Rapid Review Report

Review Title:	What are the effects of the new COVID variants on transmission and school reopenings in pediatric populations?
Abbreviated Title:	Pediatric transmission and epidemiology
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Key Findings

- Pediatric cases of COVID-19 constitute between 1% to 10% of all confirmed cases of COVID-19; variation exists by jurisdiction.
- Few case reports exist of confirmed child-to-other transmission. Contact tracing studies suggest that children are unlikely to be transmitters of the disease. Households are the most likely environments for transmission.
- A recent large South Korean contact tracing study however (in pre-print) found that household COVID-19 transmission rates for children age 10-19 were significantly higher than in adults; transmission rates for children age 0-9 were

relatively low.

- **AUGUST 7th, 2020 UPDATE:** No new studies examining secondary attack rates of pediatric index cases were found. Studies continue to suggest low transmission from pediatric cases, and high proportion of pediatric cases being asymptomatic to mildly symptomatic.

- **MARCH 9th, 2021 UPDATE:** Variants of Concerns are an emerging threat, but literature on pediatric prevalence and transmissibility is sparse. The British variant seems more transmissible (secondary attack rate higher) but follows the same age-related distribution of cases seen earlier in the pandemic.

Limitations

- Some contact tracing studies tended to have small numbers. Case reports were also limited and it is not clear if this is due to low transmission rates or lack of investigation.

- There is no clear reason for the reported lower pediatric transmission rates although authors have entertained several theories (it may be that pediatric cases are less contagious by nature, or that these cases are often not identified in the first place, or that early school closures have prevented spread by children).

GRADE of Evidence: C - Low

A grade of "C" is assigned when further research is very likely to have an important impact on confidence in the estimate of effect and is likely to change the estimate. The review may consist of one or more studies with severe limitations.

For more information about how this rating was determined, visit https://www.essentialevidenceplus.com/product/ebm_loe.cfm?show=grade

Background/Context

The contribution of pediatric cases to the spread of the virus responsible for COVID-19 is still unknown. Epidemiological studies have found that pediatric cases of COVID-19 form between 1 to 10% of all confirmed cases with variations existing across jurisdictions. For instance, the Center for Disease Control and Prevention (CDC) found that just 1.7% of laboratory confirmed cases of COVID-19 reported in the US between February 12th and April 2nd were in children (age <18 years) [1]. In a review, Li et al. found similar rates within the range of 1-10% in Iceland, Norway, the Netherlands, South Korea and the UK [2].

Although beyond the scope of this review, one consistent finding was that children are more likely to experience mild or asymptomatic cases of COVID-19. The reason for this is uncertain, but immunological explanations include that children experience many other viral infections which compete with the SARS-CoV-2 that causes COVID-19, or that the ACE-2 receptors targeted by the virus are underdeveloped in children. Importantly, the propensity of children to experience milder cases of the disease may explain why there are so few reported cases of child-to-other transmission – it may be that asymptomatic and milder cases are less contagious in general; alternatively, index pediatric cases may be under-reported. Further reviews should investigate proposed theories for these relatively milder pediatric presentations.

Purpose

The purpose of this review was to investigate what is known about transmission of the SARS-CoV-2 virus from pediatric cases (age 0-18) of COVID-19 to other children or to adults, including whether children are more or less likely than adults to transmit the disease. This information would be useful to inform public policy regarding, for example, school closure/re-opening decisions and other measures to limit the spread of COVID-19.

Review Question(s)

What are the effects of the new COVID variants on transmission and school reopenings in pediatric populations?

