

Summary of School Re-Opening Models and Implementation Approaches During the COVID 19 Pandemic

July 6, 2020

COVID-19 Literature Report Team:

Brandon L. Guthrie PhD, Diana M. Tordoff MPH, Julianne Meisner BVM&S MS,
Lorenzo Tolentino BS, Wenwen Jiang MPH, Sherrilynne Fuller PhD FACMI, Dylan Green MPH, and
Diana Louden MLib, Jennifer M. Ross MD MPH

Schools closed in many countries for some period of time during the COVID-19 pandemic as part of mitigation efforts to reduce transmission of SARS-CoV-2. Currently, a number of countries have fully or partially re-opened schools or are in the process of doing so.

This document is a brief summary of the models and implementation approaches to re-opening schools that focuses on the approaches used in 15 countries for which we were able to identify data. This is not a comprehensive survey of the models used in all countries that have re-opened schools. Our systematic search of the published and pre-print literature yielded very few articles that address this topic and so this summary relies heavily on news articles and “grey literature” sources. **It includes news articles, manuscripts published in peer-reviewed journals or on pre-print servers, and other resources identified through July 6, 2020. References that appeared in the daily COVID-19 Literature Report (Lit Rep) are marked with an asterisk*, and the summary is shown in the annotated bibliography below.**

Executive Summary of Models of School Re-Opening Globally

- There is a lack of scientific consensus about the impact of school closures and re-openings on community transmission of SARS-CoV-2. There is considerable concern about the indirect effect of school closures on students and parents.
- Most models of school re-opening involve reductions of class size, increasing physical distance between students, and keeping students in defined groups with limited interaction between groups to reduce the potential for wide-scale transmission within schools.
- Most countries that have re-opened schools have instituted some degree of staggering the start, stop, and break times within the school. A number of countries are using alternate shifts (morning, afternoon) or alternate days, while a smaller number of countries have maintained relatively normal school schedules.
- A number of countries have re-opened schools only for younger or older students in order to accommodate the increase in resources (classroom space, teachers, etc.) required for smaller class sizes. More countries have re-opened only for younger students than have re-opened only for older students.
- In a number of countries, face masks are required for students and/or staff in schools, with variability of the lower age limit for face mask requirements. However, some countries are not using facemasks as a part of their re-opening model.
- Systematic school-based testing for SARS-CoV-2 virus or antibodies is being done on a small scale in a limited number of settings, but this approach is not widely implemented at this time.

Summary of School Re-opening Models by Country

Country	Current Status	Date of closing	Date of re-opening	Younger students only	Older students only	All Ages	Max class size	Alternate shifts	Alternate days	Facemasks required	Reduced class size	Physical distancing	Increased handwashing	Temperature checks	Viral or antibody testing	Contact tracing	Impact on transmission
Belgium	Open (localized)	3/13/2020	5/18/2020	Y	•	•	10	N	Y	Teachers	Y	Y	?	?	?	?	
Denmark	Open	3/16/2020	4/15/2020	Y	•	•	12	N	N	N	Y	Y	Y	N	?	?	No significant increase in the growth rate of COVID-19 cases ¹
France	Open	3/3/2020 – 3/16/2020	5/11/2020	Y/N	•	Y/N	?	N	N	Secondary schools	Y	?	?	N	?	?	Unknown
Germany	Open (localized)	3/3/2020 – 3/18/2020	5/4/2020	•	Y	•	10	Y	N	Y/N (SARS-CoV-2-negative students allowed to not wear masks)	Y	Y	?	N	Y	?	Increased transmission among students, but not school staff ¹
Greece	Open (localized)	3/11/2020	6/1/2020	Y	•	•	15	?	?	?	Y	Y	?	?	?	?	Unknown
Israel	Open	3/12/2020	5/3/2020	•	•	Y	NA	N	N	Y (>7 years old)	N	N	?	N	?	Y	Outbreaks observed in multiple schools
Japan	Open	3/2/2020	4/24/2020	may vary	may vary	may vary	may vary	may vary	may vary	Y	may vary	Y	?	Y	?	?	Unknown
South Korea	Open	3/2/2020	6/8/2020	•	•	•	33% – 67%	Y/N	N	Y	Y	Y	Y	Y	?	Y	Unknown
New Zealand	Open	3/24/2020	5/14/2020	•	•	Y	NA	N	N	N	N	Y				Y	Unknown
Norway	Open	3/11/2020	4/20/2020	Y	•	•	15	N	N	N	Y	Y	Y	N	?	?	No significant increase in the growth rate of COVID-19 cases ¹
Scotland	Closed	3/23/2020	8/11/2020	•	•	Y	?	maybe	maybe	?	Y	Y	Y	?	?	?	NA
Sweden	Open	never closed	never closed	Y/N	•	Y/N	NA	N	N	N	N	N	?	N	N	?	Relatively high rate in children suggests there may have been significant spread in schools. ²
Switzerland	Open	3/16/2020	5/11/2020	Y	•	•	50%	N	Y	N	Y	Y	Y	N	?	?	Unknown
Taiwan	Open	winter break extended 2 weeks	2/25/2020	•	•	Y	NA	N	N	Y	N	Y/N	Y	Y	?	?	Unknown
Vietnam	Open	2/28/2020 – 3/31/2020	5/18/2020	•	•	Y	NA	N	N	Y	N	Y	?	Y	N	?	Unknown

Y/N indicates variability in implementation within the country; Current status based on UNESCO COVID-19 Impact on Education tracker (<https://en.unesco.org/covid19/educationresponse>)

Considerations for Closing Schools

- There is active discussion and lack of scientific consensus about the susceptibility of school-age children to SARS-CoV-2 infection, their infectiousness, their role in community transmission, and the impact of school closures and re-openings on transmission.^{1,3-5*} There is also vigorous debate about how best to balance the potential benefit to reducing SARS-CoV-2 transmission by closing schools or significantly modifying the schedule of in-person learning against the very real consequences of such measures on student learning, indirect harms to students (e.g., lack of access to school-based feeding programs), and the considerable burden this places on parents and caregivers, particularly those who need to simultaneously work. The burden of these indirect effects is likely to fall disproportionately on lower income families and people of color. This summary report does not systematically review these issues, but a sample of commentaries related to this topic is included.
- Most countries world-wide have implemented localized or national school closures in response to the COVID-19 pandemic, with estimates of >65% of enrolled children globally affected by school closures.⁶ A small number of countries in regions with community transmission of SARS-CoV-2 never imposed school closures. Sweden is most notable among countries that did not close all schools, although Sweden did close schools for secondary grade students between March 18 and June 4, 2020.²

Summary of Approaches to Re-Opening Schools and Subsequent Transmission

Since the initial round of school closures, many countries have re-opened schools using a wide range of models. **Characteristics of these models that vary between countries** include the **affected grades** (*younger students only, older students only, or all students*), **schedules** (*reduced in-person time, alternating shifts, alternating days*), and implementation of **transmission control measures** (*class size reductions, physical distancing, face masks, hand washing, temperature checks, and viral or antibody testing*).

