

EVIDENCE SEARCH REPORT

RESEARCH QUESTION:	What is the transmissibility and epidemiology of COVID-19 in children and adolescents?	UNIQUE IDENTIFIER:	EOC070201v2-01 ESR
RESOURCES USED:			
<ul style="list-style-type: none"> • CDC (US) database & website • DynaMed • ECRI COVID-19 Resources • Embase • Google Web Search • Google Scholar • McMaster NCCMT • MEDLINE • MedRxiv • NICE Guidance • PHAC website • PubMed/LitCovid • TRIP Medical Database (Pro) • WHO Global Research on COVID-19 			
LIMITS/EXCLUSIONS/INCLUSIONS:	English 2000-2020	REFERENCE INTERVIEW COMPLETED:	July 5, 2020
DATE:	Aug 7, 2020		
LIBRARIAN:	Michelle Dalidowicz, Courtney Ellsworth	REQUESTOR:	Dr. Gary Groot
TEAM: EOC			
SEARCH ALERTS CREATED: N			
CITE AS: Dalidowicz, M; Ellsworth, C. What is the transmissibility and epidemiology of COVID-19 in children and adolescents? 2020 Aug 7; Document no.: EOC070201v2-01 ESR. In: COVID-19 Rapid Evidence Reviews [Internet]. SK: SK COVID Evidence Support Team, c2020. 29 p. (CEST evidence search report)			

LIBRARIAN NOTES/COMMENTS

Hello,

Below is what we could find on pediatric transmission and epidemiology and COVID-19 since July 7. Please let us know if there are any questions or concerns.

Thanks,

Michelle and Courtney

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SEARCH RESULTS

To obtain full-text articles email library@saskhealthauthority.ca.

SUMMARIES, GUIDELINES & OTHER RESOURCES

DynaMed. Record No. T1587144317856, *COVID-19 and Pediatric Patients, Epidemiology*; [updated 2020 Apr 23]. Available from <https://www.dynamed.com/condition/covid-19-and-pediatric-patients#GUID-E833A4EE-7A92-40E5-97C0-EA575F2B292E>

Health Information and Quality Authority –HIQA (Ireland)

Evidence summary of potential for children to contribute to transmission of SARS-CoV-2. 23 June 2020.

<https://www.hiqa.ie/sites/default/files/2020-06/Evidence-summary-for-spread-of-COVID-19-by-children.pdf>

The National Collaborating Centre for Methods and Tools. Rapid Review: What is the specific role of daycares and schools in COVID-19 transmission? 9 July 2020.

<https://www.nccmt.ca/uploads/media/media/0001/02/5f13b54acaff367d6181f45182476c87e4d69120.pdf>

Preliminary epidemiological analysis on children and adolescents with novel coronavirus disease (2019-nCoV) in a central area of Calabria Region. 18 April 2020.

<https://www.mattioli1885journals.com/index.php/actabiomedica/article/view/9550/8798>

Transmission of SARS-CoV-2 by Children. *Dtsch Arztebl Int.* 2020;117(33-34):553-560.

<https://www.aerzteblatt.de/pdf.asp?id=214818>

ARTICLES

Note: References are sorted by year (newest to oldest)

1. Abdollahi E, Haworth-Brockman M, Keynan Y, et al. Simulating the effect of school closure during COVID-19 outbreaks in Ontario, Canada. *BMC Med.* 2020;18(1):230. DOI: 10.1186/s12916-020-01705-8

ABSTRACT: BACKGROUND: The province of Ontario, Canada, has instituted indefinite school closures (SC) as well as other social distancing measures to mitigate the impact of the novel coronavirus disease 2019 (COVID-19) pandemic. We sought to evaluate the effect of SC on reducing attack rate and the need for critical care during COVID-19 outbreaks, while considering scenarios with concurrent implementation of self-isolation (SI) of symptomatic cases. METHODS: We developed an age-structured agent-based simulation model and parameterized it with the demographics of Ontario stratified by age and the latest estimates of COVID-19 epidemiologic characteristics. Disease transmission was simulated within and between different age groups by considering inter- and intra-group contact patterns. The effect of SC of varying durations on the overall attack rate, magnitude and peak time of the outbreak, and requirement for intensive care unit (ICU) admission in the population was estimated. Secondly, the effect of concurrent community-based voluntary SI of symptomatic COVID-19 cases was assessed. RESULTS: SC reduced attack rates in the range of 7.2-12.7% when the duration of SC increased from 3 to 16 weeks, when contacts among school children were restricted by 60-80%, and in the absence of SI by mildly symptomatic persons. Depending on the scenario, the overall reduction in ICU admissions attributed to SC throughout the outbreak ranged from 3.3 to 6.7%. When SI of mildly symptomatic persons was included and practiced by 20%, the reduction of attack rate and ICU admissions exceeded 6.3% and 9.1% (on average), respectively, in the corresponding scenarios. CONCLUSION: Our results indicate that SC may have limited impact on reducing the burden of COVID-19 without measures to interrupt the chain of transmission during both pre-symptomatic and symptomatic stages. While highlighting the importance of SI, our findings indicate the need for better understanding of the epidemiologic characteristics of emerging diseases on the effectiveness of social distancing measures.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32709232>

DOI: 10.1186/s12916-020-01705-8

2. Anonymous. Erratum: Screening and severity of coronavirus disease 2019 (COVID-19) in children in Madrid, Spain (JAMA Pediatr (2020) DOI: 10.1001/jamapediatrics.2020.1346). JAMA Pediatrics. 2020.

ABSTRACT: Errors in Table: In the Research Letter entitled "Screening and Severity of Coronavirus Disease 2019 (COVID-19) in Children in Madrid, Spain," 1 there were 2 errors in the Table. In the row "No/community transmission," "25 (41)" should be "25 (61)." In the row "No" under "Underlying disease," "30 (67)" should be "30 (73)." This article was corrected online. Copyright © 2020 Lippincott Williams and Wilkins. All rights reserved.

URL: <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=emexb&AN=632216791>

3. Armann JP, Unrath M, Kirsten C, et al. Anti-SARS-CoV-2 IgG antibodies in adolescent students and their teachers in Saxony, Germany (SchoolCoviDD19): very low seroprevalence and transmission rates. medRxiv. 2020:2020.07.16.20155143. DOI: 10.1101/2020.07.16.20155143

ABSTRACT: Background: School closures are part of the SARS-CoV-2 pandemic control measures in many countries, based on the assumption that children play a similar role in transmitting SARS-CoV-2 as they do in transmitting influenza. We therefore performed a SARS-CoV-2 seroprevalence-study in students and teachers to assess their role in the SARS-CoV-2 transmission. Methods: Students grade 8-11 and their teachers in 13 secondary schools in eastern Saxony, Germany, were invited to participate in the SchoolCoviDD19 study. Blood samples were collected between May 25th and June 30th, 2020. Anti-SARS-CoV-2 IgG were assayed using chemiluminescence immunoassay technology and all samples with a positive or equivocal test result were re-tested with two additional serological tests. Findings: 1538 students and 507 teachers participated in this study. The seroprevalence for SARS-CoV-2 was 0.6%. Even in schools with reported Covid-19 cases before the Lockdown of March 13th no clusters could be identified. 23/24 participants with a household history of COVID-19 were seronegative. By using a combination of three different immunoassays we could exclude 16 participants with a positive or equivocal results after initial testing. Interpretation: Students and teachers do not play a crucial role in driving the SARS-CoV-2 pandemic in a low prevalence setting. Transmission in families occurs very infrequently, and the number of unreported cases is low in this age group, making school closures not appear appropriate as a strategy in this low prevalence settings. Funding: This study was supported by a grant from the state of Saxony. Competing Interest Statement: The authors have declared no competing interest. Clinical Trial ID: DRKS00022455. Funding Statement: This study was supported by a grant from the state of Saxony. Author Declarations: I confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained. Yes. The details of the IRB/oversight body that provided approval or exemption for the research described are given below: The SchoolCoviDD19 study was approved by the Ethics Committee of the Technische Universität (TU) Dresden (BO-EK-15604/2020). All necessary patient/participant consent has been obtained and the appropriate institutional forms have been archived. Yes. I understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance). Yes. I have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable. Yes. The authors confirm that the data supporting the findings of this study are available within the article.

URL: <http://medrxiv.org/content/early/2020/07/28/2020.07.16.20155143.abstract>

DOI: 10.1101/2020.07.16.20155143

4. Assadi F. Why Children are Less Likely to Contract COVID-19 Infection than Adults? International journal of preventive medicine. 2020;11:74. DOI: 10.4103/ijpvm.IJPVM_199_20

DOI: 10.4103/ijpvm.IJPVM_199_20

5. Bruhn C. Dispute over infection potential of children. New evaluation of the "Drosten" study: Lower risk of transmission of SARS-CoV-2 is not proven. [German]. Deutsche Apotheker Zeitung. 2020;160 (24) (no pagination)(A268).