Methods

For each Rapid Review, the initial question is posed by a decision-maker in the health care system seeking the evidence base for a specific policy decision. According to the subject of the question, the Evidence Task Group Intake Committee allocates this question to the appropriate Working Group. Each Working Group comprises a librarian, researcher, 1-2 clinicians, 1-2 subject matter experts, and a group leader. The Working Group and the decision-maker first discuss the question to ensure it was articulated in a clear, searchable manner. The librarians assigned to your team then conduct a thorough search of the indexed literature, grey literature, news sources, or other sources as agreed upon. Some reference lists for especially pertinent articles are also reviewed. An Evidence Search Report is thereby created. See Appendix for more details on the search strategy. A Rapid Review of the identified literature is then performed by the researcher using the methods of a systematic review, but without a double review or meta-analysis and in a more rapid fashion. Relevant evidence is summarized in both tabular and narrative form, key findings and limitations articulated, and the quality of the body of evidence evaluated using the GRADE hierarchy. The draft Rapid Review is reviewed and edited by the Working Group clinicians, experts, and leader. Once revisions are complete, the Rapid Review is submitted to the requesting decision-maker and placed in the COVID-19 Repository. For certain topics with rapidly changing evidence, after a period of time an updated evidence search is performed, the review process repeated, and an updated Rapid Review released.

Summary of Evidence

Evidence on transmission of COVID-19 from children to others is sparse. Our search identified a number of relevant systematic reviews and associated case reports and observational studies, whose findings are discussed below. The findings of these reviews were echoed by numerous guideline statements, commentaries and other summary publications, which are not discussed individually here. However, one large contact tracing study from South Korea, with contradictory findings to the systematic reviews, was identified after the literature search for this review was completed – this early-release article is discussed at the end of this section.

A systematic review by Li et. al. found only two reports of transmission from pediatric cases to others [2]. One was from a case series of 10 pediatric infants, where a 3-month-old infant likely transmitted the virus to her mother who was caring for her. The other was a contact tracing study from New South Wales, Australia, where 18 index cases (9 students, 9 adults) and their close contacts (735 students, 128 staff) were followed – authors highly suspect that one pupil was infected through contact with other pupils. They also identify indirect evidence of potential pediatric transmission, such a prolonged faecal shedding in children, and a case where viral contamination was confirmed in the hospital room

environment of an infected infant. They also report on a study that showed significant secondary infection of contacts from a secondary school, but the patients in this case were 15-17 years of age, which may represent illness in young adults rather than children. Finally, a pediatric case was found to have not transmitted the virus in the UK, despite a large number of contacts.

Viner et. al. conducted a meta-analysis of secondary attack rates in children compared to adults using data from contact-tracing studies [3]. The pooled odds-ratio for all included studies was 0.44 (0.29, 0.69), though there was substantial heterogeneity (63%). They also identified a number of contact-tracing studies that report rates of pediatric index cases: 1/136 (0.7%) from a study in Hunan province, China; 32/391 (8.2%) from a study in Shenzhen, China; 10/212 (4.7%) from a study in Gangzhou, China. They also report on the aforementioned Australian study, calculating that the secondary infection rate for students was 1/598 (0.2%) for secondary schools and 1/137 (0.7%) for primary schools.

Zhu et. al. conducted an analysis of 31 household transmission clusters within their systematic review, with cases from China, Singapore, the US, Vietnam, and South Korea [4]. They identified only 3 (9.7%) with a pediatric index case. Even after assuming that any asymptomatic child was the index case, this number only rose to 6/28 (21%). The authors compare these percentage with the H5N1 virus, where 54% of household clusters in one analysis involved a pediatric index case.

Wang et. al. [5] did not identify cases of pediatric transmission in their systematic review, but did conclude that around 83% cases of pediatric COVID-19 had likely acquired the virus from family members, suggesting that the household setting is the most likely setting for viral acquisition. They also report that a large percentage (94%) of COVID-19 cases in children were mild or asymptomatic.

An early release of a large contact tracing study in South Korea by Park et. al. monitored 59,073 contacts of 5,706 index patients [6]. Of household contacts, COVID-19 was detected in 18.6% (43/231; 95% CI 14.0-24.0) of contacts of index patients aged 10-19 years; these rates were significantly larger than the adult groups in the 20-29, 30-39 and 40-49 age groups, and potentially in older adult age groups as well. However, rate of positive contacts for children in the 0-9 years age range remained low (3/57; 95% CI 1.3-13.7). The authors point out that this data is representative of transmission in the midst of mitigation strategies and school closure – rates in the 0-9 years age group may increase after school re-opening.

