National Collaborating Centre for Methods and Tools

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Rapid Review: What is the specific role of daycares and schools in COVID-19 transmission?

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Date: July 9, 2020

Suggested Citation:

National Collaborating Centre for Methods and Tools. (2020). *Rapid Evidence Review: What is the specific role of daycares and schools in COVID-19 transmission?* https://www.nccmt.ca/knowledge-repositories/covid-19-rapid-evidence-service.

Version 2: July 9, 2020

Executive Summary

Background

As jurisdictions continue to lift restrictions implemented to slow the spread of coronavirus disease 2019 (COVID-19), they face major decisions about when and how to re-open and operate schools and daycares. While children are known to be effective vectors for other viruses, such as influenza, their role in the transmission of COVID-19 is much less clear.

This rapid review was produced to support public health decision makers' response to the COVID-19 pandemic. This review seeks to identify, appraise, and summarize emerging research evidence to support evidence-informed decision making.

This rapid review is based on the most recent research evidence available at the time of release. A previous version was completed on May 19, 2020. This updated version includes evidence available up to June 26, 2020.

In this rapid evidence review, we answer the question: **What is the specific role of daycares and schools in COVID-19 transmission?**

Key Points

- Within reports published to date, transmission of COVID-19 from child to child or from child to adult in daycare or school settings has not been confirmed, and no reports of outbreaks or super spreader events within schools or daycares prior to or after lockdowns have been published. There is one presumed case of transmission from one adolescent to another in a school setting. The quality of evidence is moderate, findings are consistent.
- Analyses of infection clusters revealed that for children who were infected, transmission was traced back to community and home settings rather than daycares or schools. Within household clusters, adults are much more likely to be the index case than children. The quality of this evidence is low, findings are consistent across reviews.
- Overall, the evidence to date suggests that children are not significant vectors for transmission. The quality of evidence is low, findings are consistent.
- Studies evaluating the transmission of COVID-19 in daycare and school settings are limited to case reports of contact tracing and prevalence studies. As schools and daycares continue to open around the world and more evidence becomes available, this question should be reviewed again as findings may change.

Overview of Evidence and Knowledge Gaps

- Contact tracing studies have not yet identified confirmed transmission by children in school settings. The interpretation of prevalence studies is unclear as they do not distinguish transmission by children from transmission by adults in those settings or exclude community or household exposure.
- It is not yet possible to evaluate the impact of infection prevention and control measures in daycare and school settings. Most studies were conducted prior to implementation of infection prevention measures. One contact tracing study was conducted in Singapore where schools have re-opened.
- The prevalence of COVID-19 infection in children in daycare and school settings was lower than the prevalence of COVID-19 in adults working in daycare and school settings. The quality of evidence is low, findings are consistent.
- One study conducted in an area with a high caseload found the seroprevalence of antibodies to the virus that causes COVID-19 was higher in students at a secondary school than in their parents or siblings 4 weeks after closure. The significance of this finding is unclear, as the study had a low response rate and it was not possible to trace transmission. Quality of evidence is moderate.
- There is some evidence suggesting that transmission from children to caregivers is possible and that the virus that causes COVID-19 may be transmitted through fecal matter, although this evidence is low quality and further research is needed to confirm.

Methods

Research Questions

What is the specific role of daycares and schools in COVID-19 transmission?

1. What is known about the likelihood of transmission of COVID-19 amongst children and adults in daycare and schools and among children to their household members?

2. What is known about likelihood of transmission of COVID-19 by infants, toddlers, and school-aged children to others in other settings?

Search

On May 7, 2020, and again on June 26 and June 30, 2020, the following databases were searched for evidence pertaining to the role of children in the transmission of COVID-19. The databases searched were:

- Pubmed's curated COVID-19 literature hub: LitCovid
- Trip Medical Database
- World Health Organization's Global literature on coronavirus disease
- Joanna Briggs Institute COVID-19 Special Collection
- COVID-19 Evidence Alerts from McMaster PLUS™
- Public Health +
- COVID-19 Living Overview of the Evidence (L·OVE)
- Cochrane Coronavirus (COVID-19) Special Collections
- Oxford COVID-19 Evidence Service
- Guidelines International Network (GIN)
- Cochrane Rapid Reviews Question Bank
- Prospero Registry of Systematic Reviews
- NCCMT COVID-19 Rapid Evidence Reviews
- MedRxiv preprint server
- NCCDH Equity-informed Responses to COVID-19
- NCCEH Environmental Health Resources for the COVID-19 Pandemic
- NCCHPP Public Health Ethics and COVID-19
- NCCID Public Health Quick Links
- NCCID Disease Debrief
- NCCIH Updates on COVID-19

A copy of the search strategy is available on request.