URL: <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=emedx&AN=2006739887>

6. Cai X, Ma Y, Li S, et al. Clinical Characteristics of 5 COVID-19 Cases With Non-respiratory Symptoms as the First Manifestation in Children. Front Pediatr. 2020;8:258. DOI: 10.3389/fped.2020.00258

ABSTRACT: An outbreak of the novel coronavirus disease 2019 (COVID-19) occurred in Wuhan, China, in December 2019, which then rapidly spread to more than 80 countries. However, detailed information on the characteristics of COVID-19 in

children is still scarce. Five patients with non-respiratory symptoms as the first manifestation were hospitalized from the emergency department, and were later confirmed to have COVID-19, between 23 January and 20 February 2020, at the Wuhan Children's Hospital. SARS-CoV-2 nucleic acid detection was positive for all the patients. Four of the patients were male and one was female, and their ages ranged from 2-months to 5.6 years. All lived in Wuhan. One patient had a clear history of exposure to SARS-CoV-2, one had a suspected history of exposure, while the others had no exposure history. For three of the five patients, the primary onset disease required an emergency operation or treatment, and included intussusception, acute suppurative appendicitis perforation with local peritonitis, and traumatic subdural hemorrhage with convulsion, while for the other two it was acute gastroenteritis (including one patient with hydronephrosis and a stone in his left kidney). During the course of the disease, four of the five patients had a fever, whereas one case had no fever or cough. Two patients had leukopenia, and one also had lymphopenia. In the two cases of severe COVID-19, the levels of CRP, PCT, serum ferritin, IL-6, and IL-10 were significantly increased, whereas the numbers of CD3+, CD4+, CD8+ T lymphocytes, and CD16 + CD56 natural killer cells were decreased. We also found impaired liver, kidney, and myocardial functions; the presence of hypoproteinemia, hyponatremia, and hypocalcemia; and, in one case, abnormal coagulation function. Except for one patient who had a rotavirus infection, all patients tested negative for common pathogens, including the influenza virus, parainfluenza virus, respiratory syncytial virus, adenovirus, enterovirus, mycoplasma, Chlamydia, and Legionella. Chest CT images of all the patients showed patches or ground-glass opacities in the lung periphery or near the pleura, even large consolidations. This case series is the first report to describe the clinical features of COVID-19 with non-respiratory symptoms as the first manifestation in children.
DOI: 10.3389/fped.2020.00258

7. Chao FL. Adolescents' face mask usage and contact transmission in novel Coronavirus. J Public Health Res. 2020;9(1):1771. DOI: 10.4081/jphr.2020.1771

ABSTRACT: The global outbreak of coronavirus has become an international public health threat. Prevention is of paramount importance to contain its spread. This study observes face mask wearing behavior and contact transmission problems in Taiwan. Teachers track student status in class. In addition to measuring body temperature and regular disinfection, classrooms require ventilation wear mask, provide alcohol spray and avoid sharing the microphone. Both questionnaire surveys and experimental were utilized. A total of 160 adults residing in Taiwan participated in the survey. The dye simulated the possible virus area on the mask surface during usage. Subjects were required to complete a questionnaire and simulate the spread of contact transmission when using a computer. Eighty-one % of respondents reported consistent use of surgical masks several times a day. They reported taking their masks off in relatively safe areas. Most people reported using one mask per day and storing the masks in their pockets. As a result, masks surface become a contamination source. In the contact experiment, ten adults were requested to don and doff a surgical mask while doing a word processing task. The extended contamination areas were recorded and identified by image analysis. The results show an average contamination area of the workspace is significant 530 cm(2). When the hand touches the surface of the mask, it may spread the virus to the subsequent contact area.
DOI: 10.4081/jphr.2020.1771

8. Chao JY, Derespina KR, Herold BC, et al. Clinical Characteristics and Outcomes of Hospitalized and Critically Ill Children and Adolescents with Coronavirus Disease 2019 at a Tertiary Care Medical Center in New York City. The Journal of pediatrics. 2020;223:14-9.e2. DOI: 10.1016/j.jpeds.2020.05.006

ABSTRACT: OBJECTIVE: To describe the clinical profiles and risk factors for critical illness in hospitalized children and adolescents with coronavirus disease 2019 (COVID-19). STUDY DESIGN: Children 1 month to 21 years of age with COVID-19 from a single tertiary care children's hospital between March 15 and April 13, 2020 were included. Demographic and clinical data were collected. RESULTS: In total, 67 children tested positive for COVID-19; 21 (31.3%) were managed as outpatients. Of 46 admitted patients, 33 (72%) were admitted to the general pediatric medical unit and 13 (28%) to the pediatric intensive care unit (PICU). Obesity and asthma were highly prevalent but not significantly associated with PICU admission (P = .99). Admission to the PICU was significantly associated with higher C-reactive protein, procalcitonin, and pro-B type natriuretic peptide levels and platelet counts (P < .05 for all). Patients in the PICU were more likely to require high-flow nasal cannula (P = .0001) and were more likely to have received Remdesivir through compassionate release (P < .05). Severe sepsis and septic shock syndromes were observed in 7 (53.8%) patients in the PICU. Acute respiratory distress syndrome was observed in 10 (77%) PICU patients, 6 of whom (46.2%) required invasive mechanical ventilation for a median of 9 days. Of the 13 patients in the PICU, 8 (61.5%) were discharged home, and 4 (30.7%) patients remain hospitalized on ventilatory support at day 14. One patient died after withdrawal of life-sustaining therapy because of metastatic cancer. CONCLUSIONS: We describe a higher than previously recognized rate of severe disease requiring PICU admission in pediatric patients admitted to the hospital with COVID-19.
DOI: 10.1016/j.jpeds.2020.05.006

9. Choi SH, Kim HW, Kang JM, et al. Epidemiology and clinical features of coronavirus disease 2019 in children. Clin Exp Pediatr. 2020;63(4):125-32. DOI: 10.3345/cep.2020.00535

ABSTRACT: Coronavirus disease-2019 (COVID-19), which started in Wuhan, China, in December 2019 and declared a worldwide pandemic on March 11, 2020, is a novel infectious disease that causes respiratory illness and death. Pediatric COVID-19 accounts for a small percentage of patients and is often milder than that in adults; however, it can progress to severe disease in some cases. Even neonates can suffer from COVID-19, and children may spread the disease in the community. This review summarizes what is currently known about COVID-19 in children and adolescents.

DOI: 10.3345/cep.2020.00535

10. Ciaglia E, Vecchione C, Puca AA. COVID-19 Infection and Circulating ACE2 Levels: Protective Role in Women and Children. Front Pediatr. 2020;8:206. DOI: 10.3389/fped.2020.00206

DOI: 10.3389/fped.2020.00206

11. Ciofi Degli Atti ML, Campana A, Muda AO, et al. Facing SARS-CoV-2 Pandemic at a COVID-19 Regional Children's Hospital in Italy. The Pediatric infectious disease journal. 2020;01.

ABSTRACT: BACKGROUND: In Italy, the response to coronavirus disease 2019 (COVID-19) pandemic upgraded from social distancing on February 23, 2020, to national lockdown on March 11, 2020. We described how the pandemic affected a tertiary care children hospital with a dedicated COVID-19 regional center. METHOD(S): We analyzed the characteristics of emergency department (ED) visits, urgent hospitalizations and severe acute respiratory syndrome (SARS)-CoV-2 reverse transcription-polymerase chain reaction testing, and COVID-19 patients across 3 response phases: before the first Italian case, before national lockdown and during lockdown. RESULT(S): ED visits decreased from a daily mean of 239.1 before the first COVID-19 Italian case, to 79.6 during lockdown; urgent hospitalizations decreased from 30.6 to 21.2. As of April 20, 2020, 1970 persons were tested for SARS-CoV-2 reverse transcription-polymerase chain reaction and 2.6% were positive. Positive rates were 1.2% in the ED, 21.1% in the COVID center and 0.5% in other wards. The median age of COVID-19 patients (N = 33) was 6.7 years, 27% had coexisting conditions and 79% were related to family clusters. CONCLUSION(S): The pandemic strongly impacted on the use of hospital services, with a 67% reduction in ED visits and a 31% reduction in urgent hospitalizations. Separating the flows of suspected patients from all other patients, and centralization of suspected and confirmed cases in the COVID center enabled to control the risk of nosocomial SARS-CoV-2 transmission. Delay in hospital use for urgent care must be avoided, and clear communication on infection prevention and control must be provided to families. Further studies are needed to assess how the reduction in hospital use affected children healthcare needs during the pandemic.

