

Rapid Review Report

Review Title:	What is the disease progression and epidemiology of COVID-19 in pediatric populations?
Abbreviated Title:	Pediatric Disease Progression COVID
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Prepared By:	Gideon Darko Asamoah, Research Assistant, Department of Community Health and Epidemiology, University of Saskatchewan Michelle Dalidowicz, Clinical Librarian, Saskatchewan Health Authority Library Courtney Ellsworth, Clinical Librarian, Saskatchewan Health Authority Library Brianna Howell-Spooner, Clinical Librarian, Saskatchewan Health Authority Library
Peer Reviewer:	Nazeem Muhajarine, Community Health and Epidemiology, University of Saskatchewan; Dinesh Dharel, Pediatrics, Jim Pattison Children’s Hospital
Contact:	For questions specific to this review, Dr Nazeem Muhajarine, Nazeem.muhajarine@usask.ca
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Key Findings

- Children and adolescents (0 to 18 years) contributed 1- 10% of laboratory confirmed cases of COVID-19 globally.
- Children have been reported to have milder symptoms of COVID-19 and have shown better prognosis as compared to adults.

- Severe cases presenting as a multisystem inflammatory syndrome in children (MIS-C) has been reported in some pediatric cases of COVID-19. Many of these children meet the criteria for complete or incomplete Kawasaki disease, but different clinical presentations of this inflammatory disorder are being reported.
- Underlying medical conditions and comorbidities such as sickle cell disease, immunocompromised condition, obesity, cancer, cardiovascular disease, and asthma have been associated with severity and complications from COVID-19 infection in pediatric patients.
- Although rare, death from COVID-19 in children have been reported, with a case fatality rate of less than 0.5%.

Limitations

- Data on COVID-19 infection in pediatrics still remain limited.
- Most of the cases reported in the systematic reviews and case series were from China, with limited information from the rest of the world.

GRADE of Evidence: **B - Moderate**

A grade of "B" is assigned when further research is likely to have an important impact on confidence in the estimate of effect and may change the estimate. The review may include one high quality study and/or several studies with some limitations.

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

Background/Context

Pediatric COVID-19 infection rate have been reported to be lower as compared to cases in adults around the world (1–4), even in countries where population testing were conducted (3). Regarding transmission route, household contacts have been the main source for pediatric transmission (5–7). Symptoms in children have often been milder as compared to adults (1–4,8–10). A large proportion has been asymptomatic (8,9,11), with an estimated 14 to 75% of infected children being asymptomatic (12–14). Severe cases of COVID-19 in children have also been reported (1,4,9,10), but death from COVID-19 have often been rare (3,8) with a case fatality rate < 0.5% (15,16). Although the evidence available to date suggest a milder course of disease in children, there is still much to be know about the clinical presentation and progression of COVID-19 in children as compared to adults.

As the Province consider the reopening of schools, it is important to understand the existing evidence on the epidemiology and clinical disease course of pediatric COVID-19 to inform public policy regarding decisions to reopen schools.

Purpose

The purpose of this review is to investigate the natural history and epidemiology of COVID-19 among pediatric population. The review will examine the clinical course of the disease such as incubation

period, severity of symptom, recovery period/rate, and mortality among children and adolescents. This information would be useful to inform public policy regarding, for example, school closure/re-opening decisions (how, where and when) and other measures to limit the spread of COVID-19.

