worldwide have been struggling to balance between ensuring health protection and safeguarding the quality of education for their children. For this purpose, countries have adopted different strategies concerning school opening and resuming classes. Whereas very few countries did not close schools at all (except for summer breaks); the majority suspended in-person classes since the start of the pandemic, relying totally on the distant learning option while exploring scenarios for returning to face-to-face classes.

With gradual relaxation of the broad social distancing measures, a growing number of countries are resuming in person educational activities for their students. The most common strategy was to implement a partial school reopening while applying critical measures to ensure the safety of students, school staff and teachers. Partial school reopening included one or a combination of the following strategies (Table 3):

- Opening some grade school
- Hybrid teaching models (in person and virtual lessons)
- Reduced class size
- Alternate days/shifts
- Outdoor schooling

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never closed schools</td>
<td>Taiwan; Sweden (elementary schools only); Cuba and Tajikistan</td>
</tr>
<tr>
<td>Totally suspended in-person classes</td>
<td>Current default position for most countries e.g. many states in the USA (District of Columbia, New Mexico, Hawaii, Puerto Rico; Rhode Island; Vermont, West Virginia, etc.); Lebanon; Saudi Arabia; Kazakhstan; Mongolia; Argentina; India; Iran; Indonesia; Brazil; Chile; Ethiopia; Angola; Nigeria; Kenya; Myanmar; etc.</td>
</tr>
<tr>
<td>Re-opening schools at all levels</td>
<td>Singapore; Poland, Netherlands; Germany (some areas); China; Russia; Japan; United Kingdom; Greenland; Iceland; Ireland; Hungary; Latvia; etc.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Partial school reopening strategies</strong></td>
<td></td>
</tr>
<tr>
<td>Opening some grade school</td>
<td>Greece; Taiwan; Denmark; Sweden; Vietnam; Norway; Germany; Belgium; Italy; Switzerland; Finland</td>
</tr>
<tr>
<td>Hybrid teaching models (in person and virtual lessons)</td>
<td>New Zealand (optional); Germany (some states); Australia (optional); Sweden (students ≥ 16 years old); South Korea; Belgium (initially); Scotland; Canada (optional); France; Switzerland; Italy (schools decide what method); Turkey; UAE; Oman; Jordan; Bahrain (Optional)</td>
</tr>
<tr>
<td>Reduced class size</td>
<td>Greece; Denmark; Norway; Netherlands (initially); New Zealand; Germany (initially); China; South Korea; United Kingdom; Scotland; Canada; France; Italy; Turkey; Switzerland; UAE (optional); Jordan; Oman</td>
</tr>
<tr>
<td>Alternate days/shifts</td>
<td>Japan (initially); South Korea; ; Belgium (initially); Scotland; Canada; France; Jordan; Switzerland; Oman; UAE</td>
</tr>
<tr>
<td>Outdoor schooling</td>
<td>Sweden (optional); Norway (optional)</td>
</tr>
<tr>
<td>Mandatory face mask</td>
<td>Singapore; Vietnam; Taiwan; New Zealand; Germany; Australia; China; Sweden (optional); Russia (for staff/teachers only); Japan; South Korea; Belgium (for students ≥12 years); United Kingdom (for students ≥11 years); Scotland (for staff/teachers only); Canada; France (children in secondary schools); Italy (for students ≥16 years); Switzerland; Turkey</td>
</tr>
<tr>
<td>Increased hygiene practices &amp; handwashing</td>
<td>Singapore; Taiwan; Denmark; Norway; Netherlands; New Zealand; Germany; Australia; China; Sweden; Japan; South Korea; United Kingdom; Scotland; Canada; France; Italy; UAE; Switzerland; Turkey</td>
</tr>
<tr>
<td>Temperature checks</td>
<td>Singapore; Vietnam; Taiwan; Denmark; Norway; Germany; China; Japan; South Korea; Russia; Turkey; UAE</td>
</tr>
<tr>
<td>Contact tracing</td>
<td>Norway; New Zealand; Australia; Scotland; United Kingdom; South Korea; Canada (Ontario); Italy; France; UAE</td>
</tr>
<tr>
<td>Staggered/ Arrival Dismissal</td>
<td>Singapore; Taiwan; Denmark; Norway; New Zealand; Australia; China; United Kingdom; Scotland; Canada; Italy; Switzerland</td>
</tr>
<tr>
<td>Suspension of sports events and physical education</td>
<td>Singapore; Taiwan; New Zealand; Australia; China; Sweden (Optional); Russia; United Kingdom; UAE</td>
</tr>
<tr>
<td>Regulated recreational activities &amp; lunch breaks</td>
<td>Singapore; Taiwan; Denmark; Norway; New Zealand; Germany; Australia (New South Wales); China; Sweden (Optional); Japan; South Korea; Belgium; United Kingdom; Canada; Scotland (Music &amp; Singing); France; Italy; Turkey; Russia; UAE; Jordan</td>
</tr>
<tr>
<td>Revised Transport Procedures</td>
<td>Greece; Taiwan; Denmark; Norway; China; United Kingdom; Scotland; Canada; Italy; Turkey; UAE; Jordan</td>
</tr>
</tbody>
</table>
Most commonly adopted strategies for school re-opening by countries involved increasing physical distance between students (e.g. desk divider, limiting movement in school’s hallways to one direction, seating arrangements), regulating recreational activities and mealtimes to limit interactions, wearing face masks, increasing hygiene practices among students and staffs, intensifying cleaning and disinfection of school premises, and reducing class size (e.g. maximum of 10-15 students per class or 50%), to mitigate widespread transmission of COVID-19 in schools. Please refer to Annex 2 for stratification of strategies by country.