URL: <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=emexb&AN=632302035>

12. Ciuca IM. COVID-19 in Children: An Ample Review. Risk management and healthcare policy. 2020;13:661-9. DOI: 10.2147/rmhp.S257180

ABSTRACT: The aim of this review was to describe the current knowledge about coronavirus disease 2019 (COVID-19, which is caused by severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2]) in children, from epidemiological, clinical, and laboratory perspectives, including knowledge on the disease course, treatment, and prognosis. An extensive literature search was performed to identify papers on COVID-19 (SARS-CoV-2 infection) in children, published between January 1, 2020 and April 1, 2020. There were 44 relevant papers on COVID-19 in children. The results showed that COVID-19 occurs in 0.39-12.3% of children. Clinical signs and symptoms are comparable to those in adults, but milder forms and a large percentage of asymptomatic carriers are found among children. Elevated inflammatory markers are associated with complications and linked to various co-infections. Chest computed tomography (CT) scans in children revealed structural changes similar to those found in adults, with consolidations surrounded by halos being somewhat specific for children with COVID-19. The recommended treatment includes providing symptomatic therapy, with no specific drug recommendations for children. The prognosis is much better for children compared to adults. This review highlights that COVID-19 in children is similar to the disease in the adult population, but with particularities regarding clinical manifestations, laboratory test results, chest imaging, and treatment. The prognosis is much better for children compared to adults, but with the progression of the pandemic; the cases in children might change in the future.

DOI: 10.2147/rmhp.S257180

13. Cohen R, Jung C, Ouldali N, et al. Assessment of spread of SARS-CoV-2 by RT-PCR and concomitant serology in children in a region heavily affected by COVID-19 pandemic. medRxiv. 2020:2020.06.12.20129221. DOI: 10.1101/2020.06.12.20129221

ABSTRACT: Background. Several studies indicated that children seem to be less frequently infected with SARS-CoV-2 and potentially less contagious. To examine the spread of SARS-CoV-2 we combined both RT-PCR testing and serology in children

in the most affected region in France, during the COVID-19 epidemic. **Methods.** From April 14, 2020 to May 12, 2020, we conducted a cross-sectional prospective, multicenter study. Healthy controls and pauci-symptomatic children from birth to age 15 years were enrolled by 27 ambulatory pediatricians. A nasopharyngeal swab was taken for detection of SARS-CoV-2 by RT-PCR and a microsample of blood for micro-method serology. **Results.** Among the 605 children, 322 (53.2%) were asymptomatic and 283 (46.8%) symptomatic. RT-PCR testing and serology were positive for 11 (1.8%) and 65 (10.7%) of all children, respectively. Only 3 children were RT-PCR-positive without any antibody response have been detected. The frequency of positivity on RT-PCR for SARS-CoV-2 was significantly higher in children with positive serology than those with a negative one (12.3% vs 0.6%, $p < 0.001$). Contact with a person with proven COVID-19 increased the odds of positivity on RT-PCR (OR 7.8, 95% confidence interval [1.5; 40.7]) and serology (15.1 [6.6; 34.6]). **Conclusion.** In area heavily affected by COVID-19, after the peak of the first epidemic wave and during the lockdown, the rate of children with positive SARS-CoV-2 RT-PCR was very low (1.8%), but the rate of positive on serology was higher (10.7%). Most of PCR positive children had at the same time, positive serology suggesting a low risk of transmission.

Competing Interest StatementThe authors have declared no competing interest.

Clinical TrialNCT04318431

Funding StatementThis work was supported by the French Ministry of Health DGOS PHRC regional IDF 2020 no. AOR20095.

Author DeclarationsI confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained. **Yes**The details of the IRB/oversight body that provided approval or exemption for the research described are given below: The study protocol was approved by an ethics committee (CPP IDF IX no. 08-022). Parents of all infants provided written informed consent. All necessary patient/participant consent has been obtained and the appropriate institutional forms have been archived. **Yes**I understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance). **Yes** I have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable. **Yes**Data are available upon reasonable request

URL: <http://medrxiv.org/content/early/2020/07/23/2020.06.12.20129221.abstract>

DOI: 10.1101/2020.06.12.20129221

14. Cokugras H, Onal P. SARS-CoV-2 infection in children. Turk Pediatri Ars. 2020;55(2):95-102. DOI:

10.14744/TurkPediatriArs.2020.20270

ABSTRACT: SARS-CoV-2, a RNA virus that emerged in December 2019 in the city of Wuhan in China and took hold of the whole world, affects children as well as all age groups. In our country, we started to observe the first cases by March 2020. SARS-CoV-2, which is transmitted by droplets and by way of contact with surfaces contaminated by these droplets, is generally transmitted to children from adults through close contact. There is no proven information about other transmission routes such as fecal-oral transmission. Similar to adults, the primary symptoms at presentation include fever, cough, sore throat, malaise, nasal discharge, and rarely, vomiting and diarrhea in children. Although the majority of pediatric patients are asymptomatic or have a mild clinical course, severe cases have been reported in children with underlying chronic diseases. There is currently no specific antiviral treatment against the SARS-CoV-2 virus. Supportive treatment is recommended in children with a mild course, and some treatments are recommended in children with comorbidities or in children who are observed to have a more severe course. Asymptomatic pediatric patients or pediatric patients who have a mild course constitute an important group in terms of transmission of the infection to the advanced age group who carry high risk. Prevention of infection is very important in terms of reducing new cases and alleviating the load on the healthcare system. In order to prevent transmission of SARS-CoV-2, hygienic rules should be pursued in the community, social distancing should be observed, and the family members and contacts of patients who have been diagnosed should be screened and isolated.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32684754>

DOI: 10.14744/TurkPediatriArs.2020.20270

15. Davies P, Evans C, Kanthimathinathan HK, et al. Intensive care admissions of children with paediatric inflammatory multisystem syndrome temporally associated with SARS-CoV-2 (PIMS-TS) in the UK: a multicentre observational study. Lancet Child Adolesc Health. 2020;09:09. DOI: 10.1016/S2352-4642(20)30215-7

ABSTRACT: **BACKGROUND:** In April, 2020, clinicians in the UK observed a cluster of children with unexplained inflammation requiring admission to paediatric intensive care units (PICUs). We aimed to describe the clinical characteristics, course, management, and outcomes of patients admitted to PICUs with this condition, which is now known as paediatric inflammatory multisystem syndrome temporally associated with SARS-CoV-2 (PIMS-TS). **METHODS:** We did a multicentre observational study of children (aged <18 years), admitted to PICUs in the UK between April 1 and May 10, 2020, fulfilling the case definition of PIMS-TS published by the Royal College of Paediatrics and Child Health. We analysed routinely collected, de-identified data,

including demographic details, presenting clinical features, underlying comorbidities, laboratory markers, echocardiographic findings, interventions, treatments, and outcomes; serology information was collected if available. PICU admission rates of PIMS-TS were compared with historical trends of PICU admissions for four similar inflammatory conditions (Kawasaki disease, toxic shock syndrome, haemophagocytic lymphohistiocytosis, and macrophage activation syndrome). FINDINGS: 78 cases of PIMS-TS were reported by 21 of 23 PICUs in the UK. Historical data for similar inflammatory conditions showed a mean of one (95% CI 0.85-1.22) admission per week, compared to an average of 14 admissions per week for PIMS-TS and a peak of 32 admissions per week during the study period. The median age of patients was 11 years (IQR 8-14). Male patients (52 [67%] of 78) and those from ethnic minority backgrounds (61 [78%] of 78) were over-represented. Fever (78 [100%] patients), shock (68 [87%]), abdominal pain (48 [62%]), vomiting (49 [63%]), and diarrhoea (50 [64%]) were common presenting features. Longitudinal data over the first 4 days of admission showed a serial reduction in C-reactive protein (from a median of 264 mg/L on day 1 to 96 mg/L on day 4), D-dimer (4030 mug/L to 1659 mug/L), and ferritin (1042 mug/L to 757 mug/L), whereas the lymphocyte count increased to more than 1.0×10^9 cells per L by day 3 and troponin increased over the 4 days (from a median of 157 ng/mL to 358 ng/mL). 36 (46%) of 78 patients were invasively ventilated and 65 (83%) needed vasoactive infusions; 57 (73%) received steroids, 59 (76%) received intravenous immunoglobulin, and 17 (22%) received biologic therapies. 28 (36%) had evidence of coronary artery abnormalities (18 aneurysms and ten echogenicity). Three children needed extracorporeal membrane oxygenation, and two children died. INTERPRETATION: During the study period, the rate of PICU admissions for PIMS-TS was at least 11-fold higher than historical trends for similar inflammatory conditions. Clinical presentations and treatments varied. Coronary artery aneurysms appear to be an important complication. Although immediate survival is high, the long-term outcomes of children with PIMS-TS are unknown. FUNDING: None.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32653054>

DOI: 10.1016/S2352-4642(20)30215-7

16. DeBiasi RL, Song X, Delaney M, et al. Severe Coronavirus Disease-2019 in Children and Young Adults in the Washington, DC, Metropolitan Region. The Journal of pediatrics. 2020;223:199-203.e1. DOI:

10.1016/j.jpeds.2020.05.007

ABSTRACT: Despite worldwide spread of severe acute respiratory syndrome coronavirus-2, few publications have reported the potential for severe disease in the pediatric population. We report 177 infected children and young adults, including 44 hospitalized and 9 critically ill patients, with a comparison of patient characteristics between infected hospitalized and nonhospitalized cohorts, as well as critically ill and noncritically ill cohorts. Children <1 year and adolescents and young adults >15 years of age were over-represented among hospitalized patients ($P = .07$). Adolescents and young adults were over-represented among the critically ill cohort ($P = .02$).