Study Selection Criteria

The search first included recent, high-quality syntheses. If no syntheses were found, single studies were included. English-language, peer-reviewed sources and sources published ahead-of-print before peer review were included. Grey literature and surveillance sources were excluded.

	Inclusion Criteria	Exclusion Criteria
Population	Children and adolescents aged 1-18	Infants
Intervention	Exposure to or diagnosis of COVID-19	
Comparisons		
Outcomes	Transmission of COVID-19	
Setting	Schools, daycares, playgrounds, parks, homes	

Data Extraction and Synthesis

Data on study design, setting, location, population characteristics, interventions or exposure and outcomes were extracted when reported. We synthesized the results narratively due to the variation in methodology and outcomes for the included studies.

The identified syntheses relevant to this report had considerable overlap in the primary literature but varied in the data reported across reviews for the same primary studies. We chose to conduct a new synthesis rather than reporting the overlapping results of the identified syntheses in order to present the data most succinctly and clearly. The primary studies were used to extract study characteristics, key findings and appraise study quality.

We evaluated the quality of included evidence using critical appraisal tools as indicated by the study design below. Quality assessment was completed by one reviewer and verified by a second reviewer. Conflicts were resolved through discussion.

Study Design	**Critical Appraisal Tool**
Synthesis	Health Evidence™ Quality Appraisal Tool
Cohort	Critical Appraisal Skills Programme (CASP) Cohort Study Checklist
Case Series	Joanna Briggs Institute (JBI) Checklist for Case Series
Case Report	Joanna Briggs Institute (JBI) Checklist for Case Reports
Prevalence	Joanna Briggs Institute (JBI) Checklist for Prevalence Studies

Completed quality assessments for each included study are available on request.

Findings

Quality of Evidence

The first version of this document, dated May 19, 2020, included five completed syntheses, and two in progress syntheses, for a total of seven publications. This second version adds three new completed syntheses, three updates to previously included syntheses, three in progress syntheses, and ten single studies for a total of 23 publications included in this evidence review addressing two distinct questions. The quality of the evidence included in this review is summarized below. Please note that some publications answered both questions therefore are included in more than one data table below.

		Total	Quality of Evidence
Single Studies	Completed	10	1 Low 5 Moderate 3 High 1 Not rated
Syntheses	Completed	8	3 Low 4 Moderate 1 High
	In Progress	5	---

Warning

Given the need to make emerging COVID-19 evidence quickly available, many emerging studies have not been peer reviewed. As such, we advise caution when using and interpreting the evidence included in this rapid review. We have provided a summary of the quality of the evidence as low, moderate, or high to support the process of decision making. Where possible, make decisions using the highest quality evidence available.

Question 1: What is known about the likelihood of transmission of COVID-19 amongst children and adults in daycare and primary schools and children to their household members?

Table 1: Single Studies

Reference	Date Released	Study Design	Location	Setting	Summary of findings	Quality Rating:
Contact Tracing Studies						
Yung, C.H., Kam, K., Nadua, K.D., Chong, C.Y., Tan, N.W.H., Li… Ng, K.C. (2020). Novel coronavirus 2019 transmission risk in educational settings. *Clinical Infectious Diseases.* Epub ahead of print.	Jun 25, 2020	Case report	Singapore	Preschool, secondary school Schools were cleaned and disinfected daily, children were cohorted with staggered recess and lunches.	1 child with COVID-19 attended a preschool for ages 3-6. • Total number of contacts was not reported • 34 contacts developed symptoms and were tested; none tested positive 1 adolescent with COVID-19 attended a secondary school for ages 12-15. • Total number of contacts was not reported • 8 contacts developed symptoms and were tested; none tested positive	High
Heavy, L., Casey, G., Kelly, C., & McDarby, G. (2020, May 28). *No evidence of secondary transmission of COVID-19 from children attending school in Ireland, 2020*. Eurosurveillance.	May 28, 2020	Case report	Ireland	Primary school, secondary school No infection prevention and control measures were in place. Sports, music lessons and choir practice continued.	3 children aged 10-15 with COVID-19 attended one primary and two secondary schools. • The children had contact with 822 students and 83 adults in schools • Contacts who developed symptoms were tested; number not reported • No contacts tested positive	Moderate
National Centre for Immunisation Research and Surveillance. (2020, April 26). *COVID-19 in schools – the experience in NSW*.	Apr 26, 2020	Case report	Australia	Primary school, secondary school No infection prevention and control measures reported.	1 child with COVID-19 attended a primary school. • The child had contact with 43 students and 2 adults in school • Contacts who developed symptoms were tested (number not reported); none tested positive	Moderate