- **Affected grades:** Many, but not all, countries that have re-opened schools have done so for only a subset of grades. In most examples, this appears to be an effort to make available more classrooms to accommodate smaller class sizes. Many countries have **re-opened schools only for younger children** (*Belgium, Denmark, France, Greece, Norway, Sweden initially*) while others have **re-opened only for older students**, based on the belief that older students would be more able to comply with physical distancing and transmission control measures (*Germany*). A smaller number of countries have **re-opened schools for all grades** (*France in “green zones”, Israel, Scotland proposed for 8/11/2020 re-opening, Sweden currently, Taiwan, and Vietnam*).
- **Schedules:** Many countries have **staggered start times, break times, and dismissal times** to increase physical distancing. Some countries have adopted alternative school schedules to accommodate smaller class sizes and to ensure greater social distancing. Approaches include having students attending **alternate shifts** (*morning and afternoon*) (*Germany, South Korea, and Scotland potentially*) or **attending alternate days** (*Belgium, Switzerland*).

- **Transmission control measures:** Most countries have instituted some combination of school-based measures intended to reduce transmission of SARS-CoV-2 among students and staff. These include the use of **face masks** (*with some variability in age requirements: Belgium, France, Germany, Israel, Japan, South Korea, Taiwan, and Vietnam*), **reduced class size** (*typically 10-15 students or approximately 50% capacity: Belgium, Denmark, France, Germany, Greece, South Korea, Norway, Scotland proposed, Switzerland*). Some countries have not reduced class size, many of which are relying on other measures to reduce transmission such as closing schools with confirmed cases and using desktop dividers to increase physical separation between classroom desks and cafeteria seating without increasing physical distance between students (*Israel, Sweden, Taiwan, and Vietnam*). Required temperature checks at school entries have been instituted in some countries (*Japan, South Korea, Taiwan, Vietnam*). **Routine screening for SARS-CoV-2** virus or antibodies is reported on a small scale in Germany. Systematic **contact tracing** in the event that a student or staff tests positive for SARS-CoV-2 or has confirmed COVID-19 is reported in some countries (*Israel, South Korea, New Zealand, and Germany*).

There is **limited evidence regarding the impact of school-reopening on SARS-CoV-2 transmission** in the community. Based on the experience of four European countries (Denmark, Norway, Sweden, and Germany), there is some evidence that school closures led to declines in the epidemic growth rates of COVID-19.¹ Reopening of schools for all students in countries with low community transmission (Denmark and Norway) has not resulted in a significant increase in the growth rate of COVID-19 cases. Return of most students to school in countries with higher levels of community transmission (Germany) has been accompanied by increased transmission among students, but not school staff. After re-opening schools in Israel there have been a number of outbreaks of SARS-CoV-2 in schools that have resulted in those schools being closed. In South Korea, schools in some areas were closed again after re-opening in response to surges in the number of COVID-19 cases in the community.

Country-Specific Experience with School Re-Opening

Sweden

Sweden did not close schools for students in kindergarten through grade 9 in response to the COVID-19 pandemic. Schools were closed for students in upper secondary grades from around March 18, 2020 through June 14, after which schools were reopened for all students. No major adjustments to class size, lunch policies, or recess rules were instituted.²

Seroprevalence surveys conducted by the Swedish Public Health Agency found that the antibody prevalence in children/teenagers was 4.7% compared with 6.7% in adults age 20-64 and 2.7% in adults age 65-70. The relatively high rate in children suggests there may have been significant spread in schools.²

Denmark

After a closure of schools that started around March 16, 2020, Denmark re-opened schools for children under 11 years of age on April 15, 2020 in response to early evidence that very few children get severely ill from COVID-19. Primary school children were the first to return to school, and students are kept in

small groups with minimal contact with others outside their group. “Micro-groups” of students arrive at a separate time, eat lunch separately, stay in their own zones in the playground and are taught by one teacher.⁷ These groups consist of approximately 12 students, which was determined based on the maximum number of students that could occupy a room while maintaining sufficient physical distance between students and teachers. This has required dividing classes and teaching staff. Because many schools are designed to include both primary and secondary school children, limiting re-opening of schools to primary grade students has allowed for sufficient physical classroom space to accommodate the small class sizes. Without this approach, schools would need to have morning and afternoon shifts.

Students are assigned their own desks, which are spaced 6 feet apart from each other. During recess, children are allowed to play only in small groups.

Handwashing and sanitization are an additional component to school re-opening. Students are asked to wash their hands hourly. Students and staff are not asked to wear face masks.

In the context of low community transmission, school re-opening in Denmark has not resulted in a significant increase in the growth rate of COVID-19 cases.¹

Germany

Schools in Germany were closed starting around March 3, 2020 and began reopened around May 4 for older age students. Students are assigned their own fixed desks that are spaced at least 6 feet way from other desks. The fixed location of desks combined with student seating charts can be used by contact tracers if necessary.⁷ School days have been shortened and are supplemented with online lessons. This allows multiple groups of students to share classrooms, which are allowed to hold no more than 10 students. In at least some schools, students are being tested for SARS-CoV infection every 4 days, with a negative test allowing students to attend school without a face mask.⁸

In the context of moderate community transmission, school re-opening in Germany has been accompanied by increased transmission among students, but not school staff.¹

Norway

In response to the COVID-19 pandemic, schools in Norway were closed on March 11, 2020.⁹ Re-opening of schools started on April 20 for kindergarten students followed on April 27 by students in grades 1 through 4.¹⁰ The government recommended that classes be limited to no more than 15 students. Special precautions include having children wash their desks daily. Some schools have divided their playgrounds.¹¹ School for students in grades 5 and above and universities remain closed.

In the context of low community transmission, school re-opening in Norway has not resulted in a significant increase in the growth rate of COVID-19 cases.¹

France

Starting on May 11, 2020, nursery and primary schools were re-opened across much of France.¹¹ On May 18, schools were re-opened for students age 11 to 15 years old only in “green zones” where community transmission was limited. The president of France announced that schools for students 15 to

18 years old would re-opened on June 22. Class sizes have been reduced and face masks are mandatory in secondary schools.

Belgium

Schools in Belgium were re-opened starting on May 18, 2020, with all nursery schools open by June 2, followed by all primary school grades by June 8.¹² Classroom size is limited to no more than 10 students.¹¹ Schools are using split schedules with students attending on alternate days. Teachers are encouraged to wear a face mask if social distancing is not guaranteed.¹² Children are grouped by class throughout the school day, including on the playground.

Switzerland

Schools reopened in Switzerland on May 11, 2020 with strict social distancing measures in place.¹¹ Many schools have reduced class sizes in half and students attend in-person classes only 2 days per week to allow for space for the smaller class sizes.¹³ Desks have been moved further apart and tape marks have been placed on the floor to aid students in maintaining appropriate physical distance. Hand sanitizing stations have been added throughout schools. School re-opening for students in grade 10 and above and for university students was delayed until June 8.

Greece

Kindergarten and primary school students in Greece returned to school starting on June 1, 2020. Class sizes are limited to 15 students and desks are spaced 1.5 meters apart.¹⁴ Breaks are staggered to allow for physical distancing on playgrounds.

Israel

As of early May, Israel had experienced fewer than 300 deaths from COVID-19 and the government re-opened schools, along with restaurants and other public settings. Starting in early May, school re-opening was initially implemented by opening classes in smaller groups or "capsules." By May 17, limitations on class size were lifted.¹⁵ Two weeks after school re-opening, COVID-19 outbreaks were observed in classrooms, including 130 cases in one school alone. By June 3, there were 200 confirmed COVID-19 cases and over 244 positive SARS-CoV-2 tests among students and staff across multiple schools. In response, the government ordered the closer of any school with a cases of SARS-CoV-2 infection. By June 8, 139 educational institutions had been indefinite closed out of 5,200 schools and 200,000 kindergartens.¹⁶

Since the initial opening, the school system has remained open. Due to the crowded nature of the schools system, physical distancing of students within schools has not been widely adopted and control measures have focused on closing schools with reported cases, extensive testing, and quarantine of students and staff with a potential SARS-CoV-2 exposure.¹⁷ Teachers and students older than 7 years are required to wear masks. As of June 24, 2020, isolation and quarantine has affected approximately 1% of Israeli students.