DOI: 10.1016/j.jpeds.2020.05.007

17. Dhillon P, Breuer M, Hirst N. COVID-19 breakthroughs: separating fact from fiction. FEBS J. 2020. DOI:

10.1111/febs.15442

ABSTRACT: The newly recognised coronavirus SARS-CoV-2, causative agent of coronavirus disease (COVID-19), has caused a pandemic with huge ramifications for human interactions around the globe. As expected, research efforts to understand the virus and curtail the disease are moving at a frantic pace alongside the spread of rumours, speculations and falsehoods. In this article, we aim to clarify the current scientific view behind several claims or controversies related to COVID-19. Starting with the origin of the virus, we then discuss the effect of ibuprofen and nicotine on the severity of the disease. We highlight the knowledge on fomites and SARS-CoV-2 and discuss the evidence and explications for a disproportionately stronger impact of COVID-19 on ethnic minorities, including a potential protective role for vitamin D. We further review what is known about the effects of SARS-CoV-2 infection in children, including their role in transmission of the disease, and conclude with the science on different mortality rates between different countries and whether this hints at the existence of more pathogenic cohorts of SARS-CoV-2.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32500928>

DOI: 10.1111/febs.15442

18. Di Nardo M, van Leeuwen G, Loreti A, et al. A literature review of 2019 novel coronavirus (SARS-CoV2) infection in neonates and children. Pediatr Res. 2020;17:17. DOI: 10.1038/s41390-020-1065-5

ABSTRACT: At the time of writing, there are already millions of documented infections worldwide by the novel coronavirus 2019 (2019-nCoV or severe acute respiratory syndrome coronavirus 2 (SARS-CoV2)), with hundreds of thousands of deaths. The great majority of fatal events have been recorded in adults older than 70 years; of them, a large proportion had comorbidities. Since data regarding the epidemiologic and clinical characteristics in neonates and children developing coronavirus disease 2019 (COVID-19) are scarce and originate mainly from one country (China), we reviewed all the current

literature from 1 December 2019 to 7 May 2020 to provide useful information about SARS-CoV2 viral biology, epidemiology, diagnosis, clinical features, treatment, prevention, and hospital organization for clinicians dealing with this selected population. IMPACT: Children usually develop a mild form of COVID-19, rarely requiring high-intensity medical treatment in pediatric intensive care unit. Vertical transmission is unlikely, but not completely excluded. Children with confirmed or suspected COVID-19 must be isolated and healthcare workers should wear appropriate protective equipment. Some clinical features (higher incidence of fever, vomiting and diarrhea, and a longer incubation period) are more common in children than in adults, as well as some radiologic aspects (more patchy shadow opacities on CT scan images than ground-glass opacities). Supportive and symptomatic treatments (oxygen therapy and antibiotics for preventing/treating bacterial coinfections) are recommended in these patients.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32679582>

DOI: 10.1038/s41390-020-1065-5

19. Dietrich ML, Norton EB, Elliott D, et al. SARS-CoV-2 Seroprevalence Rates of Children in Louisiana During the State Stay at Home Order. medRxiv. 2020:2020.07.07.20147884. DOI: 10.1101/2020.07.07.20147884

ABSTRACT: Children (less than 19 years) account for 20% of the US population but currently represent less than 2% of coronavirus disease 2019 (COVID-19) cases. Because infected children often have few or no symptoms and may not be tested, the extent of infection in children is poorly understood. **METHODS** During the March 18th-May 15th 2020 Louisiana Stay At Home Order, 1690 blood samples from 812 individuals from a Childrens Hospital were tested for antibodies to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) spike protein. Demographics, COVID-19 testing, and clinical presentation abstracted from medical records were compared with local COVID-19 cases. **RESULTS** In total, 62 subjects (7.6%) were found to be seropositive. The median age was 11 years with 50.4% female. The presenting complaint of seropositive patients was chronic illness (43.5%). Only 18.2% had a previous positive COVID-19 PCR or antibody test. Seropositivity was significantly associated with parish (counties), race, and residence in a low-income area. Importantly, seropositivity was linearly correlated with cumulative COVID-19 case number for all ages by parish. **CONCLUSION** In a large retrospective study, the seropositivity prevalence for SARS-CoV-2 in children in Louisiana during the mandated Stay At Home Order was 7.6%. Residence location, race, and lower socioeconomic factors were linked to more frequent seropositivity in children and correlated to regional COVID-19 case rates. Thus, a significant number of children in Louisiana had SARS-CoV-2 infections that went undetected and unreported and may have contributed to virus transmission. **Competing Interest Statement** John S. Schieffelin: I receive royalties from Walters-Kluwer (publisher of UpToDate). **Funding Statement** This project was supported by generous contributions from our Departmental Chairs at Tulane University. None of the authors received payment for any aspect of this submitted work. **Author Declarations** I confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained. **Yes** The details of the IRB/oversight body that provided approval or exemption for the research described are given below: Tulane University IRB 2020-493 All necessary patient/participant consent has been obtained and the appropriate institutional forms have been archived. **Yes** I understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance). **Yes** I have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable. **Yes** All data can be obtained through corresponding author upon publication

URL: <http://medrxiv.org/content/early/2020/07/08/2020.07.07.20147884.abstract>

DOI: 10.1101/2020.07.07.20147884

20. Ding Y, Yan H, Guo W. Clinical Characteristics of Children With COVID-19: A Meta-Analysis. Front Pediatr. 2020;8:431. DOI: 10.3389/fped.2020.00431

ABSTRACT: Background: With the global spread of novel coronavirus disease 2019 (COVID-19), health care systems are facing formidable challenges. Scientists are conducting studies to explore this new disease, and numerous studies have been shared. However, the number of studies on children with COVID-19 is limited, and no meta-analysis of this group has been performed. **Methods:** A random-effect meta-analysis was conducted to determine the characteristics of children with COVID-19, including their demographic, epidemiological, clinical, laboratory, imaging features, and outcomes. Four databases and reference lists were screened. Percentages were calculated, and pooled prevalence with 95% confidence intervals (CIs) were reported. **Results:** Of 195 studies, 33 were selected, and 14 (371 patients) of them were included in the meta-analysis. Then, 19 case reports (25 patients) were summarized separately. Our meta-analysis revealed that 17.4% (95% CI = 9.1-27.3) of children had asymptomatic infection. Fever (51.2%, 95% CI = 40.2-62.2) and cough (37.0%, 95% CI = 25.9-48.8) were the most frequent symptoms. The prevalence of severe or critical illness was almost 0% (95% CI = 0-1.0). The most frequent abnormal laboratory

findings, in pediatric patients, were leukopenia/lymphopenia (28.9%, 95% CI = 19.5-39.2) and increased creatine kinase (20.1%, 95% CI = 1.3-49.9). Ground-glass opacity was observed in the CT scan of 53.9% (95% CI = 38.4-68.7) of children diagnosed with pneumonia. Conclusions: Children are at a lower risk of developing COVID-19 and have a milder disease than adults. However, the evidence presented in this study is not satisfactory. Further investigations are urgently needed, and our data will be continuously updated.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32719759>

DOI: 10.3389/fped.2020.00431

21. Do LAH, Anderson J, Sutton P, et al. Understanding COVID-19 in children may provide clues to protect at-risk populations. *BMJ Paediatr Open*. 2020;4(1):e000702. DOI: 10.1136/bmjpo-2020-000702

DOI: 10.1136/bmjpo-2020-000702

22. Dona D, Minotti C, Costenaro P, et al. Fecal-oral transmission of SARS-CoV-2 in children: Is it time to change our approach? *Pediatric Infectious Disease Journal*. 2020:E133-E4.

ABSTRACT: Starting from 2 pediatric cases of COVID-19, with confirmation at nasopharyngeal and rectal swabs, we considered the lesson learnt from previous Coronavirus epidemics and reviewed evidence on the current outbreak. Surveillance with rectal swabs might be extended to infants and children, for the implications for household contacts and isolation timing. Copyright © 2020 Wolters Kluwer Health, Inc. All rights reserved.