				The premier of New South Wales had encouraged parents to keep students home and schools may have been less populated.	8 adolescents with COVID-19 attended secondary schools. • The adolescents had contact with 509 students and 65 adults in school • Contacts who developed symptoms were tested (approximately 1/3 of contacts); none tested positive for viral RNA • 75 close contacts were tested for antibodies 4 weeks after exposure; 1 secondary student tested positive for antibodies	
Danis, K., Epaulard, O., Bénet, T., Gaymard, A., Campoy, S., Bothelo-Nevers, E.... Saura, C. (2020). Cluster of coronavirus disease 2019 (Covid-19) in the French Alps, 2020. *Clinical Infectious Diseases*. Epub ahead of print.	Apr 11, 2020	Case report	France	Primary schools No infection prevention and control measures at the schools were reported. Schools were closed upon identification of the case.	1 child aged 9 years old with COVID-19 attended 3 primary schools. • The child had 86 contacts • 55 contacts developed symptoms and were tested; none tested positive	High
Prevalence Studies						
Fontanet, A., Grant, R., Tondeur, L., Madec, Y., Grzelak, L., Cailleau, I... Hoen, B. (2020a). SARS-CoV-2 infection in primary schools in northern France: A retrospective cohort study in an area of high transmission. *Preprint.*	Jun 29, 2020	Retrospective cohort	France	Primary school No infection prevention and control measures were reported. Schools had been shut down for 4 weeks prior to antibody testing.	510 of 1047 students (aged 6-11 years), at a primary school consented to testing for antibodies to the virus that causes COVID-19. • 45 of 510 (8.8%) tested positive for antibodies • 11.9% parents tested positive for antibodies	Moderate
Folkhälsomyndigheten. (2020, May 27). *Förekomst av covid-19 i olika yrkesgrupper*.	Jun 25, 2020	Prevalence	Sweden	Preschool, primary school, secondary school	National public health data and census data were used to determine the relative risk of COVID-19 infection for various occupations. For occupations working with children, such as primary and secondary school	Moderate

					teachers, preschool teachers and nannies, the relative risk of COVID-19 infection was no different than other occupations. Notably, Sweden has not implemented nationwide lockdown measures.	
Desmet, S., Skinci, E., Wouters, I., Decru, B., Beuselinck, K., Malhotra-Kumar, S., & Theeten, H. (2020). No SARS-CoV-2 carriage observed in children attending daycare centers during the first weeks of the epidemic in Belgium. *Preprint.*	May 18, 2020	Prevalence	Belgium	Daycare centres No infection prevention and control were reported. Samples were collected prior to the nationwide lockdown.	84 children aged 0-2.5 years attending 8 different daycare centres were randomly sampled and tested for COVID-19. No children tested positive.	High
Fontanet, A., Tondeur, L., Madec, Y., Grant, R., Besombes, C., Jolly, N… Hoen, B. (2020b). Cluster of COVID-19 in northern France: A retrospective closed cohort study. *Preprint*.	Apr 23, 2020	Prevalence	France	Secondary school No infection prevention and control measures were reported. Schools had been shut down for 4 weeks prior to antibody testing.	326 of 1262 students (aged 14-17), teachers and staff at a secondary school consented to testing for antibodies to the virus that causes COVID-19. • 92 of 240 (38.3%) tested positive for antibodies • 11.4% parents tested positive for antibodies • 10.2% siblings tested positive for antibodies	Moderate
Oster, E. & Alter, G. (2020, July 7). *COVID-19 and Children: Our Crowd-sourced Data*. COVID-Explained.	Ongoing	Surveillance (crowd-sourced)	USA	Daycare	As of June 29, 2020, crowd-sourced COVID-19 data for 970 daycare centres in the USA report: • 42 cases in 27 234 children (0.15%) • 106 cases in 9589 staff (1.11%) Infection prevention and control measures in daycare centres are not described.	Not rated