Review Question

- What is the disease progression and epidemiology of COVID-19 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 search strategy is developed and executed by a team of medical librarians. The search is conducted in biomedical databases and also includes extensive grey literature searching. Reference lists are also reviewed for articles that may have been missed in the primary search. See Appendix for more details on the search strategies. An Evidence Search Report is created. A Rapid Review of the identified literature is then performed by the researcher using the methods adapted from a systematic review; example, without systematic screening of titles/abstracts, two reviewers assessing items, quality assessments or meta-analysis. 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

Epidemiology

Pediatric cases have been reported to be low, contributing to between 1-10% of laboratory confirmed cases around the world (1–3,9,10). The incidence of reported cases was 52 per 100 000 in Sweden and 42 per 100 000 in Finland as of June 14, 2020 (17). Nevertheless, children of all ages can be affected by COVID-19 (2,9); in a multicenter cohort of 582 children less than 18 years in Europe with laboratory confirmed COVID-19, children under 1 month were 7%, 1 month to 1 year (22%), 1 to 2 years (10%), 2 to 5 years (11%), 5 to 10 years (16%) and greater 10 years through 18 years (34%) (2). In another large study involving 997 children, 44.5% were younger than 10 years and 55.5% aged between 10 and 19 years (18).

Clinical Course of Disease

The maximum incubation period for COVID-19 has been 14 days (19,20), but evidence on incubation period in pediatrics remain limited. The median duration for onset of severe symptoms from onset of symptoms in 8 children diagnosed with severe COVID-19 pneumonia was 3.00 (1.00–6.75) days.

COVID-19 presents in different forms in children. Studies have reported asymptomatic infection in children (12,14,21–23). Among the symptomatic cases, children have been reported to have milder symptoms of COVID-19 as compared to adults (6,12,14,18,23–27). In a systematic review, Liguoro et al. reported 608 of 1432 (42.5%) children presenting with mild symptoms (6). Chang et al. reported that 98% (n=93) infected children presented with mild to moderate symptoms (12). The most common symptoms reported are fever and cough (6,12–14,18,22,23,26,27). In a large study involving 1124 pediatric cases, fever (47.5%) and cough (41.5%) were the most frequently reported symptoms. Other symptoms include rhinorrhea, sneezing and nasal congestion (13,14,26,27), gastrointestinal manifestations (vomiting, diarrhoea and abdominal pain) (6,12–14,26,27), fatigue (6,13), dyspnea (26) and sore throat (14).

Although most pediatric COVID-19 symptoms have been mild, severe and critical manifestations leading to hospitalization and Intensive Care Unit (ICU) admissions have been reported (6,13,18,23–26,28,29). In a prospective observational multicentre study in 23 general paediatric hospitals located in Paris suburbs, 24 of 192 (12%) patients were admitted to ICU (24). Also a multisystem inflammatory syndrome in children (MIS-C), which present with signs and symptoms similar to pediatric inflammatory disease such as Kawasaki disease has been reported in some pediatric cases of COVID-19 (1,30–33). They usually require intensive care. A total of 156 MIS-C cases had been notified, 79 classified as confirmed cases, 16 as probable and 13 as possible cases in France from 1 March to 17 May 2020 (30).

Severity of disease in pediatric patients have been associated with the existence of underlying conditions and comorbidities (22–25,27,29,34) such as sickle cell disease, immunocompromised condition, obesity, cancer, cardiovascular disease, and asthma.

In a systematic review involving 7780 pediatric patients, 152 of 233 (65%) patients with severe symptoms had underlying medical conditions (22).

Although children have been known to show good prognosis (13,18,22,26), serious complications have been reported (25,28) even in those without history of existing medical conditions (35). Complications observed have included pneumonia, severe sepsis and septic shock syndromes, and requirement of mechanical ventilation and/or vasopressor support (1,4,9,10,25,28,30,34). Most children do recover from COVID-19 infection (18,36), however, rare cases of death has been reported (24,27,28). In a systematic review involving 2914 pediatric patients with COVID-19, 0.18% of 786 hospitalized children died (27).

Conclusions

Evidence from the epidemiology and clinical course of disease in pediatric population suggest that a lesser number of children are affected by COVID-19, have milder symptoms and better prognosis as compared to adults. However, severe symptoms, complications, and deaths from pediatric COVID-19 have also been reported, especially in children with underlying medical conditions and comorbidities. Children without underlying medical conditions have also been known to develop complications from COVID-19 infection.