Taiwan

While schools were never officially closed in Taiwan, the winter break was extended by two weeks and students returned to school on February 25, 2020.¹⁰ Schools conduct temperature checks and some

schools use plastic tabletop desk partitions. Face masks are required at all times and masks have reduced the need to space desks further apart. Tents have been used to expand eating areas to increase physical distancing between students.¹⁸ Student-athletes are allowed to practice with their teams, but competitions have been canceled.

Japan

Schools in Japan were closed on March 2, 2020. The Prime Minister announced on March 24 that the order closing schools would not be extended, leaving decisions about re-opening schools up to local municipalities.¹⁰ The Ministry of Health issued guidelines for school reopening that includes measures such as opening windows to ventilate classrooms, maintaining physical distance, checking temperatures daily, and wearing face masks.

New Zealand

Schools re-opened in New Zealand on May 14, 2020 following closures that started on March 24. Parents who are not comfortable sending their children back to school are allowed to make “transition arrangement” with their school.¹⁹ Early childhood centers record information about students that would be needed for contact tracing.¹¹

South Korea

Schools in South Korea began re-opening in late May, 2020. In the Seoul metropolitan area, limits have been placed on the proportion of the student populations allowed to be present at one time, with high schools limited to two-thirds of their student population and kindergartens, elementary, middle, and special education schools limited to one-third of their students at a time.²⁰ Physical distancing measures have been put in place, including the use of plastic desktop dividers in classrooms and lunchrooms in many schools. The Korean CDC asked all school staff and students to wear face masks in school and to follow hygiene measures like coughing into their arms and washing hands.²¹ Temperature checks are required upon entering school buildings.

In the event that someone inside a school is confirmed to have SARS-CoV-2 infection, all staff and students are sent home wearing masks and an epidemiological investigation and disinfection is initiated.²¹

Soon after the start of re-opening, a number of schools closed again and others postponed re-opening in response to a surge in new COVID-19 cases.

Vietnam

Starting on May 18, 2020, schools in Vietnam were reopened and students without a fever were allowed to return to class. Mandatory temperature check are conducted at the entrance to the school. Facemasks are required throughout the school day.¹⁹ Attempts are made to maintain physical distancing.

Scotland

Scotland has announced that schools will restart on August 11, 2020 using a “blended model” involving a combination of part-time in-person study in school facilities and learning at home, with a focus on

maintaining physical distance.¹¹ Class sizes will be significantly reduced and students will initially spend approximately half of the time in the classroom and half of the time learning from home. In-person instruction will be staggered, with possible models including morning and afternoon sessions, alternate days, and alternate weeks. Classrooms will include seating that is spaced at least 6 feet apart and arrival, departure, and break times will be staggered to maintain adequate physical distancing between students. Innovative changes to staffing are being considered, including using former teachers to support classroom or online teaching. Physical space for teaching will be expanded by using libraries, community halls, leisure centers, conference venues, and taking short-term leases of vacant business spaces. Money has been allocated to provide laptops to students without access to technology to enable online learning.

Guidelines for School Reopening

- The CDC has issued guidance on school re-opening that includes a decision tree with starting points of “no community spread,” “minimal to moderate community spread,” or “substantial community spread.” Guidance is also provided about what to do when a confirmed case has entered a school.²²
Interim Guidance for Child Care Programs and K-12 Schools | CDC –
<https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/guidance-for-schools.html>
- The WHO has published considerations for school-related public health measures in the context of COVID-19.²³
Considerations for School-Related Public Health Measures in the Context of COVID-19 –
<https://www.who.int/publications/i/item/considerations-for-school-related-public-health-measures-in-the-context-of-covid-19>
- The Washington State Superintendent of Public Instruction has published a planning guide for districts to re-open schools.²⁴
Reopening Washington Schools 2020 District Planning Guide – <https://www.k12.wa.us/about-osp/workgroups-committees/currently-meeting-workgroups/reopening-washington-schools-2020-21-workgroup>
- King County has published resources for schools and child care facilities.²⁵
COVID-19 Resources for Schools and Child Care Facilities - King County –
<https://www.kingcounty.gov/depts/health/covid-19/schools-childcare.aspx>

Relevant Commentaries

- **Transition to Virtual Learning During the Coronavirus Disease-2019 Crisis in Iran: Opportunity Or Challenge?**²⁶ – Disaster Medicine and Public Health Preparedness (May)
<https://doi.org/10.1017/dmp.2020.142>
- **Protecting Children in Low-Income and Middle-Income Countries from COVID-19**²⁷ – BMJ Global Health (May) <https://doi.org/10.1136/bmjgh-2020-002844>

- **When Life Is Put on Hold, How Do We Hold on to Life? - Challenges and Opportunities in Developmental and Behavioral Pediatrics during COVID-19**²⁸ – Journal of Developmental and Behavioral Pediatrics : JDBP (May) <https://doi.org/10.1097/DBP.0000000000000830>
- **Pandemic Stricken Cities on Lockdown. Where Are Our Planning and Design Professionals [Now, Then and into the Future]?**²⁹ – Land Use Policy (Sept 1) <https://doi.org/10.1016/j.landusepol.2020.104805>
- **Developing a Sustainable Exit Strategy for COVID-19: Health, Economic and Public Policy Implications**³⁰ – Journal of the Royal Society of Medicine (May 14) <https://doi.org/10.1177/0141076820925229>
- **COVID-19 Pandemic: Impact Caused by School Closure and National Lockdown on Pediatric Visits and Admissions for Viral and Non-Viral Infections, a Time Series Analysis**³¹ – Clinical Infectious Diseases (June) <https://doi.org/10.1093/cid/ciaa710>
- **Considering Inequalities in the School Closure Response to COVID-19**³² – The Lancet. Global Health (May) [https://doi.org/10.1016/S2214-109X\(20\)30116-9](https://doi.org/10.1016/S2214-109X(20)30116-9)
- **Information Sharing in the School Setting During a Public Health Emergency**³³ – NASN School Nurse (Print) (May 15) <https://doi.org/10.1177/1942602X20925031>
- **The Public Health Response to COVID-19: Balancing Precaution and Unintended Consequences**³⁴ – Annals of Epidemiology (June) <https://doi.org/10.1016/j.annepidem.2020.05.001>
- **Too Expensive to Re-Open Schools? Some Superintendents Say It Is**³⁵ – Education Week <https://www.edweek.org/ew/articles/2020/05/21/too-expensive-to-re-open-schools-some-superintendents.html>
- **Rethinking the Role of the School after COVID-19**³⁶ – The Lancet Public Health (May) [https://doi.org/10.1016/S2468-2667\(20\)30124-9](https://doi.org/10.1016/S2468-2667(20)30124-9)
- **School Nurses: Living the Framework During COVID-19**³⁷ – NASN School Nurse (Print) (May 26) <https://doi.org/10.1177/1942602X20929533>
- **Re-Opening Schools Safely: The Case for Collaboration, Constructive Disruption of Pre-COVID Expectations, and Creative Solutions**³⁸ – The Journal of Pediatrics (May) <https://doi.org/10.1016/j.jpeds.2020.05.022>
- **Education and the COVID-19 Pandemic**³⁹ – Prospects (Apr) <https://doi.org/10.1007/s11125-020-09464-3>
- **[Back to school and COVID-19: It is urgent to control our fears and move forward for the good of children]**⁴⁰ – Journal de pediatrie et de puericulture (June 1) <https://doi.org/10.1016/j.jpp.2020.05.001>
- **Understanding COVID-19 in Children May Provide Clues to Protect at-Risk Populations**⁴¹ – BMJ Paediatrics Open (May) <https://doi.org/10.1136/bmjpo-2020-000702>
- **Low-Income Children and Coronavirus Disease 2019 (COVID-19) in the US**⁴² – JAMA Pediatrics (May 13) <https://doi.org/10.1001/jamapediatrics.2020.2065>
- **Feeding Low-Income Children during the Covid-19 Pandemic**⁴³ – The New England Journal of Medicine (Apr) <https://doi.org/10.1056/NEJMp2005638>
- **To Mask or Not to Mask Children to Overcome COVID-19**⁴⁴ – European Journal of Pediatrics (May 9) <https://doi.org/10.1007/s00431-020-03674-9>
- **COVID-19 and the Re-Opening of Schools: A Policy Maker's Dilemma**⁴⁵ – Italian Journal of Pediatrics (June 9) <https://doi.org/10.1186/s13052-020-00844-1>