Table 2: Syntheses

Reference	Date Released	Included Studies Relevant to Questions	Review Conclusions	Quality Rating	Quality Rating: Included Studies
New evidence reported July 9, 2020					
Health Information and Quality Authority. (2020, Jun 23). *Evidence summary for potential for children to contribute to transmission of SARS-CoV-2*.	Jun 23, 2020 (search completed May 31, 2020)	Heavey, 2020 NCIRS, 2020 Fontanet, 2020b Desmet, 2020	The role that children play in the transmission of the virus that causes COVID-19 is unclear. Larger-scale studies are needed.	Moderate	Low-moderate
Ludvigsson, J.F. (2020). Children are unlikely to be the main drivers of the COVID-19 pandemic – A systematic review. *Acta Paediatr.* Epub ahead of print.	May 19, 2020 (search completed May 11, 2020)	NCIRS, 2020 Danis, 2020	Children are unlikely to be key drivers of transmission. Opening daycares and schools is unlikely to affect mortality in adults.	Low	Not reported
Usher Institute. (2020, May 6). *Summary: What is the evidence for transmission of SARS-COV-2 by children [or in schools]?*	May 6, 2020 (search completed May 4, 2020)	NCIRS, 2020 Fontanet, 2020b	Children are less likely to infect others than adults. However, children have similar viral loads to adults. Fecal shedding of the virus that causes COVID-19 is possible.	Low	Not reported
Brurberg, K.G. (2020). The role of children in the transmission of SARS-CoV-2-19 – 1st update - a rapid review Oslo: Folkehelseinstituttet/ Norwegian Institute of Public Health.	Apr 30, 2020 (search completed Apr 22, 2020)	NCIRS, 2020 Viner 2020a	Children can transmit the virus that causes COVID-19 but are unlikely to be the main drivers of transmission. It is too early to conclude firmly about the role of children in transmission.	Low	Not reported
Evidence previously reported May 19, 2020					
Viner, R.M., Russell, S.J., Croker, H., Packer, J., Ward, J., Stansfield, C… Booy, R. (2020a). School closure and management practices during coronavirus outbreaks including COVID-19: a rapid systematic review. *The Lancet Child & Adolescent Health, 4*(5), 397–404.	Apr 6, 2020 (search completed Mar 19, 2020)	None included in Table 1. This review included studies from pandemics prior to COVID-19.	It is not possible to specifically evaluate the impact of school closures on infection prevention and control, as they were part of a broad range of quarantine and social distancing measures.	Moderate	Low

Table 3: In-progress Syntheses

Title	Anticipated Release Date	Setting	Description of document
New evidence reported July 9, 2020			
Minozzi, S., Amato, L., Mitrova, Z., & Davoli, M. *COVID-19 among children and adolescents and impact of school closure on outbreaks control: an overview of systematic reviews*. PROSPERO 2020 CRD42020186291.	Jul 31, 2020	Home, school	This review will summarize available evidence for the prevalence of infection and disease as well as the risk of transmission by children and adolescents. The review also seeks to assess the effect of school closures on controlling the spread of COVID-19.
Harling, M., Pearce-Smith, N., Clark, R., Kijauskaite, G., & Nicholson, W. *What is the risk of transmission of COVID-19 within school and preschool settings, and how effective are interventions to reduce transmission? A rapid review*. PROSPERO 2020 CRD42020191867.	Jul 11, 2020	School	This rapid review will summarize evidence for the risk of transmission within schools and onsite daycare centres, as well as evaluate the effectiveness of infection prevention and control measures in school settings.

Question 2: What is known about the likelihood of transmission of COVID-19 by infants, toddlers and school-aged children to others?