AUGUST 7TH 2020 UPDATE: No studies assessing secondary attack rates for pediatric index cases were identified. Of note, a systematic review by Madewell et al found that "the mean household secondary attack rate (SAR) from symptomatic index cases (19·9%; 95% CI: 14·0%–25·7%) was significantly higher than from asymptomatic index cases (0·7%; 95% CI: 0%–3·8%) (P <0·001)", though this is limited by a small number of identified asymptomatic cases [7]. Since pediatric cases are more likely to be asymptomatic, this may indirectly suggest a lower SAR for pediatric index cases. Additionally, the review found that "the estimated mean household SAR was significantly higher to adult contacts (31·0%; 95% CI: 19·4%–42·7%) than to children contacts (15·7%; 95% CI: 9·9%–21·5%) (P < 0·001)", which may suggest that adults are more susceptible to infection than children [7]. Finally, though not part of the meta-analysis, the review identified, in 2/6 studies that addressed the question, that older age in index case was associated with higher infectiousness.

Data analysis by Yoon et al following school re-opening in South Korea found that the proportion of pediatric cases remained around 7%; in other words, there was no sudden increase in pediatric cases following school re-opening [8]. Of 45 children diagnosed with COVID-19 after school re-opening; 55.6%

were infected by family members. This suggests that households are a major contributor to the spread of COVID-19 among children.

Yung et al analyzed data from a Singaporean hospital to study pediatric attack rates of adult index cases [9]. Thirteen out of 213 children were defined as cases of COVID-19, for an attack rate of 6.1%. The study also found that "in age-stratified analysis, the attack rate was 1.3% among children age <5 years, 8.1% among those age 5-9 years, and 9.8% among those age 10-16 years." They also found that attack rates were similar regardless of the sex of the child.

MARCH 9th 2021 UPDATE: Variants of Concern (VOC) of the SARS-CoV-2 virus are an emerging threat to communities in Saskatchewan. We analyzed 14 articles and 7 reports in the grey literature, excluding all except one report, because they did not examine primary epidemiological data relating to pediatric transmission. Epidemiologic data on VOC's is sparse, but of the strains identified, the British variant first identified in September of 2020 (designated VOC 202012/01, also called B.1.1.7) is the best studied. Epidemiological data from Public Health England (as of January 4th, 2021) provides insight into the age distribution and age-associated secondary attack rate of this VOC compared with the wildtype (WT) strain [10]. Both tables discussed are attached for reference below our Summary of Evidence.

Table 1 of Public Health England's technical briefing reports prevalence of VOC 202012/01 cases by age, identified between September 20th, 2020 and January 4th, 2021 (n= 6,008), and compares to all cases identified in the same time period (n= 68,246) [10]. There is a slightly higher proportion of cases of VOC represented in the youngest age group, 0-9 years, compared to all sequenced cases (6.1% vs 4.0%). Similarly, in age groups 30 to 49, a slightly higher proportion of VOC cases are observed compared to all cases (19.2% vs 17.5%, 18.5% vs 15.0%). This suggests that the British VOC, during the time period studied, closely follows the age distribution of all cases studied.

Table 6 and 7 both show contact tracing data, the former using genome sequencing data and the latter using TaqPath data [10]. The trends are similar so here we discuss data from Table 6. Overall, the VOC seems to be more transmissible: stratified by level of contact, the secondary attack rate (contact becoming a case) was VOC 15.5% vs WT 11.8% for direct contact and was VOC 7.5% vs WT 5.2% for "close contact". The VOC was more transmissible at every age category: 9.0% versus 6.1% in the 0-9 age group, 11.8% versus 9.6% in the 10-19 age group, and the difference was even greater in older age groups. However, both strains showed a lower level of pediatric transmissibility.