- **The Effect of the COVID-19 Lockdown on Parents: A Call to Adopt Urgent Measures** ⁴⁶ – Psychological Trauma (June 11) <https://doi.org/10.1037/tra0000672>
- **Children Returning to Schools Following COVID-19: A Balance of Probabilities** ⁴⁷ – International Journal of Surgery (June) <https://doi.org/10.1016/j.ijssu.2020.05.084>
- **Children of COVID-19: Pawns, Pathfinders or Partners?** ⁴⁸ – Journal of Medical Ethics (June 5) <https://doi.org/10.1136/medethics-2020-106465>
- **Advocating for Children During the COVID-19 School Closures** ⁴⁹ – Pediatrics (June) <https://doi.org/10.1542/peds.2020-1440>
- **Covid-19: School Closures and Bans on Mass Gatherings Will Need to Be Considered, Says England’s CMO** ⁵⁰ – BMJ (Feb) <https://doi.org/10.1136/bmj.m806>
- **Children Are Not COVID-19 Super Spreaders: Time to Go Back to School** ⁵¹ – Archives of Disease in Childhood (May) <https://doi.org/10.1136/archdischild-2020-319474>
- **Screen Time for Children and Adolescents during the COVID-19 Pandemic** ⁵² – Obesity (May 28) <https://doi.org/10.1002/oby.22917>
- **Covid-19: Papers Justifying Government’s Plans to Reopen Schools Are “Inconclusive,” Say Union Bosses** ⁵³ – BMJ (Clinical Research Ed.) (May 27) <https://doi.org/10.1136/bmj.m2108>
- **Children and the COVID-19 Pandemic** ⁵⁴ – Psychological Trauma (June 11) <https://doi.org/10.1037/tra0000861>
- **Covid-19: Local Implementation of Tracing and Testing Programmes Could Enable Some Schools to Reopen** ⁵⁵ – BMJ (Mar) <https://doi.org/10.1136/bmj.m1187>
- **COVID-19 and Schools Closure: Implications for School Nurses** ⁵⁶ – The Journal of School Nursing : The Official Publication of the National Association of School Nurses (May 14) <https://doi.org/10.1177/1059840520925533>
- **School Nurses on the Front Lines of Healthcare: The Approach to Maintaining Student Health and Wellness During COVID-19 School Closures** – ⁵⁷NASN School Nurse (June 16) <https://doi.org/10.1177/1942602X20935612>
- **COVID-19, School Closures, and Child Poverty: A Social Crisis in the Making** ⁵⁸ – The Lancet Public Health (May) [https://doi.org/10.1016/S2468-2667\(20\)30084-0](https://doi.org/10.1016/S2468-2667(20)30084-0)
- **How Sweden Wasted a ‘Rare Opportunity’ to Study Coronavirus in Schools** ² – Science (May 22) <https://doi.org/10.1126/science.abc9565>
- **Covid-19: Delaying School Reopening by Two Weeks Would Halve Risks to Children, Says ISAGE** ⁵⁹ – BMJ (May 22) <https://doi.org/10.1136/bmj.m2079>
- **Covid-19: Push to Reopen Schools Risks New Wave of Infections, Says Independent SAGE** ⁶⁰ – BMJ (Clinical Research Ed.) (May 28) <https://doi.org/10.1136/bmj.m2161>
- **They Stumble That Run Fast the Economic and COVID-19 Transmission Impacts of Reopening Industries in the US** ⁶¹ – Medrxiv (June 12) <https://doi.org/10.1101/2020.06.11.20128918>

Recommended Resources

- **School Closures Caused by Coronavirus (Covid-19)** ⁶ – UNESCO <https://en.unesco.org/covid19/educationresponse>
- **Effects of School Closure on Incidence of Pandemic Influenza in Alberta, Canada** ⁶² – Annals of Internal Medicine (Feb 7) <https://doi.org/10.7326/0003-4819-156-3-201202070-00005>