Table 4: Syntheses

Reference	Date Released	Description of included studies	Summary of Findings	Quality Rating: Synthesis	Quality Rating: Included Studies
New evidence reported July 9 2020					
Health Information and Quality Authority. (2020, Jun 23). *Evidence summary for potential for children to contribute to transmission of SARS-CoV-2*.	Jun 23, 2020 (search completed May 31, 2020)	10 case series and case reports of household or close-contact transmission involving children	Overall, included case series show that children very rarely transmit COVID-19 to household members or close contacts. A case from a single family reports confirmed transmission from children to caregivers. Analysis of a larger case series reported no confirmed transmission from cases aged 15 years or younger.	Moderate	Low-moderate
Viner, R.M., Mytton, O.T., Bonell, C., Melendez-Torres, G.J., Ward, J.L., Hudson, L... Eggo, R. (2020b). Susceptibility to SARS-CoV-2 infection amongst children and adolescents compared with adults: a systematic review and meta-analysis. *Preprint*.	May 24, 2020 (search completed May 16, 2020)	9 contact-tracing studies, including 2 preprint articles and one unpublished report.	Data from 8 contact tracing studies conducted within household or close contacts were meta-analyzed. Authors compared secondary infection rate in those <20 compared to those >20 years old; children were less than half as likely to be infected as adults (Odds Ratio (OR) = 0.41, 95% Confidence Interval (CI) = 0.23, 0.73). It was not possible to compare the likelihood of infection transmission by children vs. adults due to limited available data. One included synthesis found that in 3 of 31 (9.7%) household clusters analyzed, the index case was a child. It is not possible to determine whether children are less likely to be an index case because they are less infectious than adults or because they are less likely to be infected.	High	Low-Moderate

Ludvigsson, J. F. (2020). Children are unlikely to be the main drivers of the COVID-19 pandemic – A systematic review. *Acta Paediatrica*. Epub ahead of print.	May 19, 2020 (search completed May 11, 2020)	47 articles were reviewed, however a full list of included studies was not provided.	This review described a systematic search and screen for included studies, however the author does not provide a list of studies reviewed and it is unclear how evidence was synthesized across studies. Cross sectional studies found that viral loads or viral shedding are similar in different age groups. Most of these studies assessed symptomatic cases. Two case reports and 2 syntheses analyzed transmission of COVID-19 within households. Most reported no evidence of child-to-child or child-to-adult transmission. One included synthesis found that in 3 of 31 (9.7%) household clusters analyzed, the index case was a child. (Viner, 2020b)	Low	Not reported
Mehta, N.S., Mytton, O.T., Mullins, E.W.S., Fowler, T.A., Falconer, C.L., Murphy, O.B… Nguyen-Van-Tam, J.S. (2020). SARS-CoV-2 (COVID-19): What do we know about children? A systematic review. *Clinical Infectious Diseases: An Official Publication of the Infectious Diseases Society of America*. Epub ahead of print.	May 11, 2020 (search completed Mar 9, 2020)	24 primary studies • 20 studies assessing prevalence, symptoms and outcomes in children • 4 case reports of transmission involving children	Evidence related to transmission by children was limited. Case reports identified cases in children through adult cases. One case report described probable transmission from an infant to her parents.	Moderate	Not reported
Usher Institute. (2020, May 6). *Summary: What is the evidence for transmission of SARS-COV-2 by children [or in schools]?*	May 6, 2020, searched up to May 4, 2020	81 primary studies • 2 case reports of transmission by children • 6 studies on the potential for infection by children, such as through fecal shedding	Overall, there is limited evidence of transmission of COVID-19 from children to others. Three studies found that fecal shedding in children lasts longer than in adults. Another study of 3712 COVID-19 patients found similar viral loads between age groups.	Low	Not reported