Data on the epidemiology and progression of disease in pediatric COVID-19 cases continue to be reported. Sufficient body of evidence is required to understand firmly epidemiology and natural history of COVID-19 in pediatric population.

Table 1: Summary of Literature

Ref	Sample/population	Method	Primary outcome measure	Additional findings	Quality of study
1.	Children from 1-19	Report of Comparison between Sweden and Finland	Number of reported cases, number admitted in intensive care unit (ICU), number of deaths due to covid-19 and cumulative incidence of reported cases, per June 14, 2020	<ul style="list-style-type: none"> Sweden: Total pop 1, 121, 961 584 reported cases, 1 admitted in ICU, 0 deaths, 52 Incidence of reported cases (per 100 000) Finland: Total pop 2, 288, 347 1124 reported cases, 14 admitted in ICU, 0 deaths, 49 Incidence of reported cases (per 100 000) 	Moderate
2. Belot A et al.	156 CoV- PIMS cases in Children	Epidemiological study of SARS-CoV-2-related paediatric inflammatory multisystem syndrome in France from 1 March to 17 May 2020	The risk of PIMS, based on confirmed, probable and possible cases would be fewer than 2 per 10,000 children	<ul style="list-style-type: none"> Total of 156 PIMS cases had been notified, 79 classified as confirmed CoV-PIMS cases, 16 as probable and 13 as possible CoV-PIMS cases 73% of patients required vasopressor/inotrope support in the ICU and one case was fatal 	Low
3. Castagnoli R et al.	1065 participants	Systematic review	Children experience less severe COVID-19 than adults, presenting mild symptoms, if any, good prognosis, and recovering within 1 to 2 weeks after disease onset.	<ul style="list-style-type: none"> 444 patients were younger than 10 years, and 553 were aged 10 to 19 years Children at any age were mostly reported to have mild respiratory symptoms, namely fever, dry cough, and fatigue, or were asymptomatic only 1 case of severe COVID-19 infection, which occurred in a 13-month-old infant No death recorded 	Low
4. Chang TH et al	93 Pediatric cases	Systematic review and Meta analysis (March 15, 2020)	COVID-19 has distinct features in children. There are more asymptomatic and mild cases	<ul style="list-style-type: none"> The disease severity was mainly mild to moderate (98%) Approximately 26% were asymptomatic initially Common symptoms were cough 46% (95% CI 0.27–0.66; I2 = 57%, p = 0.03) and fever (59%, 95% CI 0.41–0.72; I2 = 44%, p = 0.10) 	Moderate

				<ul style="list-style-type: none"> • 12% patients had gastrointestinal manifestations • Only 2 children (2%) received intensive care and 1 developed complication 	
5. Chao JY et al	67 children 1 month to 21 years of age with COVID-19	Retrospective review of laboratory confirmed SARS-CoV-2 infection of children admitted at the Children's Hospital at Montefiore between March 15 and April 13, 2020	Higher than previously recognized rate of severe disease requiring PICU admission in pediatric patients admitted to the hospital with COVID-19	<ul style="list-style-type: none"> • 21 (31.3%) were managed as outpatients • 46 admitted patients, 33 (72%) were admitted to the general pediatric medical unit and 13 (28%) to the pediatric intensive care unit (PICU) • Severe sepsis and septic shock syndromes were observed in 7 (53.8%) patients in the PICU • Severe sepsis and septic shock syndromes was observed in 10 (77%) PICU patients, 6 of whom (46.2%) required invasive mechanical ventilation for a median of 9 days • 8/13 patients in the PICU, were discharged home, and 4/13 (30.7%) patients remain hospitalized on ventilatory support at day 14 • 1 died with metastatic cancer comorbidity 	Low
6. de Souza et al.	1124 Pediatric cases	Systematic review (Medline database was searched between December 1st, 2019 and April 6th, 2020)	Fever and respiratory symptoms should not be considered a hallmark of COVID-19 in children Regardless of the favorable prognosis, it is important that the child's role in the contamination chain is precisely established and considered.	<ul style="list-style-type: none"> • most prevalent symptom fever, (47.5%), cough (41.5%), nasal symptoms (11.2%), diarrhea (8.1%), nausea/vomiting (7.1%), fatigue (5.0%), and respiratory distress (3.5%) • 145 (36.9%) children were diagnosed with pneumonia and 43 (10.9%) upper airway infections were reported • 159 (14.2%) asymptomatic, 406 (36.3%) were mild, 514 (46.0%) moderate, 25 (2.1%) were severe, and 13 (1.2%) were critical cases 	Moderate