URL: <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=emexb&AN=632256736>

23. Dub T, Erra E, Hagberg L, et al. Transmission of SARS-CoV-2 following exposure in school settings: experience from two Helsinki area exposure incidents. *medRxiv*. 2020:2020.07.20.20156018. DOI: 10.1101/2020.07.20.20156018

ABSTRACT: Background: The role of children in SARS-CoV-2 transmission is unclear. We investigated two COVID-19 school exposure incidents in the Helsinki area. Methods: We conducted two retrospective cohort studies after schools exposures, with a household transmission extension. We defined a case as an exposed person with either a positive RT-PCR, or positive microneutralisation testing (MNT) as confirmation of SARS-CoV-2 nucleoprotein IgG antibodies detection via fluorescent microsphere immunoassay (FMIA). We recruited close school contacts and families of school cases, calculated attack rates (AR) on school level and families, and identified transmission chains. Findings: In incident A, the index was a pupil. Participation rate was 74% (89/121), and no cases were identified. In incident B, the index was a member of school personnel. Participation rate was 81% (51/63). AR was 16% (8/51): 6 pupils and 1 member of school personnel were MNT and FMIA positive; 1 pupil had a positive RT-PCR, but negative serology samples. We visited all school cases' families (n=8). The AR among close household contacts was 42% (9/20 in 3/8 families) but other plausible sources were always reported. At three months post-exposure, 6/8 school cases were re-sampled and still MNT positive. Interpretation: When the index was a child, no school transmission was identified, while the occurrence of an adult case led to a 16% AR. Further cases were evidenced in 3 families, but other transmission chains were plausible. It is likely that transmission from children to adults is limited. Funding: The Finnish Institute for Health and Welfare funded this study. Competing Interest Statement The authors have declared no competing interest. Funding Statement The Finnish Institute for Health and Welfare funded this study. Author Declarations I confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained. Yes The details of the IRB/oversight body that provided approval or exemption for the research described are given below: The Steering committee of the Infectious Disease Control and Vaccinations of the Department of Health Security (Finnish institute for Health and Welfare) exempted this research from further institutional ethical review. The Finnish communicable diseases law and the law on the duties of the Finnish Institute for Health and Welfare allowed the implementation of this research without seeking further institutional ethical review. All necessary patient/participant consent has been obtained and the appropriate institutional forms have been archived. Yes I understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance). Yes I have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable. Yes Data cannot be transferred or shared

URL: <http://medrxiv.org/content/early/2020/07/30/2020.07.20.20156018.abstract>

DOI: 10.1101/2020.07.20.20156018

24. Dufort EM, Koumans EH, Chow EJ, et al. Multisystem Inflammatory Syndrome in Children in New York State. *N Engl J Med*. 2020;383(4):347-58. DOI: 10.1056/NEJMoa2021756

ABSTRACT: BACKGROUND: A multisystem inflammatory syndrome in children (MIS-C) is associated with coronavirus disease 2019. The New York State Department of Health (NYSDOH) established active, statewide surveillance to describe hospitalized patients with the syndrome. METHODS: Hospitals in New York State reported cases of Kawasaki's disease, toxic shock syndrome, myocarditis, and potential MIS-C in hospitalized patients younger than 21 years of age and sent medical records to the NYSDOH. We carried out descriptive analyses that summarized the clinical presentation, complications, and outcomes of patients who met the NYSDOH case definition for MIS-C between March 1 and May 10, 2020. RESULTS: As of May 10, 2020, a total of 191 potential cases were reported to the NYSDOH. Of 95 patients with confirmed MIS-C (laboratory-confirmed acute or recent severe acute respiratory syndrome coronavirus 2 [SARS-CoV-2] infection) and 4 with suspected MIS-C (met clinical and epidemiologic criteria), 53 (54%) were male; 31 of 78 (40%) were black, and 31 of 85 (36%) were Hispanic. A total of 31 patients (31%) were 0 to 5 years of age, 42 (42%) were 6 to 12 years of age, and 26 (26%) were 13 to 20 years of age. All presented with subjective fever or chills; 97% had tachycardia, 80% had gastrointestinal symptoms, 60% had rash, 56% had conjunctival injection, and 27% had mucosal changes. Elevated levels of C-reactive protein, d-dimer, and troponin were found in 100%, 91%, and 71% of the patients, respectively; 62% received vasopressor support, 53% had evidence of myocarditis, 80% were admitted to an intensive care unit, and 2 died. The median length of hospital stay was 6 days. CONCLUSIONS: The emergence of multisystem inflammatory syndrome in children in New York State coincided with widespread SARS-CoV-2 transmission; this hyperinflammatory syndrome with dermatologic, mucocutaneous, and gastrointestinal manifestations was associated with cardiac dysfunction.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32598830>

DOI: 10.1056/NEJMoa2021756

25. Gaborieau L, Delestrain C, Bensaid P, et al. Epidemiology and Clinical Presentation of Children Hospitalized with SARS-CoV-2 Infection in Suburbs of Paris. J Clin Med. 2020;9(7):14. DOI: 10.3390/jcm9072227

ABSTRACT: Understanding the clinical presentation of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection and prognosis in children is a major issue. Children often present mild symptoms, and some severe forms require paediatric intensive care, with in some cases a fatal prognosis. Our aim was to identify the epidemiological characteristics, clinical presentation, and prognosis of children with coronavirus disease 2019 (Covid-19) hospitalized in Paris suburb hospitals. In this prospective, observational, multicentre study, we included children hospitalized in paediatric departments of Paris suburb hospitals from 23 March 2020 to 10 May 2020, during the national lockdown in France with confirmed SARS-CoV-2 infection (positive RNA test on a nasopharyngeal swab) or highly suspected infection (clinical, biological, and/or radiological data features suggestive for SARS-CoV-2 infection). A total of 192 children were included for confirmed (n = 157) or highly suspected (n = 35) SARS-CoV-2 infection. The median age was one year old (interquartile range 0.125-11) with a sex ratio 1.3:1. Fever was recorded in 147 (76.6%) children and considered poorly tolerated in 29 (15.1%). The symptoms ranged from rhinorrhoea (34.4%) and gastrointestinal (35.5%) to respiratory distress (25%). Only 10 (5.2%) children had anosmia and five (2.6%) had chest pain. An underlying condition was identified in almost 30% of the children in our study. Overall, 24 (12.5%) children were admitted to paediatric intensive care units, 12 required mechanical ventilation, and three died. For children in Paris suburbs, most cases of Covid-19 showed mild or moderate clinical expression. However, one-eighth of children were admitted to paediatric intensive care units and three died.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32674306>

DOI: 10.3390/jcm9072227

26. Garcia-Salido A. SARS-CoV-2 children transmission: The evidence is that today we do not have enough evidence. Acta Paediatrica, International Journal of Paediatrics. 2020.

URL: <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=emexb&AN=2005481863>

27. Goldstein E, Lipsitch M, Cevik M. On the effect of age on the transmission of SARS-CoV-2 in households, schools and the community. medRxiv. 2020;24:24. DOI: 10.1101/2020.07.19.20157362

ABSTRACT: There is limited information on the effect of age on the transmission of SARS-CoV-2 infection in different settings. We undertook a review of published data/studies on detection of SARS-CoV-2 infection in contacts of COVID-19 cases, as well as serological studies, and studies of infections in the school setting to examine those issues. Those sources suggest significantly lower susceptibility to infection for children aged under 10 years compared to adults, for elevated susceptibility to infection in adults aged over 60y, and for the risk of SARS-CoV-2 infection associated with sleeping close to an infected individual. Those sources also suggest that younger adults (particularly those aged under 35y) often have high rates of SARS-CoV-2 infection in the community. Additionally, there is evidence of robust spread of SARS-CoV-2 in high schools, and more limited spread in primary schools. Some countries with relatively large class sizes in primary schools (e.g. Chile and Israel) reported sizeable outbreaks in some of those schools, though the amount of transmission occurring in these schools (vs.

outside) is not clear from current reports. Nonetheless, these reports suggest that classroom crowding and other factors related to social distancing in classrooms/schools may play a role in the spread of SARS-CoV-2 in primary schools. Those findings should have implications for school openings in different age groups of children, and they suggest the need to better protect adults over the age of 60 during the community spread of SARS-CoV-2.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32743609>

DOI: 10.1101/2020.07.19.20157362

28. Gray DJ, Kurscheid J, Mationg ML, et al. Health-education to prevent COVID-19 in schoolchildren: a call to action. *Infect Dis Poverty*. 2020;9(1):81. DOI: 10.1186/s40249-020-00695-2