		• 73 contact tracing studies investigating transmission to children	There was no discussion of results of contact tracing studies.		
Brurberg, K.G. (2020). The role of children in the transmission of SARS-CoV-2-19 – 1st update - a rapid review Oslo: Folkehelseinstituttet/ Norwegian Institute of Public Health.	Apr 30, 2020, searched up to Apr 22, 2020	This review includes 9 case series or case reports and one narrative review related to the likelihood of children transmitting COVID-19 to others.	Case reports indicate that children are susceptible to COVID-19 infection, although less so than adults. The overall prevalence of COVID-19 among children is unknown, due to lack of comprehensive testing. According to tracing of infection routes in case studies, infected children are less likely to transmit the disease than adults, but this data is very limited.	Low	Not reported
Evidence previously reported May 19, 2020					
Zhen-Dong, Y., Gao-Jun, Z., Run-Ming, J., Zhi-Sheng, L., Zong-Qi, D., Xiong, X., & Guo-Wei, S. (2020). Clinical and transmission dynamics characteristics of 406 children with coronavirus disease 2019 in China: A review. *Journal of Infection.* Epub ahead of print.	Apr 28, 2020, searched to Apr 3, 2020	406 case reports of children up to 16 years of age diagnosed with COVID-19.	Among the included case reports, nearly half of cases were asymptomatic or had only mild symptoms. Evidence from stool samples indicated that children had higher rates of fecal virus RNA (81.8%) than adults (53.4%), suggesting that further investigation of fecal-oral transmission by children may be warranted.	Moderate	Low

Table 5: In-progress Syntheses

Title	Anticipated Release Date	Setting	Description of document
New evidence reported July 9, 2020			
Du, P., & Luo, X. *Are children more unsusceptible to COVID-19? A rapid review and meta-analysis*. PROSPERO 2020 CRD42020190740.	Sep 7, 2020	Home, community	This review seeks to compare the likelihood of infection in children and adults who have been exposed to COVID-19.
Evidence previously reported May 19, 2020			
Chan, M., Bhuiyan, M., Islam, S., Hassan, Z., Satter, S., Haider, N., & Homaira, N. *Epidemiology of COVID-19 in children aged <5 years: a systematic review and metanalysis*. PROSPERO 2020 CRD42020181936	Jul 31, 2020	Home	This review will summarize COVID-19 epidemiology in children <5 years, including answering the question "is there any secondary/household transmission from pediatric COVID-19 cases?"
Medeiros, G., Azevedo, K., Hugo, V., Segundo, O., Santos, G., Mata, A.N… Piuvezam, G. *The control and prevention of COVID-19 transmission in children: a systematic review*. PROSPERO 2020 CRD42020179263.	Nov 1, 2020	Home, community	This review will summarize the role of children in COVID-19 transmission

Table 6: Single Studies

Reference	Date Released	Study Design	Location	Setting	Summary of findings	Quality Rating:
New evidence reported July 9, 2020						
Somekh, E., Gleyzer, A., Heller, E., Popian, M., Kashani-Ligumski, L., Czeiger, S… Stein, M. (2020). The role of children in the dynamics of intra family coronavirus 2019 spread in densely populated area. *The Pediatric Infectious Diseases Journal.* Epub ahead of print.	Jun 1, 2020	Case series	Israel	Households	Members of 13 households of COVID-19 cases were tested for COVID-19. Test results were presented by age group. • 21 of 36 (58.3%) adults tested positive • 13 of 40 (32.5%) children aged 5-17 tested positive • 2 of 18 (11.1%) children aged <5 tested positive In 1 household, the index case was an adolescent aged 14.5 years who was exposed in the community. The index case for the other 12 households were adults.	Low

References

Brurberg, K.G. (2020). The role of children in the transmission of SARS-CoV-2-19 – 1st update - a rapid review Oslo: Folkehelseinstituttet/Norwegian Institute of Public Health.

Chan, M., Bhuiyan, M., Islam, S., Hassan, Z., Satter, S., Haider, N., & Homaira, N. *Epidemiology of COVID-19 in children aged <5 years: a systematic review and metanalysis*. PROSPERO 2020 CRD42020181936.

Danis, K., Epaulard, O., Bénet, T., Gaymard, A., Campoy, S., Bothelo-Nevers, E… Saura, C. (2020). Cluster of coronavirus disease 2019 (Covid-19) in the French Alps, 2020. *Clinical Infectious Diseases*. Epub ahead of print.

Desmet, S., Skinci, E., Wouters, I., Decru, B., Beuselinck, K., Malhotra-Kumar, S., & Theeten, H. (2020). No SARS-CoV-2 carriage observed in children attending daycare centers during the first weeks of the epidemic in Belgium. *Preprint.*

Du, P., & Luo, X. *Are children more unsusceptible to COVID-19? A rapid review and meta-analysis.* PROSPERO 2020 CRD42020190740.