- **Contact Tracing Evaluation for COVID-19 Transmission during the Reopening Phase in a Rural College Town**^{63*} – Medrxiv (June) <https://doi.org/10.1101/2020.06.24.20139204>
- **The Effect of State-Level Stay-at-Home Orders on COVID-19 Infection Rates**⁶⁴ – American Journal of Infection Control (May) <https://doi.org/10.1016/j.ajic.2020.05.017>
- **Returning Chinese School-Aged Children and Adolescents to Physical Activity in the Wake of COVID-19: Actions and Precautions**⁶⁵– Journal of Sport and Health Science (Apr) <https://doi.org/10.1016/j.jshs.2020.04.003>
- **Hand Hygiene, Mask-Wearing Behaviors and Its Associated Factors during the COVID-19 Epidemic: A Cross-Sectional Study among Primary School Students in Wuhan, China**⁶⁶ – International Journal of Environmental Research and Public Health (Apr) <https://doi.org/10.3390/ijerph17082893>
- **Impact of School Closures for COVID-19 on the US Health-Care Workforce and Net Mortality: A Modelling Study**⁶⁷ – The Lancet Public Health (May) [https://doi.org/10.1016/S2468-2667\(20\)30082-7](https://doi.org/10.1016/S2468-2667(20)30082-7)
- **School Closure During the Coronavirus Disease 2019 (COVID-19) Pandemic: An Effective Intervention at the Global Level?**⁶⁸ – JAMA Pediatrics (May 13) <https://doi.org/10.1001/jamapediatrics.2020.1892>
- **Socially Distanced School-Based Nutrition Program Feeding under COVID 19 in the Rural Niger Delta**⁶⁹ – The Extractive Industries and Society (Apr) <https://doi.org/10.1016/j.exis.2020.04.007>
- **No Evidence of Secondary Transmission of COVID-19 from Children Attending School in Ireland, 2020**⁵ – Euro Surveillance (May 28) <https://doi.org/10.2807/1560-7917.ES.2020.25.21.2000903>
- **Epidemiological Features and Viral Shedding in Children with SARS-CoV-2 Infection**³ – Journal of Medical Virology (June) <https://doi.org/10.1002/jmv.26180>
- **School Opening Delay Effect on Transmission Dynamics of Coronavirus Disease 2019 in Korea: Based on Mathematical Modeling and Simulation Study**⁷⁰ – Journal of Korean Medical Science (Apr) <https://doi.org/10.3346/jkms.2020.35.e143>
- **Impact of Public Health Interventions on Seasonal Influenza Activity During the SARS-CoV-2 Outbreak in Korea**⁷¹ – Clinical Infectious Diseases (May) <https://doi.org/10.1093/cid/ciaa672>
- **The Severity of COVID-19 in Children on Immunosuppressive Medication**⁷² – The Lancet Child & Adolescent Health (May) [https://doi.org/10.1016/S2352-4642\(20\)30145-0](https://doi.org/10.1016/S2352-4642(20)30145-0)
- **The Role of Children in the Dynamics of Intra Family Coronavirus 2019 Spread in Densely Populated Area**⁴ – Pediatric Infectious Disease Journal (June 1) <https://doi.org/10.1097/INF.0000000000002783>
- **Shut and Re-Open the Role of Schools in the Spread of COVID-19 in Europe**¹ – Medrxiv (June 26) <https://doi.org/10.1101/2020.06.24.20139634>
- **De-Escalation by Reversing the Escalation with a Stronger Synergistic Package of Contact Tracing, Quarantine, Isolation and Personal Protection: Feasibility of Preventing a COVID-19 Rebound in Ontario, Canada, as a Case Study**⁷³ – Biology (May 16) <https://doi.org/10.3390/biology9050100>
- **School Closure and Management Practices during Coronavirus Outbreaks Including COVID-19: A Rapid Systematic Review**⁷⁴ – The Lancet Child & Adolescent Health (May) [https://doi.org/10.1016/S2352-4642\(20\)30095-X](https://doi.org/10.1016/S2352-4642(20)30095-X)
- **Mental Health Status Among Children in Home Confinement During the Coronavirus Disease 2019 Outbreak in Hubei Province, China**⁷⁵ – JAMA Pediatrics (Apr) <https://doi.org/10.1001/jamapediatrics.2020.1619>

- **Recognizing and Controlling Airborne Transmission of SARS-CoV-2 in Indoor Environments** ⁷⁶ – Indoor Air (July 19) <https://doi.org/10.1111/ina.12697>

Annotated Bibliography

1. Stage HB, Shingleton J, Ghosh S, Scarabel F, Pellis L, Finnie T. Shut and re-open the role of schools in the spread of COVID-19 in Europe. medrxiv [Internet]. 2020 Jun 26; Available from: <https://doi.org/10.1101/2020.06.24.20139634>
 - Stage et al. compared daily hospitalization trends in northern European countries (Denmark, Norway, Sweden, and Germany), and found that the growth rate of COVID-19 cases declined approximately 9 days after implementation of school closures.
 - Limited school attendance did not appear to significantly affect transmission.
 - Reopening of schools for all students in countries with low community transmission (Denmark and Norway) has not resulted in a significant increase in the growth rate of COVID-19 cases. Return of most students to school in countries with higher levels of community transmission (Germany) has been accompanied by increased transmission among students, but not school staff.
2. Vogel G. How Sweden wasted a ‘rare opportunity’ to study coronavirus in schools. Science (80-) [Internet]. American Association for the Advancement of Science (AAAS); 2020 May 22 [cited 2020 Jul 1]; Available from: <https://doi.org/10.1126/science.abc9565>
3. Hua C-Z, Miao Z-P, Zheng J-S, Huang Q, Sun Q-F, Lu H-P, Su F-F, Wang W-H, Huang L-P, Xu Z-W, Ji L-D, Zhang H-P, Yang X-W, Li M-H, Mao Y-Y, Ying M-Z, Ye S, Shu Q, Chen E-F, Liang J-F, Wang W, Chen Z-M, Li W, Fu J-F. Epidemiological features and viral shedding in children with SARS-CoV-2 infection. J Med Virol [Internet]. United States; 2020 Jun; Available from: <https://doi.org/10.1002/jmv.26180> PMID: 32542750
 - An analysis of all children (n=314) from families with SARS-CoV-2 infected members in Zhejiang Province, China found incidence in children who were close contacts was significantly lower than in adults who were close contacts (13% vs 21%). Among 43 pediatric cases, the mean age was 8.2 years and mean incubation was 9.1 days, 77% had mild pneumonia and the remainder were asymptomatic. While SARS-CoV-2 RNA could be detected in stool samples in 91% of cases and for over 70 days in some children, no family contacts of these children were subsequently infected.
4. Somekh E, Gleyzer A, Heller E, Lopian M, Kashani-Ligumski L, Czeiger S, Schindler Y, Lessing JB, Stein M. The Role of Children in the Dynamics of Intra Family Coronavirus 2019 Spread in Densely Populated Area. Pediatr Infect Dis J [Internet]. United States; 2020 Jun 1; Publish Ah. Available from: <https://doi.org/10.1097/INF.0000000000002783> PMID: 32496407
 - Among 13 family clusters in a city in Israel, after removing the index case, 58% of adults became SARS-CoV-2 positive by PCR compared to 33% of children 5-17 years and 12% of children less than 5 years of age. Children appeared to play a smaller role in transmission of SARS-CoV-2 than adults.
5. Heavey L, Casey G, Kelly C, Kelly D, McDarby G. No evidence of secondary transmission of COVID-19 from children attending school in Ireland, 2020. Euro Surveill [Internet]. Sweden; 2020 May 28 [cited 2020 Jun 4];25(21). Available from: <https://doi.org/10.2807/1560-7917.ES.2020.25.21.2000903> PMID: 32489179
6. UNESCO. School closures caused by Coronavirus (Covid-19) [Internet]. [cited 2020 Jul 2]. Available from: <https://en.unesco.org/covid19/educationresponse>