ABSTRACT: BACKGROUND: There is currently considerable international debate around school closures/openings and the role of children in the transmission of coronavirus disease 2019 (COVID-19). Whilst evidence suggests that children are not impacted by COVID-19 as severely as adults, little is still known about their transmission potential, and with a lot of asymptomatic cases they may be silent transmitters (i.e. infectious without showing clinical signs of disease), albeit at a lower level than adults. In relation to this, it is somewhat concerning that in many countries children are cared for, or are often in close contact with, older individuals such as grandparents horizontal line the age group most at risk of acquiring serious respiratory complications resulting in death. MAIN TEXT: We emphasise that in the absence of a vaccine or an effective therapeutic drug, preventive measures such as good hygiene practices horizontal line hand washing, cough etiquette, disinfection of surfaces and social distancing represent the major (in fact only) weapons that we have against COVID-19. Accordingly, we stress that there is a pressing need to develop specific COVID-19 prevention messages for schoolchildren. CONCLUSION: An entertainment education intervention for schoolchildren systematically implemented in schools would be highly effective and fill this need. With such measures in place there would be greater confidence around the opening of schools.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32611385>

DOI: 10.1186/s40249-020-00695-2

29. Hasan A, Mehmood N, Fergie J. Coronavirus Disease (COVID-19) and Pediatric Patients: A Review of Epidemiology, Symptomatology, Laboratory and Imaging Results to Guide the Development of a Management Algorithm. *Cureus*. 2020;12(3):e7485. DOI: 10.7759/cureus.7485

ABSTRACT: Coronavirus disease (COVID-19) has been declared a worldwide pandemic. Compared to adults, there has been a significantly smaller number of reported cases of COVID-19 in the pediatric population, although the incidence is increasing every day. This article looks to review specific epidemiological factors, symptomatology, laboratory and imaging workup, and other relevant metrics derived from the limited published literature that are specific to the pediatric population, to provide a review for the pediatric practitioner and guide, in part, the creation of a clinical algorithm for the management of COVID-19 in the pediatric population that can be utilized by pediatric institutions.

DOI: 10.7759/cureus.7485

30. Kilicaslan O, Sav NM, Karaca SE, et al. COVID-19 disease in children: Clinical course, diagnosis and treatment overview and literature data compilation. *Konuralp Tip Dergisi*. 2020;12(2):316-25.

ABSTRACT: The novel Coronavirus is named as SARS-CoV-2 is a highly contagious infection agent compared to the previous human coronaviruses. Each previous outbreak had distinctive danger. The high potential of infectiousness is the primary danger of novel coronavirus. While MERS-CoV infection is known to have higher mortality rate, SARS-CoV-2 has spread to many people all over the world in a concise time. SARS-CoV-2 (like SARS-CoV and MERS) infects fewer children and results in milder clinical symptoms than in adults. The primary pathogenesis of it is not known; the difference in children's immunities, less likelihood of exposure to the agent may be the reasons. Nevertheless, along with being mostly asymptomatic, the child population is a potential source for infection spread. Copyright © 2020 Duzce University Medical School. All rights reserved.

URL: <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=emedx&AN=2007113046>

31. Lassandro G, Palladino V, Amoruso A, et al. Children in Coronaviruses' Wonderland: What Clinicians Need to Know. *Mediterranean journal of hematology and infectious diseases*. 2020;12(1):e2020042. DOI: 10.4084/mjhid.2020.042

ABSTRACT: Human coronaviruses (HCoVs) commonly cause mild upper-respiratory tract illnesses but can lead to more severe and diffusive diseases. A variety of signs and symptoms may be present, and infections can range in severity from the common cold and sore throat to more serious laryngeal or tracheal infections, bronchitis, and pneumonia. Among the seven coronaviruses that affect humans (SARS)-CoV, the Middle East respiratory syndrome (MERS)-CoV, and the most recent coronavirus disease 2019 (COVID-19) represent potential life-threatening diseases worldwide. In adults, they may cause severe pneumonia that evolves in respiratory distress syndrome and multiorgan failure with a high mortality rate. Children appear to

be less susceptible to develop severe clinical disease and present usually with mild and aspecific symptoms similar to other respiratory infections typical of childhood. However, some children, such as infants, adolescents, or those with underlying diseases may be more at-risk categories and require greater caution from clinicians. Available data on pediatric coronavirus infections are rare and scattered in the literature. The purpose of this review is to provide to clinicians a complete and updated panel useful to recognize and characterize the broad spectrum of clinical manifestations of coronavirus infections in the pediatric age.

DOI: 10.4084/mjhid.2020.042

32. Lee J, Kim KH, Kang HM, et al. Do We Really Need to Isolate All Children with COVID-19 in Healthcare Facilities? J Korean Med Sci. 2020;35(29):e277. DOI: 10.3346/jkms.2020.35.e277

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32715674>

DOI: 10.3346/jkms.2020.35.e277

33. Lee PY, Day-Lewis M, Henderson LA, et al. Distinct clinical and immunological features of SARS-CoV-2-induced multisystem inflammatory syndrome in children. J Clin Invest. 2020;23:23. DOI: 10.1172/JCI141113

ABSTRACT: BACKGROUND: Pediatric SARS-CoV-2 infection can be complicated by a dangerous hyperinflammatory condition termed multisystem inflammatory syndrome in children (MIS-C). The clinical and immunologic spectrum of MIS-C and its relationship to other inflammatory conditions of childhood have not been studied in detail. METHODS: We retrospectively studied confirmed cases of MIS-C at our institution from March to June 2020. The clinical characteristics, laboratory studies and treatment response were collected. Data were compared with historic cohorts of Kawasaki disease (KD) and macrophage activation syndrome (MAS). RESULTS: Twenty-eight patients fulfilled the case definition of MIS-C. Median age at presentation was 9 years (range 1 month to 17 years); 50% of patients had pre-existing conditions. All patients had laboratory confirmation of SARS-CoV-2 infection. Seventeen patients (61%) required intensive care, including 7 patients (25%) requiring inotrope support. Seven patients (25%) met criteria for complete or incomplete KD and coronary abnormalities were found in 6 cases. Lymphopenia, thrombocytopenia, and elevation in inflammatory markers, D-dimer, B-type natriuretic peptide, IL-6 and IL-10 levels were common but not ubiquitous. Cytopenias distinguished MIS-C from KD and the degree of hyperferritinemia and pattern of cytokine production differed between MIS-C and MAS. Immunomodulatory therapy given to MIS-C patients included IVIG (71%), corticosteroids (61%) and anakinra (18%). Clinical and laboratory improvement were observed in all cases, including 6 cases that did not require immunomodulatory therapy. No mortality was recorded in this cohort. CONCLUSION: MIS-C encompasses a broad phenotypic spectrum with clinical and laboratory features distinct from Kawasaki disease and macrophage activation syndrome. FUNDING: This work was supported by the National Institute of Health / National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS) K08-AR074562 (PYL), K08-AR AR073339 (LAH), R01-AR065538, R01-AR073201 and P30-AR070253 (PAN); National Institute of Allergy and Infectious Diseases 5T32AI007512-34 (JL, JR, TB, AAN and RWN); Rheumatology Research Foundation Investigator Awards (PYL and LAH) and Medical Education Award (JSH); Boston Children's Hospital Faculty Career Development Awards (PYL and LAH), the McCance Family Foundation (JWN), and the Samara Jan Turkel Center (JC, RPS, MBS).

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32701511>

DOI: 10.1172/JCI141113

34. L'Huillier AG, Torriani G, Pigny F, et al. Culture-Competent SARS-CoV-2 in Nasopharynx of Symptomatic Neonates, Children, and Adolescents. Emerg Infect Dis. 2020;26(10). DOI: 10.3201/eid2610.202403

ABSTRACT: Children do not seem to drive transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). We isolated culture-competent virus in vitro from 12 (52%) of 23 SARS-CoV-2-infected children; the youngest was 7 days old. Our findings show that symptomatic neonates, children, and teenagers shed infectious SARS-CoV-2, suggesting that transmission from them is plausible.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32603290>

DOI: 10.3201/eid2610.202403

35. Li X, Xu W, Dozier M, et al. The role of children in transmission of SARS-CoV-2: A rapid review. J Glob Health. 2020;10(1):011101. DOI: 10.7189/jogh.10.011101