Conclusions

The general conclusion reached by the systematic reviews, guidelines, commentary articles and primary sources identified in this review is that children are responsible for a small minority of secondary COVID-19 cases. However, one very recent study from South Korea sheds doubt on the above findings, finding transmission rates in children aged 10-19 higher than or comparable to adults, implying that older children are a significant source of COVID-19 spread. It is not clear why this study reached a different conclusion than the previous systematic reviews. It may be that prior tracing studies identified by the reviews were too small, or that pediatric index cases and their contact cases were underreported due to, for example, pediatric cases being generally mild. It is also unclear why a discrepancy between pediatric and adult transmission rates would exist at all, though several theories have been posited (not mentioned here). In light of the evidence from the recent South Korean tracing study, we should be cautious in assuming that pediatric transmission rates, especially among older children, are lower than

the transmission rates for adults.

AUGUST 7TH, 2020 UPDATE: No new data regarding secondary attack rates for pediatric index cases was found. Publications continue to suggest that children are often asymptomatic or mildly symptomatic, and that children, especially young children under 10 years of age, are not likely to be major contributors to the spread of COVID-19.

MARCH 9th, 2021 UPDATE: Data regarding VOC's is sparse, but preliminary data from Public Health England suggests that while the B.1.1.7 VOC is more transmissible, it follows the same age-related trends observed earlier in the pandemic, with both the incidence and secondary attack rate being markedly lower in children under 10 (and likely in younger adolescents as well) [10].

Table 1: Summary of Literature

Reference (link)	Method	Primary outcome measure	Additional findings	Quality of study
2. Li et al http://jogh.org/documents/issue202001/jogh-10-011101.pdf	Systematic review (conducted on 4/30/20)	Only 2 reports of child-to-other transmission: one from a contact tracing study in NSW, Australia; the other a case report where an infant may have infected its mother.	Prolonged faecal shedding of the virus may suggest transmission route in children via faecal-oral route.	Moderate
3. Viner et al https://www.medrxiv.org/content/10.1101/2020.05.20.20108126v1.full.pdf	Systematic review (conducted on 5/16/20)	Secondary attack rate in children vs. adults: Pooled OR = 0.44 (0.29-0.69); with significant (63%) heterogeneity.	Rate of pediatric index cases from individual studies: • Hunan, China (1/136; 0.7%) • Shenzhen, China (32/391; 8.2%) • Gangzhou, China (10/212; 4.7%) • NSW, Australia (1/598 for secondary schools; 1/137 for primary schools)	Moderate
4. Zhu et al https://www.medrxiv.org/content/10.1101/2020.03.26.20044826v1.full.pdf	Systematic review (conducted on 3/18/2020)	Analysis of 31 household clusters with cases from China, Singapore, Vietnam, the US, and South Korea: pediatric index case in only 3/31 (9.7%) of clusters.	When assuming any asymptomatic pediatric case was the index case, the rate rises to 6/28 (21%).	Low
5. Wang et al https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7290619/	Systematic review (conducted on 3/31/2020)	No confirmed cases of pediatric COVID-19 transmission found.	83% of pediatric cases acquired from a household family member; 94% of pediatric COVID-19 cases were mild or asymptomatic.	Low
6. Park et al https://wwwnc.cdc.gov/eid/article/26/10/20-1315_article#r8	Contact tracing study (Monitored 59,073 contacts of 5,706 South Korean COVID-19 index patients)	No. of household contacts positive/No. of household contacts traced for index patients in age group (years): • 0-9: 3/57 (5.3%; 1.3-13.7) • 10-19: 43/231 (18.6%; 14.0-24.0) • Rates for adults ranged from 7-14.4%	Rate for all ages within household contacts was 1,248/10,592 (11.8%; 11.2-12.4%); compared to non-household rates of 921/48,481 (1.9%; 1.8-2.0%).	Moderate