Furthermore, the majority of countries have introduced a quarantine and school closure policy to be adopted in case a positive case was detected among school attendees (students and staff) in addition to contact tracing requirement (see box). While several countries required temperature checks at school entries (Japan, South Korea, Taiwan, Singapore, Taiwan, Denmark, Norway, China, UAE), COVID-19 testing is not a requirement for school attendance in the majority of countries. The exception is Germany where some schools require students to be tested for SARS-CoV2 infection every 4 days, with a negative test allowing students to attend school without a face mask. On the other hand, the Italian government has made more than 2 million COVID-19 tests available and voluntary for teachers, janitors and school staff between 24 August and 7 September, one week before the scheduled reopening date of 14 September.

Most countries have initially reopened schools for specific ages or grades only with much more schools reopening for younger students than for older students. A number of countries that have re-opened schools have adopted some degree of staggering the start, stop, and break times within the school or have rotated schedules whereby different grade classes attend only specific days or specific times during the day, while a smaller number of countries have maintained relatively normal school schedules. For example, in Japan, children initially attended schools on alternate days but most classes are back to normal now. In Belgium, students aged 12 and above initially attended schools for four days a week, with an additional half-day of virtual schooling. While in the UAE, schools had the option to schedule lessons in staggered ‘shifts’, alternating days, half days; or alternating weeks based on schools’ decisions. Similarly, most states in the USA are providing several sample-scheduling options.

**Quarantine and school closure policy**

Many countries (e.g. Denmark, Norway, Netherlands, New Zealand, Germany, Australia, China, Russia, Scotland, Canada, France, UAE, Jordan) require students and school staff showing COVID-19 symptoms, or those that have been in contact with a suspected or confirmed COVID-19 case to stay at home until symptoms resolve

**Taiwan:** A class will be suspended for 14 days if one case is confirmed and the entire school will be closed for 14 days if 2+ cases are confirmed

**Germany:** Only the class with a confirmed case will be suspended for 14 days while other classes continue normally

**Belgium:** Students returning from high infection areas are required to stay at home for 14 days before coming to schools

**Canada:** Any student or staff who develops COVID-19 symptoms while in school should be immediately separated from others until they are able to go home; they should not use public transportation and should be supervised per school policy.
In terms of teaching modalities, COVID-19 pandemic has encouraged innovative models, the most common being the hybrid model which involves a combination of online and in-person teaching methods. Such hybrid model was adopted by schools in many countries including New Zealand, Germany, Sweden, South Korea, Belgium, Scotland, Turkey, France and UAE.