7. Coughlan S. How reopened schools in Denmark keep children safely apart - BBC News. BBC [Internet]. 2020 May 12 [cited 2020 Jun 30]; Available from: <https://www.bbc.com/news/education-52550470>
8. Bennhold K. As Europe Reopens Schools, Relief Combines With Risk - The New York Times. New York Times [Internet]. 2020 May 10 [cited 2020 Jul 1]; Available from: <https://www.nytimes.com/2020/05/10/world/europe/reopen-schools-germany.html>
9. Fretheim A. ISRCTN44152751: School opening in Norway during the COVID-19 pandemic. ISRCTN Regist [Internet]. [cited 2020 Jul 1]; Available from: <http://www.isrctn.com/ISRCTN44152751>
10. How are schools reopening after coronavirus lockdowns? [Internet]. World Economic Forum. 2020 [cited 2020 Jul 1]. Available from: <https://www.weforum.org/agenda/2020/05/coronavirus-countries-schools-education-covid19-reopen-classroom>
11. Lyst C. Coronavirus: What is a blended model of learning? BBC [Internet]. 2020 May 22 [cited 2020 Jun 30]; Available from: <https://www.bbc.com/news/uk-scotland-52412171>
12. Moens B. All nursery and primary schools in Belgium to reopen in June. Politico [Internet]. 2020 May 27; Available from: <https://www.politico.eu/article/all-nursery-and-primary-schools-in-belgium-to-reopen-in-june/>
13. Farge E, Miller J. Swiss back-to-school angst illustrates worries around easing lockdowns - Reuters. Reuters [Internet]. 2020 May 10 [cited 2020 Jul 1]; Available from: <https://www.reuters.com/article/us-health-coronavirus-swiss-education/swiss-back-to-school-angst-illustrates-worries-around-easing-lockdowns-idUSKBN22MOEH>
14. Hope K. Coronavirus: Greece to reopen more schools — as it happened. Financ Times [Internet]. May [cited 2020 Jul 1]; Available from: <https://www.ft.com/content/dcdadf44-37ed-3e2c-bdff-fe475617c6e8>
15. Estrin D. After Reopening Schools, Israel Orders Them To Shut If COVID-19 Cases Are Discovered. NPR [Internet]. Jun [cited 2020 Jun 30]; Available from: <https://www.npr.org/sections/coronavirus-live-updates/2020/06/03/868507524/israel-orders-schools-to-close-when-covid-19-cases-are-discovered>
16. Coronavirus Israel live: Health minister cautions over “dramatic” rise in new cases. Haaretz [Internet]. 2020 May 8 [cited 2020 Jun 30]; Available from: <https://www.haaretz.com/israel-news/israel-coronavirus-rise-cases-test-news-1.8899992>
17. Stub ST. Israel’s Schools Struggle With Reopening Amid Coronavirus Pandemic. US News World Reports [Internet]. 2020 Jun 24 [cited 2020 Jun 30]; Available from: <https://www.usnews.com/news/best-countries/articles/2020-06-24/israels-schools-struggle-with-reopening-amid-coronavirus-pandemic>
18. Will M. How Schools in Other Countries Have Reopened - Education Week. Educ Week [Internet]. 2020 [cited 2020 Jun 30]; Available from: <https://www.edweek.org/ew/articles/2020/06/11/how-schools-in-other-countries-have-reopened.html>
19. Ward A. Germany, Vietnam, and New Zealand reopening schools despite coronavirus - Vox. Vox [Internet]. 2020 May 27 [cited 2020 Jul 1]; Available from: <https://www.vox.com/21270817/coronavirus-schools-reopen-germany-vietnam-new-zealand>
20. Kwon J, Jeong S. South Korea schools: Hundreds close again after reopening. CNN [Internet]. 2020 May 29 [cited 2020 Jul 1]; Available from: <https://www.cnn.com/2020/05/29/asia/south-korea-coronavirus-shuts-down-again-intl/index.html>
21. Lee HK. South Korea’s COVID precautions as students head back to school offers a glimpse of what’s needed to re-open [Internet]. ABC News. 2020 [cited 2020 Jul 1]. Available from: <https://abcnews.go.com/International/high-school-seniors-head-back-school-south-korea/story?id=70784590>

22. CDC. Interim Guidance for Child Care Programs and K-12 Schools | CDC [Internet]. Available from: <https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/guidance-for-schools.html>
23. Considerations for school-related public health measures in the context of COVID-19 [Internet]. [cited 2020 Jun 26]. Available from: <https://www.who.int/publications/i/item/considerations-for-school-related-public-health-measures-in-the-context-of-covid-19>
24. Miller MW, Jeffries-Simmons T, Rockholt C. Reopening Washington Schools 2020 District Planning Guide [Internet]. 2020. Available from: <https://www.k12.wa.us/about-ospi/workgroups-committees/currently-meeting-workgroups/reopening-washington-schools-2020-21-workgroup>
25. COVID-19 resources for schools and child care facilities - King County [Internet]. [cited 2020 Jun 26]. Available from: <https://www.kingcounty.gov/depts/health/covid-19/schools-childcare.aspx>
26. Ahmady S, Shahbazi S, Heidari M. Transition to Virtual Learning During the Coronavirus Disease-2019 Crisis in Iran: Opportunity Or Challenge? *Disaster Med Public Health Prep* [Internet]. 2020 May;1–2. Available from: <https://doi.org/10.1017/dmp.2020.142> PMID: 32375914
27. Ahmed S, Mvalo T, Akech S, Agweyu A, Baker K, Bar-Zeev N, Campbell H, Checkley W, Chisti MJ, Colbourn T, Cunningham S, Duke T, English M, Falade AG, Fancourt NSS, Ginsburg AS, Graham HR, Gray DM, Gupta M, Hammitt L, Hesseling AC, Hooli S, Johnson A-WB, King C, Kirby MA, Lanata CF, Lufesi N, Mackenzie GA, McCracken JP, Moschovis PP, Nair H, Oviawe O, Pomat WS, Santosham M, Seddon JA, Thahane LK, Wahl B, Van der Zalm M, Verwey C, Yoshida L-M, Zar HJ, Howie SR, McCollum ED, Zeev NB-, Campbell H, Checkley W, Cunningham S, English M, Duke T, Ginsburg AS, Graham HR, Fancourt NSS, Kirby MA, McCollum ED. Protecting children in low-income and middle-income countries from COVID-19. [Internet]. *BMJ global health England*; May, 2020 p. 5–7. Available from: <https://doi.org/10.1136/bmjgh-2020-002844> PMID: 32461228
28. Aishworiya R, Chong SC, Kiing JS. When life is put on hold, how do we hold on to life? - Challenges and Opportunities in Developmental and Behavioral Pediatrics during COVID-19. *J Dev Behav Pediatr* [Internet]. United States; 2020 May [cited 2020 May 21];1. Available from: <https://doi.org/10.1097/DBP.0000000000000830> PMID: 32433220
29. Allam Z, Jones DS. Pandemic stricken cities on lockdown. Where are our planning and design professionals [now, then and into the future]? *Land use policy* [Internet]. England: Elsevier Ltd; 2020 Sep 1 [cited 2020 Jun 9];97:104805. Available from: <https://doi.org/10.1016/j.landusepol.2020.104805> PMID: 32508374
30. Anderson M, Mckee M, Mossialos E. Developing a sustainable exit strategy for COVID-19: health, economic and public policy implications. *J R Soc Med* [Internet]. England; 2020 May 14 [cited 2020 May 15];113(5):176–178. Available from: <https://doi.org/10.1177/0141076820925229> PMID: 32407649
31. Angoulvant F, Ouldali N, Yang DD, Filser M, Gajdos V, Rybak A, Guedj R, Soussan-Banini V, Basmaci R, Lefevre-Utile A, Brun-Ney D, Beaujouan L, Skurnik D. COVID-19 pandemic: Impact caused by school closure and national lockdown on pediatric visits and admissions for viral and non-viral infections, a time series analysis. *Clin Infect Dis* [Internet]. United States; 2020 Jun; Available from: <https://doi.org/10.1093/cid/ciaa710> PMID: 32492117
32. Armitage R, Nellums LB. Considering inequalities in the school closure response to COVID-19. [Internet]. *The Lancet Global health*. 2020. p. e644. Available from: [https://doi.org/10.1016/S2214-109X\(20\)30116-9](https://doi.org/10.1016/S2214-109X(20)30116-9) PMID: 32222161
33. Baker C, Galemore CA, Lowrey KM. Information Sharing in the School Setting During a Public Health Emergency. *NASN Sch nurse* [Internet]. United States; 2020 May 15 [cited 2020 May 18];1942602X20925031. Available from: <https://doi.org/10.1177/1942602X20925031> PMID: 32413270
34. Baral SD, Mishra S, Diouf D, Phanuphak N, Dowdy D. The public health response to COVID-19:

- balancing precaution and unintended consequences. *Ann Epidemiol* [Internet]. United States; 2020 Jun;46:12–13. Available from: <https://doi.org/10.1016/j.annepidem.2020.05.001> PMID: 32532367
35. Burnette D. Too Expensive to Re-Open Schools? Some Superintendents Say It Is - Education Week [Internet]. [cited 2020 Jun 26]. Available from: <https://www.edweek.org/ew/articles/2020/05/21/too-expensive-to-re-open-schools-some-superintendents.html>
 36. Colao A, Piscitelli P, Pulimeno M, Colazzo S, Miani A, Giannini S. Rethinking the role of the school after COVID-19. [Internet]. *The Lancet Public Health* England; May, 2020. Available from: [https://doi.org/10.1016/S2468-2667\(20\)30124-9](https://doi.org/10.1016/S2468-2667(20)30124-9) PMID: 32464100
 37. Combe LG. School Nurses: Living the Framework During COVID-19. *NASN Sch nurse* [Internet]. United States; 2020 May 26 [cited 2020 May 27];1942602X20929533. Available from: <https://doi.org/10.1177/1942602X20929533> PMID: 32452274
 38. Cooper DM, Guay-Woodford L, Blazar BR, Bowman S, Byington CL, Dome J, Forthal D, Konstan MW, Kuppermann N, Liem RI, Ochoa ER, Pollock BH, Price OA, Ramsey BW, Ross LF, Sokol RJ, Wright RJ. Re-Opening Schools Safely: The Case for Collaboration, Constructive Disruption of Pre-COVID Expectations, and Creative Solutions. *J Pediatr* [Internet]. Elsevier BV; 2020 May; Available from: <https://doi.org/10.1016/j.jpeds.2020.05.022>
 39. Daniel J. Education and the COVID-19 pandemic. *Prospects* [Internet]. 2020 Apr;1–6. Available from: <https://doi.org/10.1007/s11125-020-09464-3> PMID: 32313309
 40. Delacourt C, Gras-Le Guen C, Gonzales E. [Back to school and COVID-19: It is urgent to control our fears and move forward for the good of children]. [Internet]. *Journal de pediatrie et de puericulture*. France: Elsevier Masson SAS; 2020 [cited 2020 Jun 9]. p. 99–100. Available from: <https://doi.org/10.1016/j.jpp.2020.05.001> PMID: 32508483
 41. Do LAH, Anderson J, Sutton P, Pellicci DG, Mulholland K, Licciardi P V. Understanding COVID-19 in children may provide clues to protect at-risk populations. [Internet]. *BMJ paediatrics open* England: BMJ; May, 2020 p. e000702. Available from: <https://doi.org/10.1136/bmjpo-2020-000702> PMID: 32455170
 42. Dooley DG, Bandealy A, Tschudy MM. Low-Income Children and Coronavirus Disease 2019 (COVID-19) in the US. *JAMA Pediatr* [Internet]. United States; 2020 May 13 [cited 2020 May 14]; Available from: <https://doi.org/10.1001/jamapediatrics.2020.2065> PMID: 32401283
 43. Dunn CG, Kenney E, Fleischhacker SE, Bleich SN. Feeding Low-Income Children during the Covid-19 Pandemic. *N Engl J Med* [Internet]. United States; 2020 Apr;382(18):e40. Available from: <https://doi.org/10.1056/NEJMp2005638> PMID: 32227759
 44. Esposito S, Principi N. To mask or not to mask children to overcome COVID-19. *Eur J Pediatr* [Internet]. Germany; 2020 May 9 [cited 2020 May 11]; Available from: <https://doi.org/10.1007/s00431-020-03674-9> PMID: 32388722
 45. Fantini MP, Reno C, Biserni GB, Savoia E, Lanari M. COVID-19 and the re-opening of schools: a policy maker’s dilemma. [Internet]. *Italian journal of pediatrics* England; Jun 9, 2020 p. 79. Available from: <https://doi.org/10.1186/s13052-020-00844-1> PMID: 32517815
 46. Fontanesi L, Marchetti D, Mazza C, Di Giandomenico S, Roma P, Verrocchio MC. The effect of the COVID-19 lockdown on parents: A call to adopt urgent measures. *Psychol trauma* [Internet]. United States; 2020 Jun 11 [cited 2020 Jun 12]; Available from: <https://doi.org/10.1037/tra0000672> PMID: 32525382
 47. Khattab N, Abbas A-RA, Abbas A-RA, Memon SF. Children returning to schools following COVID-19: a balance of probabilities [Internet]. *International journal of surgery* England; Jun, 2020 p. 202–203. Available from: <https://doi.org/10.1016/j.ijso.2020.05.084> PMID: 32505646
 48. Larcher V, Brierley J. Children of COVID-19: pawns, pathfinders or partners? *J Med Ethics*

- [Internet]. England; 2020 Jun 5 [cited 2020 Jun 8]; Available from: <https://doi.org/10.1136/medethics-2020-106465> PMID: 32503924
49. Masonbrink AR, Hurley E. Advocating for Children During the COVID-19 School Closures. *Pediatrics* [Internet]. United States; 2020 Jun; Available from: <https://doi.org/10.1542/peds.2020-1440> PMID: 32554517
 50. Moberly T. Covid-19: school closures and bans on mass gatherings will need to be considered, says England's CMO. *BMJ* [Internet]. England; 2020 Feb;368:m806. Available from: <https://doi.org/10.1136/bmj.m806> PMID: 32111656
 51. Munro APS, Faust SN. Children are not COVID-19 super spreaders: time to go back to school. *Arch Dis Child* [Internet]. England; 2020 May; Available from: <https://doi.org/10.1136/archdischild-2020-319474> PMID: 32371442
 52. Nagata JM, Abdel Magid HS, Gabriel KP. Screen time for children and adolescents during the COVID-19 pandemic. *Obesity* [Internet]. United States; 2020 May 28 [cited 2020 May 29];oby.22917. Available from: <https://doi.org/10.1002/oby.22917> PMID: 32463530
 53. O'Dowd A. Covid-19: Papers justifying government's plans to reopen schools are "inconclusive," say union bosses. *BMJ* [Internet]. England; 2020 May 27 [cited 2020 May 29];369:m2108. Available from: <https://doi.org/10.1136/bmj.m2108> PMID: 32461199
 54. Phelps C, Sperry LL. Children and the COVID-19 pandemic. *Psychol trauma* [Internet]. United States; 2020 Jun 11 [cited 2020 Jun 12]; Available from: <https://doi.org/10.1037/tra0000861> PMID: 32525366
 55. Pollock AM. Covid-19: local implementation of tracing and testing programmes could enable some schools to reopen. [Internet]. *BMJ* (Clinical research ed.). England; 2020. p. m1187. Available from: <https://doi.org/10.1136/bmj.m1187> PMID: 32209551
 56. Rosario R, Rosário R. COVID-19 and Schools Closure: Implications for School Nurses. [Internet]. *The Journal of school nursing* United States; May 14, 2020 p. 1059840520925533. Available from: <https://doi.org/10.1177/1059840520925533> PMID: 32406302
 57. Rothstein R, Olympia RP. School Nurses on the Front Lines of Healthcare: The Approach to Maintaining Student Health and Wellness During COVID-19 School Closures. *NASN Sch Nurse* [Internet]. United States; 2020 Jun 16;1942602X2093561. Available from: <https://doi.org/10.1177/1942602X20935612> PMID: 32546120
 58. Van Lancker W, Parolin Z. COVID-19, school closures, and child poverty: a social crisis in the making. *Lancet Public Heal* [Internet]. 2020 May;5(5):e243–e244. Available from: [https://doi.org/10.1016/S2468-2667\(20\)30084-0](https://doi.org/10.1016/S2468-2667(20)30084-0) PMID: 32275858
 59. Wise J. Covid-19: Delaying school reopening by two weeks would halve risks to children, says iSAGE. *BMJ* [Internet]. England; 2020 May 22 [cited 2020 May 25];369:m2079. Available from: <https://doi.org/10.1136/bmj.m2079> PMID: 32444387
 60. Wise J. Covid-19: Push to reopen schools risks new wave of infections, says Independent SAGE. *BMJ* [Internet]. England; 2020 May 28 [cited 2020 Jun 1];369:m2161. Available from: <https://doi.org/10.1136/bmj.m2161> PMID: 32467094
 61. Zimmermann M, Benefield AE, Althouse BM. They stumble that run fast the economic and COVID-19 transmission impacts of reopening industries in the US. *medrxiv* [Internet]. 2020 Jun 12; Available from: <https://doi.org/10.1101/2020.06.11.20128918>
 62. Earn DJD. Effects of School Closure on Incidence of Pandemic Influenza in Alberta, Canada. *Ann Intern Med* [Internet]. American College of Physicians; 2012 Feb 7 [cited 2020 Jun 29];156(3):173. Available from: <https://doi.org/10.7326/0003-4819-156-3-201202070-00005>
 63. Moon S afroj, Scoglio C. Contact Tracing Evaluation for COVID-19 Transmission during the Reopening Phase in a Rural College Town. *medrxiv* [Internet]. 2020 Jun 26; Available from: <https://doi.org/10.1101/2020.06.24.20139204>