7. Madewell et al (https://www.medrxiv.org/content/10.1101/2020.07.29.20164590v1.full.pdf)	Systematic Review (conducted July 29th)	The estimated mean SAR for household contacts is 19·0% (95% CI: 14·9%–23·1%) and family contacts is 18·1% (95% CI: 12·9%–34·8%), both with significant heterogeneity (P < 0·001). The estimated mean household SAR from symptomatic index cases (19·9%; 95% CI: 14·0%–25·7%) was significantly higher than from asymptomatic index cases (0·7%; 95% CI: 0%–3·8%) (P <0·001), though there were only a few studies of asymptomatic index cases.	The estimated mean household SAR was significantly higher to adult contacts (31·0%; 95% CI: 19·4%–42·7%) than to children contacts (15·7%; 95% CI: 9·9%–21·5%) (P < 0·001), both with significant heterogeneity (P < 0·001); Lower infection rates in children may in part be attributed to asymptomatic or mild disease and low case ascertainment. Older index case age was associated with increased secondary infections in 2/6 studies. Critically severe index case symptoms and hospitalization were associated with higher infectiousness in 4/6 studies	Moderate
8. Yoon et al (https://www.medrxiv.org/content/10.1101/2020.08.03.20165589v1.full.pdf)	Data analysis	There was no sudden increase in pediatric cases after the school opening, and the proportion of pediatric cases remained around 7.0% to 7.1%.	As of July 11, 45 children from 40 schools and kindergartens were diagnosed with COVID-19 after off-line classes started. More than 11,000 students and staff were tested; only one additional student was found to be infected in the same classroom. Among those 45, 32 (71.1%) patients had available information for the source of infection. Twenty-five (25/45, 55.6%) were infected by the family members	Moderate
9. Yung et al (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7334921/)	Surveillance study of a hospital in Singapore	During March and April, among 137 households with a total of 223 adults (index patients) with laboratory-confirmed COVID-19, 213 children age ≤16 years were tested for	In age-stratified analysis, the attack rate was 1.3% among children age <5 years, 8.1% among those age 5-9 years, and 9.8% among those age 10-16 years.	Moderate

		SARS-CoV-2; 13 cases were detected in 7 households, for an attack rate of 6.1% among children and 5.2% of households with confirmed exposure to COVID-19	Attack rates were similar, regardless of the sex of the child.	
10. Public Health England (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/959360/Variant_of_Concern_VOC_202012_01_Technical_Briefing_3.pdf)	Surveillance data from Public Health England; September 20th 2020 to January 4th 2021	Trends show lower prevalence and transmissibility in pediatric populations aged 0-9 compared to older youth and adults. See Tables attached below.		N/A

Age group	VOC 202012/01		All sequenced	
	n	%	n	%
0-9	365	6.1	2,752	4.0
10-19	846	14.1	9,062	17.3
20-29	1,033	17.2	13,513	19.8
30-39	1,151	19.2	11,915	17.5
40-49	1,111	18.5	10,263	15.0
50-59	821	13.7	9,881	14.5
60-69	369	6.1	5,226	7.7
70-79	176	2.9	2,797	4.1
80+	136	2.3	2,821	4.1
Unknown	0	0.0	16	0.0
Total	6,008		68,246	

Table 1. Age breakdown of VOC 202012/01 cases in England compared to sequenced cases, 20 September 2020 to 4 January 2021

Attack rate: contacts becoming cases

Characteristic of contact		All contacts	Contacts of people with VOC 202012/01			Contacts of people with wild type (not VOC 202012/01)			Contacts of people without sequencing
		Total contacts	All contacts	Contacts that became cases	%	All contacts	Contacts that became cases	%	%
Region of residence	All	956,519	9,228	1,361	14.7	11,269	1,244	11.0	12.7
	East Midlands	60,153	150	15	10.0	1,008	117	11.6	11.2
	East of England	154,144	1,869	263	14.1	1,199	153	12.8	13.5
	London	281,461	3,507	505	14.4	1,844	197	10.7	13.1
	North East	28,450	235	29	12.3	738	79	10.7	11.8
	North West	71,002	400	65	16.2	2,182	223	10.2	11.7
	South East	186,311	2,419	377	15.6	1,155	107	9.3	13.5
	South West	41,465	230	43	18.7	380	50	13.2	11.8
	West Midlands	78,112	299	47	15.7	1,388	155	11.2	11.6
	Yorkshire and Humber	53,192	109	16	14.7	1,339	158	11.8	10.6
Level of contact*	Direct	875,237	8,399	1,299	15.5	10,088	1,193	11.8	13.2
	Close	79,867	829	62	7.5	863	45	5.2	6.9
Age group	0 – 9	135,998	1,345	121	9.0	1,536	93	6.1	7.2
	10 – 19	172,506	1,659	196	11.8	1,943	186	9.6	10.4
	20 – 29	111,391	1,020	167	16.4	1,352	192	14.2	15.1
	30 – 39	111,712	1,145	229	20.0	1,361	175	12.9	16.7
	40 – 49	126,005	1,241	263	21.2	1,448	199	13.7	16.8
	50 – 59	101,501	953	190	19.9	1,236	181	14.6	17.1
	60 – 69	44,985	366	74	20.2	610	92	15.1	17.7
	70 – 79	17,817	142	34	23.9	198	38	19.2	18.1
	80+	7,429	53	11	20.8	93	14	15.1	17.7
	Not known	127,175	1,304	76	5.8	1,492	74	5.0	5.3