Mixed evidence has been received from schools that have remained open during the pandemic or that have reopened recently, in terms of COVID-19 transmission among students and staff. Several countries (Denmark, Norway, Netherlands and Sweden) have reported no significant increase in the growth rate of COVID-19 cases in schools; while others (Germany, South Korea and Jordan) have reported increased COVID-19 transmission. In Berlin, at least 41 schools reported COVID-19 infections among students and teachers (including elementary schools, high schools and trade schools) nearly two weeks after schools reopened in the German capital (Grieshaber, 2020); however, health officials have linked these spikes to summer travel rather than schools (Morris & Weber-Steinhaus, 2020). In Jordan, soon after schools reopened on the 1st of September, the Ministry of Education closed two schools in the Balqa governorate after two COVID-19 cases were reported and announced that classes shall be conducted online for two weeks (Al-Khalidi, 2020; Arab News, 2020). Similarly, nearly 200 staff and students have been infected in Seoul, South Korea in mid-August; consequently, the Ministry of Education requested to shift to remote learning until 11 September.
Reopening of Schools in EMR countries

While very few countries in the Eastern Mediterranean Region (EMR) have resumed their educational activities (UAE, Saudi Arabia, Jordan), the majority are still examining potential scenarios for the 2020-21 academic year including the continuation of distant learning or partially re-opening schools using the alternate days/shifts system combined with online learning (Morocco, Bahrain, Tunisia, Egypt, and Kuwait). For instance, schools in Saudi Arabia resumed with distant learning for the first seven weeks; with exceptions for university and technical school students who might be required to attend courses in person, after this period the situation will be assessed to decide on the learning model (Saudi Press Agency 2020; Reuters 2020). As for the UAE, which activated online learning system since the first weeks of the crisis, both public and private schools have resumed in-person educational activity starting August 30th, 2020 (Halligan 2020).

On the other hand, schools in Jordan resumed educational activities in rotation on September 1st after nearly five months of absence; however due to recent spike in COVID-19 cases at the national level and in several schools, the Ministry of Education announced that students shall continue their classes from home for two weeks through the official distant learning online platform Darsak as well as through official TV channels (Al-Khalid 2020; Al-Monitor 2020). Similarly in Oman, schools were supposed to reopen starting the 1st of September; however, the Supreme Committee and Ministry of Education announced in mid-August that the beginning of the academic year is postponed for all students till November 1st 2020, due to the continuing spread of the COVID-19 19 (Times of Oman 2020; Xinhua 2020).
Implications

As countries around the world grapple with the decision to reopen schools for in-person education during the fall of 2020, governments must balance the uncertainty and risks of reopening schools against the clear harms associated with prolonged closure. Socio-economic disparities and inequalities which could be amplified by school's closure and online learning should particularly be taken into consideration.

If the decision to reopen in-person school education is taken, new public health measures should be introduced into the school setting to curb the spread of COVID-19. The measures should be led by a flexible approach in order to adapt to the local context in terms of epidemiological data and system capabilities (Fantini et al 2020).
Annexes
## Annex

### Annex 1: *Summary of key findings on school practices from modelling studies on COVID-19*

<table>
<thead>
<tr>
<th>Author</th>
<th>Type</th>
<th>Countries</th>
<th>Measures</th>
<th>Main Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Davies et al. 2020</td>
<td>Modelling study</td>
<td>England, Wales, Scotland, and Northern Ireland</td>
<td>School closures, physical distancing, shielding of people aged 70 years or older, and self-isolation of symptomatic cases</td>
<td>Individual measures not as effective as combined measures (individual interventions reduced total cases by 20-30%). Implementing only one measure would not be effective in sustained decline of number of cases. Shielding of older people was predicted to have the greatest impact on the number of deaths.</td>
</tr>
<tr>
<td>Juni et al. 2020</td>
<td>Modelling study</td>
<td>144 geopolitical areas worldwide with at least 10 COVID-19 cases by Mar. 20, 2020, excluding China, South</td>
<td>Cumulative count of COVID-19 cases in addition to latitude, temperature, humidity, school closures, restrictions of mass gatherings, and physical distancing</td>
<td>Latitude and temperature were not associated with epidemic growth whereas public health interventions were strongly associated with reduced epidemic growth. A combination of public health interventions (school closure, restrictions on mass gatherings and physical distancing) were</td>
</tr>
<tr>
<td>Author</td>
<td>Type</td>
<td>Countries</td>
<td>Measures</td>
<td>Main Finding</td>
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</tr>
<tr>
<td>Koo et al. 2020</td>
<td>Modelling study</td>
<td>Singapore</td>
<td>Isolation for infected individuals, quarantine of family members, school closures, workplace distancing</td>
<td>Combining interventions (quarantine, workplace distancing and school closures) decreased the median cumulative infection count compared to baseline scenario. Quarantine and workplace distancing should be prioritised over school closure because symptomatic children have higher withdrawal rates from school than do symptomatic adults from work. In the event that quarantine is unsuccessful and local transmission soars, policymakers can deploy alternate measures, such as school closure and workplace distancing.</td>
</tr>
<tr>
<td>Brauner et al. 2020</td>
<td>Modelling study</td>
<td>41 countries</td>
<td>Mask wearing, limiting social gatherings, closing non-essential business, closing schools and universities,</td>
<td>School closures were more effective than other interventions in reducing number of cases as this measure coincides with enforcing other measures but its individual effect is hard to assess given that it can coincide with other measures (such as forcing parents to stay home or...</td>
</tr>
<tr>
<td>Author</td>
<td>Type</td>
<td>Countries</td>
<td>Measures</td>
<td>Main Finding</td>
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<td>------------------------------------------------</td>
<td>-------------------------------------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Yehya et al. 2020</td>
<td>Observational study</td>
<td>United States</td>
<td>School closure, emergency declaration</td>
<td>Delays in emergency declarations and school closure resulted in higher number of deaths.</td>
</tr>
<tr>
<td>Zhang et al. 2020</td>
<td>Modelling study</td>
<td>China</td>
<td>Physical distancing, age, contact patterns</td>
<td>School closure reduced mean daily peak incidence of cases and while they can affect transmission dynamics, they are not sufficient in preventing an outbreak unless combined with other measures.</td>
</tr>
<tr>
<td>Banholzer et al. 2020</td>
<td>Modelling study</td>
<td>Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom, Norway, and Switzerland</td>
<td>School closures, border closures, public event bans, gathering bans, venue closures, lockdowns prohibiting public movements without valid reason, and work bans on non-essential business activities.</td>
<td>School closures and lockdown were the least effective measures in reducing cases. Venue closures, gathering bans, border closures, and work bans showed similar effect sizes.</td>
</tr>
</tbody>
</table>