				<ul style="list-style-type: none"> 1 death was recorded 	
7. Ding Y et al.	371 Pediatric cases (0–17 years)	Meta-analysis	Children are at a lower risk of developing COVID-19 and likely have a milder disease compared with adults.	<ul style="list-style-type: none"> 60.1% > 5 years 6.1% of all the included children had underlying diseases fever (51.2) and cough (37.0%) common symptoms 17.4% (95% CI = 9.1–27.3) were asymptomatic 5/371 developed severe or critical illness and required intensive care 	Moderate
8. Gabori eau L et al.	192 children (< 18 years old) who were hospitalized with confirmed or highly suspected SARS-CoV-2 infection	prospective observational multicentre study in 23 general paediatric hospitals located in Paris suburbs (from 23 March 2020 to 10 May 2020)	children with SARS-CoV-2 infection mostly show a mild form of Covid-19. SARS-CoV-2 infection usually affects children with no underlying condition, causing severe disease in rare cases and is associated with a low rate of death.	<ul style="list-style-type: none"> symptoms such as anosmia, dysgeusia and chest pain have been observed in children over six years of age underlying conditions were reported for 56 (29.2%) children included sickle cell disease (n = 16, 8.3%), asthma (n = 10, 5.2%), immunocompromised condition (n = 9, 4.7%), preterm birth (n = 8, 4.2%) and obesity defined by BMI > 95% (n = 5, 2.6%) 24 (12.5%) children were admitted to pediatric intensive care units 3 deaths were recorded 	Low
9. Götzin ger F et al.	582 aged 18 years or younger with confirmed SARS-CoV-2 infection, detected at any anatomical site by RT-PCR	multicentre cohort study involved 82 participating health-care institutions across 25 European countries (between April 1 and April 24, 2020)	COVID-19 is generally a mild disease in children, including infants. However, a small proportion develop severe disease requiring ICU admission and prolonged ventilation, although fatal outcome is overall rare	<ul style="list-style-type: none"> median age of 5.0 years 145 (25%) had pre-existing medical conditions 363 (62%) individuals were admitted to hospital 48 (8%) individuals required ICU admission and 25 (4%) mechanical ventilation Significant risk factors for requiring ICU admission were being younger than 1 month and presence of lower respiratory tract infection 	Low