- An individual-based contact network model and a compartmental transmission model were used to assess the effectiveness of contact tracing for COVID-19 control under four different re-opening strategies ranging from 0% to 75% of contacts traced. They found tracing 20% of contacts is enough to reduce the epidemic size by half under all strategies, and that above a threshold, increasing effectiveness of contact tracing results in a smaller number of quarantined individuals due to a reduced number of confirmed cases.
64. Castillo RC, Staguhn ED, Weston-Farber E. The effect of state-level stay-at-home orders on COVID-19 infection rates. *Am J Infect Control* [Internet]. United States; 2020 May [cited 2020 May 29]; Available from: <https://doi.org/10.1016/j.ajic.2020.05.017> PMID: 32461066
 65. Chen P, Mao L, Nassis GP, Harmer P, Ainsworth BE, Li F. Returning Chinese school-aged children and adolescents to physical activity in the wake of COVID-19: Actions and precautions. *J Sport Heal Sci* [Internet]. 2020 Apr; Available from: <https://doi.org/10.1016/j.jshs.2020.04.003> PMID: 32325023
 66. Chen X, Ran L, Liu Q, Hu Q, Du X, Tan X. Hand Hygiene, Mask-Wearing Behaviors and Its Associated Factors during the COVID-19 Epidemic: A Cross-Sectional Study among Primary School Students in Wuhan, China. *Int J Environ Res Public Health* [Internet]. 2020 Apr;17(8). Available from: <https://doi.org/10.3390/ijerph17082893> PMID: 32331344
 67. Bayham J, Fenichel EP. Impact of school closures for COVID-19 on the US health-care workforce and net mortality: a modelling study. *Lancet Public Heal* [Internet]. 2020 May;5(5):e271–e278. Available from: [https://doi.org/10.1016/S2468-2667\(20\)30082-7](https://doi.org/10.1016/S2468-2667(20)30082-7) PMID: 32251626
 68. Esposito S, Principi N. School Closure During the Coronavirus Disease 2019 (COVID-19) Pandemic: An Effective Intervention at the Global Level? *JAMA Pediatr* [Internet]. United States; 2020 May 13 [cited 2020 May 14]; Available from: <https://doi.org/10.1001/jamapediatrics.2020.1892> PMID: 32401277
 69. Francis NN, Pegg S. Socially distanced school-based nutrition program feeding under COVID 19 in the rural Niger Delta. *Extr Ind Soc* [Internet]. 2020 Apr;7(2):576–579. Available from: <https://doi.org/10.1016/j.exis.2020.04.007> PMID: 32322535
 70. Kim S, Kim YJ, Peck KR, Jung E. School Opening Delay Effect on Transmission Dynamics of Coronavirus Disease 2019 in Korea: Based on Mathematical Modeling and Simulation Study. *J Korean Med Sci* [Internet]. 2020 Apr;35(13):e143. Available from: <https://doi.org/10.3346/jkms.2020.35.e143> PMID: 32242349
 71. Lee H, Lee H, Song K-H, Kim ES, Park JS, Jung J, Ahn S, Jeong EK, Park H, Kim H Bin. Impact of Public Health Interventions on Seasonal Influenza Activity During the SARS-CoV-2 Outbreak in Korea. *Clin Infect Dis* [Internet]. United States; 2020 May; Available from: <https://doi.org/10.1093/cid/ciaa672> PMID: 32472687
 72. Marlais M, Wlodkowski T, Vivarelli M, Pape L, Tonshoff B, Schaefer F, Tullus K, Tönshoff B, Schaefer F, Tullus K. The severity of COVID-19 in children on immunosuppressive medication. *Lancet Child Adolesc Heal* [Internet]. England; 2020 May [cited 2020 May 18]; Available from: [https://doi.org/10.1016/S2352-4642\(20\)30145-0](https://doi.org/10.1016/S2352-4642(20)30145-0) PMID: 32411815
 73. Tang B, Scarabel F, Bragazzi NL, McCarthy Z, Glazer M, Xiao Y, Heffernan JM, Asgary A, Ogden NH, Wu J. De-Escalation by Reversing the Escalation with a Stronger Synergistic Package of Contact Tracing, Quarantine, Isolation and Personal Protection: Feasibility of Preventing a COVID-19 Rebound in Ontario, Canada, as a Case Study. *Biology (Basel)* [Internet]. Switzerland; 2020 May 16 [cited 2020 May 21];9(5):100. Available from: <https://doi.org/10.3390/biology9050100> PMID: 32429450
 74. Viner RM, Russell SJ, Croker H, Packer J, Ward J, Stansfield C, Mytton O, Bonell C, Booy R. School closure and management practices during coronavirus outbreaks including COVID-19: a rapid

systematic review. *Lancet Child Adolesc Heal* [Internet]. 2020 May;4(5):397–404. Available from: [https://doi.org/10.1016/S2352-4642\(20\)30095-X](https://doi.org/10.1016/S2352-4642(20)30095-X) PMID: 32272089

75. Xie X, Xue Q, Zhou Y, Zhu K, Liu Q, Zhang J, Song R. Mental Health Status Among Children in Home Confinement During the Coronavirus Disease 2019 Outbreak in Hubei Province, China. *JAMA Pediatr* [Internet]. 2020 Apr; Available from: <https://doi.org/> PMID: 32329784
76. Allen JG, Marr LC. Recognizing and controlling airborne transmission of SARS-CoV-2 in indoor environments. *Indoor Air* [Internet]. England; 2020 Jul 19;30(4):557–558. Available from: <https://doi.org/10.1111/ina.12697> PMID: 32557915