*Source: Public Health Ontario, 2020*
## Annex 2 Overview of key measures adopted by selected countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Specific age groups</th>
<th>Reduce class size</th>
<th>Alternate shifts/ days</th>
<th>Adjusted Learning Model</th>
<th>Physical Distancing</th>
<th>Staggered Arrival &amp; Dismissal</th>
<th>Suspension of sports events and physical education</th>
<th>Regulated recreational activities &amp; lunch breaks</th>
<th>Revised Transport Procedures</th>
<th>Required temperature checks</th>
<th>Required Face mask</th>
<th>Hygiene practices &amp; handwashing</th>
<th>Regular cleaning &amp; disinfection</th>
<th>Required Contact Tracing</th>
<th>Quarantine &amp; Closure Policy in place</th>
<th>Increased transmissi on after reopening</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greece</td>
<td>✓</td>
<td>✓</td>
<td>?</td>
<td>?</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Taiwan</td>
<td>✓</td>
<td>✗</td>
<td>?</td>
<td>?</td>
<td>✓</td>
<td>✓</td>
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### Key
- **✓** Yes
- ✗ No
- O Optional
- ? No evidence
- ! Warnings issued

### Footnotes
1. Measures initially implemented but later revoked
2. For older students and adults
3. The government threatened to punish parents who did not send their children to school

### Footnotes

1. Measures initially implemented but later revoked
2. For older students and adults
3. The government threatened to punish parents who did not send their children to school
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<tr>
<th>Country</th>
<th>Specific age groups</th>
<th>Reduce class size</th>
<th>Alternative shifts/days</th>
<th>Adjusted Learning Model</th>
<th>Physical Distancing</th>
<th>Staggered Arrival &amp; Dismissal</th>
<th>Suspension of sports events and physical education</th>
<th>Regulated recreation activities &amp; lunch breaks</th>
<th>Revised Transport Procedures</th>
<th>Required temperature checks</th>
<th>Required Face mask</th>
<th>Hygiene practices &amp; handwashing</th>
<th>Regular cleaning &amp; disinfection</th>
<th>Required Contact Tracing</th>
<th>Quarantine &amp; Closure Policy in place</th>
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*Table format has been adapted from Grieshaber 2020 and Melnick and Darling-Hammond 2020*
References


NCIRS (2020). COVID-19 in schools and early childhood education and care services – the Term 2 experience in NSW.


Knowledge to Policy Center draws on an unparalleled breadth of synthesized evidence and context-specific knowledge to impact policy agendas and action. K2P does not restrict itself to research evidence but draws on and integrates multiple types and levels of knowledge to inform policy including grey literature, opinions and expertise of stakeholders.