Table 6. Breakdown by contact characteristics using genomic sequencing data

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Appendix: Evidence Search Details

Search Strategies

Database: Ovid MEDLINE(R) ALL <1946 to July 02, 2020>
Search Strategy:
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1 exp *pediatrics/ or exp *child/ or *adolescent/ (50031)
2 (child? or children or p?ediatric* or toddler? or preschool* or pre-school* or boy? or girl? or adolescen* or teen* or youth? or juvenile? or pre-menarch* or pre-adolescen* or pre-teen or pre-pubert* or pre-pubesc* or premenarch* or preadolescen* or preteen or prepubert* or prepubesc*).ti. or (child? or children or p?ediatric* or toddler? or preschool* or pre-school* or boy? or girl? or adolescen* or teen* or youth? or juvenile? or pre-menarch* or pre-adolescen* or pre-teen or pre-pubert* or pre-pubesc* or premenarch* or preadolescen* or preteen or prepubert* or prepubesc*).ab. /freq=2 (1351312)
3 1 or 2 (1362809)
4 exp coronavirus/ or exp coronavirus infections/ or Middle East Respiratory Syndrome Coronavirus/ (24329)
5 ((corona* or corono*) adj1 (virus* or viral* or virinae*)).ti,ab,kw,kf. (1362)
6 (coronavirus* or coronovirus* or coronavirinae* or CoV or "middle east respiratory syndrome*" or "middle eastern respiratory syndrome*" or MERSCoV or "MERS-CoV" or MERS).ti,ab,kw,kf. (30518)
7 ("2019-nCoV" or 2019nCoV or nCoV2019 or "nCoV-2019" or "COVID-19" or COVID19 or "CORVID-19" or CORVID19 or "WN-CoV" or WNCoV or "HCoV-19" or HCoV19 or "2019 novel*" or Ncov or "n-cov" or "SARS-CoV-2" or "SARSCoV-2" or "SARSCoV2" or "SARS-CoV2" or SARSCov19 or "SARS-Cov19" or "SARSCov-19" or "SARS-Cov-19" or Ncovor or Ncorona* or Ncorono* or NcovWuhan* or NcovHubei* or NcovChina* or NcovChinese* or SARS2 or "SARS-2" or SARScoronavirus2 or "SARS-coronavirus-2" or "SARScoronavirus 2" or "SARS coronavirus2" or SARScoronovirus2 or "SARS-coronovirus-2" or "SARScoronovirus 2" or "SARS coronovirus2").ti,ab,kw,kf. (28276)
8 (respiratory* adj2 (symptom* or disease* or illness* or condition*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw,kf. (486)
9 "severe acute respiratory syndrome*".ti,ab,kw,kf. (7759)
10 or/4-9 (52939)
11 exp Communicable Diseases/ (35369)
12 exp Disease Transmission, Infectious/ or infectious disease incubation period/ (68511)
13 (Basic Reproduction Number or transmiss* or communicab* or infectivity or infectiousness or contagious*).tw,kf. (429828)
14 Epidemiology/ or ep.fs. (1676152)
15 (clinical characteristics or disease characteristics or epidemiological characteristics).tw,kf. (78487)
16 or/11-15 (2138711)
17 3 and 10 and 16 (728)
18 limit 17 to (english language and yr="2019 -Current") (321)
19 from 18 keep 1,9,11,23-24,26,34,38,43,49-50,54,57,59-61,66-67,74,77,79,82,85-86,91,97,108,117,119,133,149,158,176,189-192,196-197,203,215,259,281,284,294,310,312,314 (48)
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Database: Embase <1974 to 2020 July 02>
Search Strategy:
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1 exp Coronavirinae/ or exp Coronavirus infection/ (23596)