ABSTRACT: Background: Understanding the role of children in the transmission of SARS-CoV-2 is urgently required given its policy implications in relation to the reopening of schools and intergenerational contacts. Methods: We conducted a rapid review of studies that investigated the role of children in the transmission of SARS-CoV-2. We synthesized evidence for four categories: 1) studies reporting documented cases of SARS-CoV-2 transmission by infected children; 2) studies presenting indirect evidence on the potential of SARS-CoV-2 transmission by (both symptomatic and asymptomatic) children; 3) studies

reporting cluster outbreaks of COVID-19 in schools; 4) studies estimating the proportions of children infected by SARS-CoV-2, and reported results narratively. Results: A total of 16 unique studies were included for narrative synthesis. There is limited evidence detailing transmission of SARS-CoV-2 from infected children. We found two studies that reported a 3-month-old whose parents developed symptomatic COVID-19 seven days after caring for the infant and two children who may have contracted COVID-19 from the initial cases at a school in New South Wales. In addition, we identified six studies presenting indirect evidence on the potential for SARS-CoV-2 transmission by children, three of which found prolonged virus shedding in stools. There is little data on the transmission of SARS-CoV-2 in schools. We identified only two studies reporting outbreaks of COVID-19 in school settings and one case report of a child attending classes but not infecting any other pupils or staff. Lastly, we identified six studies estimating the proportion of children infected; data from population-based studies in Iceland, Italy, South Korea, Netherlands, California and a hospital-based study in the UK suggest children may be less likely to be infected. Conclusions: Preliminary results from population-based and school-based studies suggest that children may be less frequently infected or infect others, however current evidence is limited. Prolonged faecal shedding observed in studies highlights the potentially increased risk of faeco-oral transmission in children. Further seroprevalence studies (powered adequately for the paediatric population) are urgently required to establish whether children are in fact less likely to be infected compared to adults. Note: We plan to update this rapid review as new data becomes available. These updates are available at <https://www.ed.ac.uk/usher/uncover/completed-uncover-reviews>.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32612817>

DOI: 10.7189/jogh.10.011101

36. Liu E, Smyth RL, Luo Z, et al. Rapid advice guidelines for management of children with COVID-19. *Ann Transl Med.* 2020;8(10):617. DOI: 10.21037/atm-20-3754

DOI: 10.21037/atm-20-3754

37. Liu T, Liang W, Zhong H, et al. Risk factors associated with COVID-19 infection: a retrospective cohort study based on contacts tracing. *Emerg Microbes Infect.* 2020;9(1):1546-53. DOI: 10.1080/22221751.2020.1787799

ABSTRACT: This study aimed to estimate the attack rates, and identify the risk factors of COVID-19 infection. Based on a retrospective cohort study, we investigated 11,580 contacts of COVID-19 cases in Guangdong Province from 10 January to 15 March 2020. All contacts were tested by RT-PCR to detect their infection of SARS-COV-2. Attack rates by characteristics were calculated. Logistic regression was used to estimate the risk factors of infection for COVID-19. A total of 515 of 11,580 contacts were identified to be infected with SARS-COV-2. Compared to young adults aged 20-29 years, the infected risk was higher in children (RR: 2.59, 95%CI: 1.79-3.76), and old people aged 60-69 years (RR: 5.29, 95%CI: 3.76-7.46). Females also had higher infected risk (RR: 1.66, 95%CI: 1.39-2.00). People having close relationship with index cases encountered higher infected risk (RR for spouse: 20.68, 95%CI: 14.28-29.95; RR for non-spouse family members: 9.55, 95%CI: 6.73-13.55; RR for close relatives: 5.90, 95%CI: 4.06-8.59). Moreover, contacts exposed to index case in symptomatic period (RR: 2.15, 95%CI: 1.67-2.79), with critically severe symptoms (RR: 1.61, 95%CI: 1.00-2.57), with symptoms of dizzy (RR: 1.58, 95%CI: 1.08-2.30), myalgia (RR: 1.49, 95%CI: 1.15-1.94), and chill (RR: 1.42, 95%CI: 1.05-1.92) had higher infected risks. Children, old people, females, and family members are susceptible of COVID-19 infection, while index cases in the incubation period had lower contagiousness. Our findings will be helpful for developing targeted prevention and control strategies to combat the worldwide pandemic.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32608325>

DOI: 10.1080/22221751.2020.1787799

38. Liu X, Lv J, Gan L, et al. Comparative analysis of clinical characteristics, imaging and laboratory findings of different age groups with COVID-19. *Indian J Med Microbiol.* 2020;38(1):87-93. DOI: 10.4103/ijmm.IJMM_20_133

ABSTRACT: Objective: This study aims to provide scientific basis for rapid screening and early diagnosis of the coronavirus disease 2019 (COVID-19) through analysing the clinical characteristics and early imaging/laboratory findings of the inpatients. Methods: Three hundred and three patients with laboratory-confirmed COVID-19 from the East Hospital of People's Hospital of Wuhan University (Wuhan, China) were selected and divided into four groups: youth (20-40 years, n = 64), middle-aged (41-60 years, n = 89), older (61-80 years, n = 118) and elderly (81-100 years, n = 32). The clinical characteristics and imaging/laboratory findings including chest computed tomography (CT), initial blood count, C-reactive protein [CRP], procalcitonin (PCT) and serum total IgE were captured and analysed. Results: (1) The first symptoms of all age groups were primarily fever (76%), followed by cough (12%) and dyspnoea (5%). Beside fever, the most common initial symptom of elderly patients was fatigue (13%). (2) Fever was the most common clinical manifestation (80%), with moderate fever being the most common (40%), followed by low fever in patients above 40 years old and high fever in those under 40 years (35%). Cough was the second most common clinical manifestation and was most common (80%) in the middle-aged. Diarrhoea was more common in the middle-aged (21%) and the older (19%). Muscle ache was more common in the middle-aged (15%). Chest pain

was more common in the youth (13%), and 13% of the youth had no symptoms. (3) The proportion of patients with comorbidities increased with age. (4) Seventy-one per cent of the patients had positive reverse transcription-polymerase chain reaction results and 29% had positive chest CT scans before admission to the hospital. (5) Lesions in all lobes of the lung were observed as the main chest CT findings (76%). (6) Decrease in lymphocytes and increase in monocytes were common in the patients over 40 years old but rare in the youth. Eosinophils (50%), red blood cells (39%) and haemoglobin (40%) decreased in all age groups. (7) The proportion of patients with CRP and PCT elevation increased with age. (8) Thirty-nine per cent of the patients had elevated IgE, with the highest proportion in the old (49%). Conclusion: The clinical characteristics and imaging/laboratory findings of COVID-19 patients vary in different age groups. Personalised criteria should be formulated according to different age groups in the early screening and diagnosis stage.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32719214>

DOI: 10.4103/ijmm.IJMM_20_133

39. Long SS. A picture of severe COVID-19 in US children and youth emerges. Journal of Pediatrics. 2020;223:1-5.

ABSTRACT: The reports of Chao et al and DeBiasi et al from the Children's Hospital at Montefiore in New York City (NYC) and Children's National Hospital in Washington, DC (DC) provide their SARS-CoV-2 experience over 4- and 6-week periods, respectively, beginning on March 15, 2020. Although SARS-CoV-2 generally has been said to be a mild infection in the pediatric age group, a picture of severe COVID-19 in US children and youth emerges through these reports. Together, 91 hospitalized patients with 22 critically ill are reported, with demographic and other patient characteristics compared between groups. Hospitalized patients were representative of the Bronx, NYC, and DC communities served, with high proportion of Hispanic/Latinos in NYC and Hispanic/Latinos and African Americans in DC. Obesity (BMI >30kg/m²) was present in 26% of Bronx patients and 2% of DC patients. Although underlying medical conditions were common in hospitalized patients, 37% of hospitalized and 22% of critically ill patients in DC had no underlying condition. Of the combined studies' 22 critically ill patients, 63% were male and 82% were > 10 years of age. PICU admission predominantly was due to respiratory compromise and was associated with briskly elevated inflammatory markers, lung opacities on chest radiograph, and systemic inflammatory response syndrome (SIRS). Both reports show that approximately 20% of COVID-19 hospitalizations were comprised of patients with asthma, but neither shows an excess of asthmatics among the critically ill. Because substantial SARS-CoV-2 testing of symptomatic outpatients was occurring in DC (1804 tests over 6 weeks), we also know that 21% of infected outpatients had asthma. Taken together, there likely is a signal that SARS-CoV-2 may exacerbate asthma but itself is not a major risk factor for the severe COVID-19 pulmonary syndrome. Additionally, from the DC study, we see that although children <1 year and > 15 years of age were over-represented among hospitalized patients with COVID-19, only those > 15 years were overrepresented among the critically ill (Figure). [Formula presented] These 2 reports have limitations of small numbers. Characteristics of COVID-19 in these dense urban populations of special racial/ethnic groups where there is known high transmission of SARS-CoV-2 may not be generalizable to all pediatric and US populations. They provide, however, a sobering reality check that is vital to our current and upcoming considerations of social distancing. Children and youth are susceptible to life-threatening COVID-19. Articles pages and Copyright © 2020

URL: <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=emedx&AN=2007067939>

40. Madewell ZJ, Yang Y, Longini IM, et al. Household transmission of SARS-CoV-2: a systematic review and meta-analysis of secondary attack rate. medRxiv. 2020:2020.07.29.20164590. DOI: 10.1101/2020.07.29.20164590

ABSTRACT: Background: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is spread by direct, indirect, or close contact with infected people via infected respiratory droplets or saliva. Crowded indoor environments with sustained close contact and conversations are a particularly high-risk setting. Methods: We performed a meta-analysis through July 29, 2020 of SARS-CoV-2 household secondary attack rate (SAR), disaggregating by several covariates (contact type, symptom status, adult/child contacts, contact sex, relationship to index case, index case sex, number of contacts in household, coronavirus). Findings: We identified 40 relevant published studies that report household secondary transmission. The estimated overall household SAR was 18.8% (95% confidence interval [CI]: 15.4%-22.2%), which is higher than previously observed SARs for SARS-CoV and MERS-CoV. We observed that household SARs were significantly higher from symptomatic index cases than asymptomatic index cases, to adult contacts than children contacts, to spouses than other family contacts, and in households with one contact than households with three or more contacts. Interpretation: To prevent the spread of SARS-CoV-2, people are being asked to stay at home worldwide. With suspected or confirmed infections referred to isolate at home, household transmission will continue to be a significant source of transmission. Competing Interest Statement The authors have declared no competing interest. Funding Statement This work was supported by the National Institutes of Health R01-AI139761. Author Declarations I confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained. Yes The details of the IRB/oversight body that provided approval or exemption for the research described are given below: Not required. All necessary patient/participant consent has been obtained and the appropriate

institutional forms have been archived. Yes I understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance). Yes I have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable. Yes All relevant data are within the manuscript.