Folkhälsomyndigheten. (2020, May 27). *Förekomst av covid-19 i olika yrkesgrupper*.

Fontanet, A., Grant, R., Tondeur, L., Madec, Y., Grzelak, L., Cailleau, I… Hoen, B. (2020a). SARS-CoV-2 infection in primary schools in northern France: A retrospective cohort study in an area of high transmission. *Preprint.*

Fontanet, A., Tondeur, L., Madec, Y., Grant, R., Besombes, C., Jolly, N… Hoen, B. (2020b). Cluster of COVID-19 in northern France: A retrospective closed cohort study. *Preprint*.

Harling, M., Pearce-Smith, N., Clark, R., Kijauskaite, G., & Nicholson, W. *What is the risk of transmission of COVID-19 within school and preschool settings, and how effective are interventions to reduce transmission? A rapid review*. PROSPERO 2020 CRD42020191867.

Health Information and Quality Authority. (2020, June 23). *Evidence summary for potential for children to contribute to transmission of SARS-CoV-2*.

Heavy, L., Casey, G., Kelly, C., & McDarby, G. (2020, May 28). *No evidence of secondary transmission of COVID-19 from children attending school in Ireland, 2020*. Eurosurveillance.

Ludvigsson, J. F. (2020). Children are unlikely to be the main drivers of the COVID-19 pandemic – A systematic review. *Acta Paediatrica*. Epub ahead of print.

Medeiros, G., Azevedo, K., Hugo, V., Segundo, O., Santos, G., Mata, A.N… Piuvezam, G. *The control and prevention of COVID-19 transmission in children: a systematic review*. PROSPERO 2020 CRD42020179263.

Mehta, N.S., Mytton, O.T., Mullins, E.W.S., Fowler, T.A., Falconer, C.L., Murphy, O.B… Nguyen-Van-Tam, J.S. (2020). SARS-CoV-2 (COVID-19): What do we know about children? A systematic review. *Clinical Infectious Diseases: An Official Publication of the Infectious Diseases Society of America*. Epub ahead of print.

Minozzi, S., Amato, L., Mitrova, Z., & Davoli, M. *COVID-19 among children and adolescents and impact of school closure on outbreaks control: an overview of systematic reviews*. PROSPERO 2020 CRD42020186291.

National Centre for Immunisation Research and Surveillance. (2020, April 26). *COVID-19 in schools – the experience in NSW*.

Oster, E. & Alter, G. (2020). *COVID-19 and Children: Our Crowd-sourced Data*. COVID-Explained.

Somekh, E., Gleyzer, A., Heller, E., Popian, M., Kashani-Ligumski, L., Czeiger, S... Stein, M. (2020). The role of children in the dynamics of intra family coronavirus 2019 spread in densely populated area. *The Pediatric Infectious Diseases Journal.* Epub ahead of print.

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Viner, R.M., Russell, S.J., Croker, H., Packer, J., Ward, J., Stansfield, C… Booy, R. (2020a). School closure and management practices during coronavirus outbreaks including COVID-19: a rapid systematic review. *The Lancet Child & Adolescent Health*, *4*(5), 397–404.

Viner, R.M., Mytton, O.T., Bonell, C., Melendez-Torres, G.J., Ward, J.L., Hudson, L… Eggo, R. (2020b). Susceptibility to SARS-CoV-2 infection amongst children and adolescents compared with adults: a systematic review and meta-analysis. *Preprint*

Yung, C.H., Kam, K., Nadua, K.D., Chong, C.Y., Tan, N.W.H., Li, J… Ng, K.C. Novel coronavirus 2019 transmission risk in educational settings. *Clinical Infectious Diseases*, Epub ahead of print.

Zhen-Dong, Y., Gao-Jun, Z., Run-Ming, J., Zhi-Sheng, L., Zong-Qi, D., Xiong, X., & Guo-Wei, S. (2020). Clinical and transmission dynamics characteristics of 406 children with coronavirus disease 2019 in China: A review. *The Journal of Infection*. Epub ahead of print.