2 (coronavirus disease 2019 or severe acute respiratory syndrome coronavirus 2).sh,dj. (22387)
3 ((corona* or corono*) adj1 (virus* or viral* or virinae*)).ti,ab,kw. (1022)
4 (coronavirus* or coronovirus* or coronavirinae* or CoV).ti,ab,kw. (28379)
5 ("2019-nCoV" or 2019nCoV or nCoV2019 or "nCoV-2019" or "COVID-19" or COVID19 or "CORVID-19" or CORVID19 or "WN-CoV" or WNCoV or "HCoV-19" or HCoV19 or "2019 novel*" or Ncov or "n-cov" or "SARS-CoV-2" or "SARSCoV-2" or "SARSCoV2" or "SARS-CoV2" or SARSCov19 or "SARS-Cov19" or "SARSCov-19" or "SARS-Cov-19" or Ncovor or Ncorona* or Ncorono* or NcovWuhan* or NcovHubei* or NcovChina* or NcovChinese* or SARS2 or "SARS-2" or SARScoronavirus2 or "SARS-coronavirus-2" or "SARScoronavirus 2" or "SARS coronavirus2" or SARScoronovirus2 or "SARS-coronovirus-2" or "SARScoronovirus 2" or "SARS coronovirus2").ti,ab,kw. (25663)
6 (respiratory* adj2 (symptom* or disease* or illness* or condition*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw. (591)
7 (("seafood market*" or "food market*" or pneumonia*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw. (1519)
8 ((outbreak* or wildlife* or pandemic* or epidemic*) adj1 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw. (118)
9 "severe acute respiratory syndrome*".ti,ab,kw. (7761)
10 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 (54126)
11 Pediatrics/ or exp Child/ or Adolescent/ (3377791)
12 (child? or children or p?ediatric* or toddler? or preschool* or pre-school* or boy? or girl? or adolescen* or teen* or youth? or juvenile? or pre-menarch* or pre-adolescen* or pre-teen or pre-pubert* or pre-pubesc* or premenarch* or preadolescen* or preteen or prepubert* or prepubesc*).ti. or (child? or children or p?ediatric* or toddler? or preschool* or pre-school* or boy? or girl? or adolescen* or teen* or youth? or juvenile? or pre-menarch* or pre-adolescen* or pre-teen or pre-pubert* or pre-pubesc* or premenarch* or preadolescen* or preteen or prepubert* or prepubesc*).ab. /freq=2 (1668270)
13 11 or 12 (3671027)
14 exp disease transmission/ (251535)
15 (Basic Reproduction Number or transmiss* or communicab* or infectivity or infectiousness or contagious*).tw,kw. (473301)
16 14 or 15 (630540)
17 10 and 13 and 16 (730)
18 limit 17 to yr="2019 -Current" (396)
19 from 18 keep 5,9,12,15,30-31,34,38,51,55,62,65,70,75,128,137,143,149-150,152,162,169,176,193,197,203-204,207,232,241,262,274,296,300,303,308,331,336,340,371 (40)

Google Scholar / Google

- pediatric|child|children AND covid|coronavirus|pandemic|outbreak|epidemic AND transmission|transmisability|communicability|contagious
- preschool|schools|childcare AND covid|coronavirus|pandemic|outbreak|epidemic AND transmission|transmisability|communicability|contagious

Other search terms used:

- transmiss* or transmit* or communicab* or infectivity or infectiousness or contagious*
- child* or pediatric* or paediatric* or adolescen* or school or youth or juvenile

Sources

- Grey literature was searched for this report
- Refer to the evidence search report for extensive sources