10. Hoang A et al.	7780 pediatric patients	Systematic review (December 1, 2019 to May 14)	Children diagnosed with COVID-19 have an overall excellent prognosis	<ul style="list-style-type: none"> Fever (59.1%) and cough (55.9%) were the most frequent symptoms 19.3% of children were asymptomatic 152 of 233 individuals had medical conditions (Immunocompromised, respiratory/cardiac disease) 	Moderate
11. Liguoro I et al.	7480 children (0-18 years)	systematic review (Papers published between 1 January and 1 May 2020)	SARS-CoV-2 affects children less commonly and severely in comparison to adults, with an estimated very low mortality rate but still susceptible	<ul style="list-style-type: none"> The weighted mean age of patients was 7.6 years Patients showed mainly mild (608/1432, 42.5%) and moderate (567/1432, 39.6%) signs of the infection most commonly symptoms were fever (51.6%) and cough (47.3%) the estimated mortality was 0.08% 2926/4709 (71%) were discharged after a weighted mean hospitalization of 11.2 days (range 2–27) Severe and critically ill children accounted for 2% (30/1475) and 0.6% (10/1475) Extra respiratory symptoms were mainly represented by diarrhea (9.7%), vomiting (7.2%), and fatigue (10.6%) 	Moderate
12. Mantovani A et al.	2855 children and/or adolescents with COVID-19	Meta-analysis (April 11, 2020)	Children and/or adolescents tend to have a mild COVID-19 course with a good prognosis	<ul style="list-style-type: none"> 47% had fever and 37% cough Other symptoms 4% diarrhea, 2% nasal congestion, 1% dyspnea mild symptoms in 79%, 4% were critical. 	Moderate
13. Patel NA	2914 pediatric patients with COVID-19 (1 day to 17 years)	Systematic review	Children appear to have a milder course and have better outcomes overall	<ul style="list-style-type: none"> 21% with comorbidities most common were asthma, immunosuppression, and cardiovascular disease Common symptoms- cough (48%), fever (47%) and sore throat/pharyngitis (28.6%) Other symptoms upper respiratory symptoms/rhinorrhea/sneezing/nasal 	Moderate

				<p>congestion (13.7%), vomiting/nausea (7.8%) and diarrhea (10.1%)</p> <ul style="list-style-type: none"> • 27.0% of patients hospitalized were infants under 1 year of age • The mortality rate of children that were hospitalized with COVID-19 was 0.18%. 	
14. Shekerdemian LS et al.	48 children with COVID-19 (< 21 years) admitted to 14 PICUs in the US	Cross-sectional study of 46 North American PICUs, between March 14 and April 3, 2020	COVID-19 can result in a significant disease burden in children but confirms that severe illness is less frequent, and early hospital outcomes in children are better than in adults.	<ul style="list-style-type: none"> • 40 children (83%) had pre-existing underlying medical conditions • 35 (73%) presented with respiratory symptoms • 18 (38%) required invasive ventilation • hospital mortality rate was 4.2%. 	Low
15. Tung Ho CL et al.	820 paediatric cases of COVID-19 (range of 1 day to 17 years)	Systematic Review (01 June 2019 to 18 March 2020)	children are disproportionately affected by COVID-19 and are more likely to run a milder course following this infection with COVID-19 compared to adults	<ul style="list-style-type: none"> • Asymptomatic cases represented 14.3% (n = 117) • 85.7% (n = 703) experienced symptoms • detailed clinical presentations were only available for 89 cases • most reported symptom in 53.9% (n = 48) Fever, cough in 39.3% (n = 35) • other symptoms Rhinorrhoea or pharyngeal congestion 13.5% (n = 12) diarrhoea in 7.9% (n = 7) and sore throats in 9.0% (n = 8) 	Moderate
16. Wang Y et al.	8 children diagnosed with severe COVID-19 pneumonia	Retrospective case-control study	More than 3 lung segments involved were associated with greater risk of development of severe COVID-19 in children	<ul style="list-style-type: none"> • 2 (25.0%) children were found to have a comorbidity • 1 diagnosed lymphoblastic leukemia in remission • 1 diagnosed primary obesity • comorbidity status was not a risk to develop the poorer outcome • most common symptoms were dyspnea (87.5%), fever (62.5%) and cough (62.5%) • 3 cases (37.5%) developed symptoms of the digestive tract including vomiting and diarrhea. 	Low

				<ul style="list-style-type: none">• median duration from onset of symptoms of severe cases was 3.00 (1.00–6.75) days and median time for nucleic acid tests turning negative was 10.50 (6.75–13.75)	
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Appendix: Evidence Search Details

Search Strategies

Database: Embase <1974 to 2020 July 30>

Search Strategy:

- 1 exp Coronavirinae/ or exp Coronavirus infection/ (25656)
- 2 (coronavirus disease 2019 or severe acute respiratory syndrome coronavirus 2).sh,dj. (31915)
- 3 ((corona* or corono*) adj1 (virus* or viral* or virinae*)).ti,ab,kw. (1193)
- 4 (coronavirus* or coronovirus* or coronavirinae* or CoV).ti,ab,kw. (34016)
- 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 SARSCoronavirus2 or "SARS-coronavirus-2" or "SARSCoronavirus 2" or "SARS coronavirus2").ti,ab,kw. (35814)
- 6 (respiratory* adj2 (symptom* or disease* or illness* or condition*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw. (606)
- 7 (("seafood market*" or "food market*" or pneumonia*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw. (1634)
- 8 ((outbreak* or wildlife* or pandemic* or epidemic*) adj1 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw. (129)
- 9 "severe acute respiratory syndrome*".ti,ab,kw. (9092)
- 10 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 (65340)
- 11 exp *epidemiology/ or epidemiol*.tw,kw. or ep.fs. (1703491)
- 12 exp disease exacerbation/ (117002)
- 13 ((disease or clinical or illness) adj2 (course or trajector* or characteristi* or progress*)).ti,ab,kw. (495720)
- 14 (natural adj2 histor*).ti,ab,kw. (68676)
- 15 exp probability/ or ((rate* or trend* or likelihood or probabilit* or proportion) adj2 (symptom* or asymptom* or mortali* or death* or hospitali*)).ti,ab,kw. (376912)
- 16 (sever* adj3 case?).ti,ab,kw. (88317)
- 17 11 or 12 or 13 or 14 or 15 or 16 (2644133)
- 18 exp *pediatrics/ or exp *infant/ or exp *child/ or exp *juvenile/ or exp *adolescent/ (241401)
- 19 (child? or children or childhood or p?pediatric* or baby or babies or newborn? or new-born? or neonat* or perinat* or infant? or infantile or infancy or toddler? or preschooler? or pre-schooler* or boy? or girl? or adolescen* or teen* or youth? or juvenile? or pre-menarch* or pre-adolescenc* or pre-teen or pre-pubert* or pre-pubesc* or premenarch* or preadolescenc* or preteen or prepubert* or prepubesc*).ti. (1703354)
- 20 18 or 19 (1751602)
- 21 10 and 17 and 20 (967)
- 22 limit 21 to (english language and yr="2019 -Current") (476)
- 23 from 22 keep 3,33,39,41,45,47,52-53,56,83,85-86,96,99,103,106,110,112,114,130,133-134,141,148,169,177-178,187,221-222,228,239,245,247,253,255,263,273,281,293,296,313,316,320,322,343,345,347,370,381,410,413-414,419,426,447 (56)

Database: Ovid MEDLINE(R) <1946 to July Week 3 2020>

Search Strategy:

-
- 1 exp coronavirus/ (21816)
 - 2 exp Coronavirus Infections/ (21940)
 - 3 ((corona* or coron*) adj1 (virus* or viral* or virinae*)).ti,ab,kw,kf. (785)
 - 4 (coronavirus* or coronovirus* or coronavirinae* or CoV).ti,ab,kw,kf. (17429)
 - 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 SARSCoronavirus2 or "SARS-coronavirus-2" or "SARSCoronavirus 2" or "SARS coronavirus2").ti,ab,kw,kf. (11863)
 - 6 (respiratory* adj2 (symptom* or disease* or illness* or condition*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw,kf. (400)
 - 7 (("seafood market*" or "food market*" or pneumonia*) adj10 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw,kf. (989)
 - 8 ((outbreak* or wildlife* or pandemic* or epidemic*) adj1 (Wuhan* or Hubei* or China* or Chinese* or Huanan*)).ti,ab,kw. (186)
 - 9 "severe acute respiratory syndrome*".ti,ab,kw,kf. (5688)
 - 10 or/1-9 (32324)
 - 11 exp *Epidemiology/ or epidemiol*.tw,kw,kf. or ep.fs. (1826953)
 - 12 exp disease progression/ (179447)
 - 13 ((disease or clinical or illness) adj2 (course or trajector* or characteristi* or progress*)).tw,kf. (255820)
 - 14 (natural adj2 histor*).tw,kf. (43889)
 - 15 exp Probability/ or ((rate* or trend* or likelihood or probabilit* or proportion) adj2 (symptom* or asymptom* or mortali* or death* or hospitali*)).tw,kf. (1507539)
 - 16 (sever* adj3 case?).tw,kf. (52473)
 - 17 11 or 12 or 13 or 14 or 15 or 16 (3144581)
 - 18 exp *Pediatrics/ or exp *Infant/ or exp *Child/ or *Adolescent/ (110431)
 - 19 (child? or children or childhood or p?ediatric* or baby or babies or newborn? or new-born? or neonat* or perinat* or infant? or infantile or infancy or toddler? or preschooler? or pre-schooler* or boy? or girl? or adolescen* or teen* or youth? or juvenile? or pre-menarch* or pre-adolescenc* or pre-teen or pre-pubert* or pre-pubesc* or premenarch* or preadolescenc* or preteen or prepubert* or prepubesc*).ti. (1323700)
 - 20 18 or 19 (1346360)
 - 21 10 and 17 and 20 (824)
 - 22 limit 21 to (english language and yr="2019 -Current") (323)
 - 23 from 22 keep 10,21,46,56-59,61-62,73,88,94,97,109,121-122,126,130,145-146,151,155,158,160,179,188,193,198,200,209,249,251,255,262-264,281,283,286,293,295-297,303,309 (45)

Pubmed – July 30, 2020

#	Query	Results	Time
5	((#1) AND (#2)) AND (#3) in the last year	106	18:05:35

4	((#1) AND (#2)) AND (#3)	106	18:05:28
3	(((((disease progression[MeSH Terms]) OR (disease progression*[Text Word])) OR (clinical course[Text Word])) OR (disease timeline[Text Word])) OR (natural history[Text Word])) OR (disease course[Text Word])) OR (clinical timeline[Text Word])) OR (infection time[Text Word])) OR (illness progression[Text Word])	348,007	18:03:46
2	((((((((((((((adolescent[MeSH Terms]) OR (child[MeSH Terms])) OR (infant[MeSH Terms])) OR (child, preschool[MeSH Subheading])) OR (infant, newborn[MeSH Subheading])) OR (infant*[Text Word])) OR (paediatric[Text Word])) OR (paediatrics[Text Word])) OR (pediatric[Text Word])) OR (pediatrics[Text Word])) OR (toddler*[Text Word])) OR (child[Text Word])) OR (children[Text Word])) OR (teen*[Text Word])) OR (adolescent*[Text Word])) OR (youth*[Text Word])) OR (preteen*[Text Word])) OR (preschooler*[Text Word])	4,037,727	18:01:15
1	((wuhan[tw] AND (coronavirus[tw] OR corona virus[tw])) OR coronavirus*[ti] OR COVID*[tw] OR nCov[tw] OR 2019 nCov[tw] OR novel coronavirus[tw] OR novel corona virus[tw] OR covid-19[tw] OR SARS-COV-2[tw] OR Severe Acute Respiratory Syndrome Coronavirus 2[tw] OR coronavirus disease 2019[tw] OR corona virus disease 2019[tw] OR new coronavirus[tw] OR new corona virus[tw] OR new coronaviruses[all] OR novel coronaviruses[all] OR "Severe Acute Respiratory Syndrome Coronavirus 2"[nm] OR 2019 nCov[tw] OR nCov 2019[tw] OR SARS Coronavirus 2[all]) AND (2019/12[dp]:2020[dp])	37,727	17:57:02

Google Advanced – July 29, 2020, July 30, 2020

(pediatric|pediatrics|infant|infants|toddler|toddlers|child|children|teen|teens|adolescent|adolescents|youth|youths) AND (COVID-19 OR SARS-Cov-2) AND ("natural history"|"disease course"|"disease progression")

Sources

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



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