URL: <http://medrxiv.org/content/early/2020/08/01/2020.07.29.20164590.abstract>

DOI: 10.1101/2020.07.29.20164590

41. Melekhina IV, Gorelov AV, Muzyka AD. Clinical characteristics of covid-19 in children of different ages. Literature review as of april 2020. [Russian]. Voprosy Prakticheskoi Pediatrii. 2020;15(2):7-20.

ABSTRACT: This review aims to describe epidemiological and clinical characteristics of COVID-19 in children and identify possible approaches to its therapy. We analyzed articles published in international peer-reviewed journals and official data from China, Germany, and Italy, as well as WHO reports regarding COVID-19 in children for December 2019-March 2020. The new coronavirus (SARS-CoV-2) causes disease in children of all age groups (including newborns), although it is milder than that in adults. This trend was observed during SARS-Cov-1 and MERS outbreaks. Approximately one-third of children have asymptomatic SARS-CoV-2 infection, including cases with pneumonia. Pregnant women have COVID-19 as frequently as non-pregnant women; however, vertical transmission of the virus to the fetus has not yet been confirmed or definitively rejected. We reviewed currently available information on possibilities of COVID-19 therapy in children from different age groups, depending on the disease severity. Despite the fact that most experts agree that children tend to have mild and often asymptomatic disease, there are still many factors suggesting the need for a long-term follow-up of such children, including those who had family contacts with COVID-19 patients. These factors encompass combined organ lesions, possible asymptomatic myocarditis and pneumonia in the early stages, prolonged excretion of virus particles in bodily fluids even after the elimination of the main symptoms, and uncertainty about the outcomes and consequences of the disease. Copyright © 2020, Dynasty Publishing House. All rights reserved.

URL: <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=emedx&AN=632401840>

42. Merckx J, Labrecque JA, Kaufman JS. Transmission of SARS-CoV-2 by Children. Dtsch Arztebl Int. 2020;117(33-34):553-60. DOI: 10.3238/arztebl.2020.0553

ABSTRACT: BACKGROUND: Six months into the COVID-19 pandemic, children appear largely spared from the direct effects of disease, suggesting age as an important predictor of infection and severity. They remain, however, impacted by far-reaching public health interventions. One crucial question often posed is whether children generally transmit SARS-CoV-2 effectively. METHODS: We assessed the components of transmission and the different study designs and considerations necessary for valid assessment of transmission dynamics. We searched for published evidence about transmission of SARS-CoV-2 by children employing a narrative review methodology through 25 June, 2020. RESULTS: Transmission dynamics must be studied in representative pediatric populations with a combination of study designs including rigorous epidemiological studies (e.g. in households, schools, daycares, clinical settings) and laboratory studies while taking into account the social and socio-economic contexts. Viral load (VL) estimates from representative pediatric samples of infected children are missing so far. Currently available evidence suggests that the secondary attack rate stratified by age of the infector is lower for children, however this age pattern needs to be better quantified and understood. CONCLUSION: A generalizable pediatric evidence base is urgently needed to inform policy making now, later when facing potential subsequent waves, and extending through a future in which endemicity alongside vaccination may become the enduring reality.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32705983>

DOI: 10.3238/arztebl.2020.0553

43. Munro APS, Faust SN. Children are not COVID-19 super spreaders: time to go back to school. Archives of Disease in Childhood. 2020;105(7):618. DOI: 10.1136/archdischild-2020-319474

ABSTRACT: Since the first reports of SARS-CoV-2 infections in China, doctors, parents and policy-makers have been aware that COVID-19 is 'not just another respiratory virus' in children. There is a large discrepancy in case rate and prognosis between young children and older adults that has caught everyone by surprise, and for which the mechanisms remain unknown. As community testing has demonstrated a significant number of children with no or subclinical symptoms, 1 key questions needs answering: are there low rates of confirmed infection in children because children are not becoming infected and/or infectious, or is COVID-19 in children usually such a benign upper respiratory illness that does not even cause infants or immune suppressed children to need hospital admission? If children are infected, are they infectious to each other and/or to adults? If so, how long for? The implications of asymptomatic but potentially infectious children in the community are important. If, as for

influenza,2 children are the primary drivers of household SARS-CoV-2 transmission, then silent spread from children who did not alert anyone to their infection could be a serious driver of community transmission. On this presumption but without evidence, school closures were implemented almost ubiquitously around the world to try and halt the potential spread of disease despite early modelling that suggested this would have less impact than most other non-pharmacological interventions.³ Early contact tracing data from Shenzhen, China, appeared to confirm a role for children in transmission. Although apparently presenting with more benign disease or even without symptoms, similar attack rates were found in children and adults in individual households.⁴ However, the story has subsequently evolved. Some regions have implemented widespread community testing, such as South Korea and Iceland. Both countries found children were significantly underrepresented. In Iceland, this is true both in ...

URL: <http://adc.bmj.com/content/105/7/618.abstract>

DOI: 10.1136/archdischild-2020-319474

44. Nakra NA, Blumberg DA, Herrera-Guerra A, et al. Multi-System Inflammatory Syndrome in Children (MIS-C) Following SARS-CoV-2 Infection: Review of Clinical Presentation, Hypothetical Pathogenesis, and Proposed Management. *Children (Basel, Switzerland)*. 2020;7(7). DOI: 10.3390/children7070069

ABSTRACT: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection may result in the multisystem inflammatory syndrome in children (MIS-C). The clinical presentation of MIS-C includes fever, severe illness, and the involvement of two or more organ systems, in combination with laboratory evidence of inflammation and laboratory or epidemiologic evidence of SARS-CoV-2 infection. Some features of MIS-C resemble Kawasaki Disease, toxic shock syndrome, and secondary hemophagocytic lymphohistiocytosis/macrophage activation syndrome. The relationship of MIS-C to SARS-CoV-2 infection suggests that the pathogenesis involves post-infectious immune dysregulation. Patients with MIS-C should ideally be managed in a pediatric intensive care environment since rapid clinical deterioration may occur. Specific immunomodulatory therapy depends on the clinical presentation. The relationship between the immune response to SARS-CoV-2 vaccines in development and MIS-C requires further study.

DOI: 10.3390/children7070069

45. Oba J, Carvalho WB, Silva CA, et al. Gastrointestinal manifestations and nutritional therapy during COVID-19 pandemic: a practical guide for pediatricians. *Einstein (Sao Paulo)*. 2020;18:eRW5774. DOI: 10.31744/einstein_journal/2020rw5774

ABSTRACT: Coronavirus disease 2019 (COVID-19) is a disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which has spread globally in pandemic proportions. Accumulative evidence suggests SARS-CoV-2 can be transmitted through the digestive system, the so-called fecal-oral route of transmission, and may induce several gastrointestinal manifestations. MEDLINE(R) and Embase databases were extensively searched for major clinical manifestations of gastrointestinal involvement in children and adolescents with COVID-19 reported in medical literature, and for nutritional therapy-related data. Findings and recommendations were pragmatically described to facilitate overall pediatric approach. A total of 196 studies addressing gastrointestinal or nutritional aspects associated with the global COVID-19 pandemic were found. Of these, only 17 focused specifically on pediatric patients with regard to aforementioned gastrointestinal or nutritional aspects. Most articles were descriptive and six addressed guidelines, established protocols, or expert opinions. Children and adolescents with gastrointestinal symptoms, such as nausea, vomiting and diarrhea, should be seriously suspected of COVID-19. Gastrointestinal signs and symptoms may occur in 3% to 79% of children, adolescents and adults with COVID-19, and are more common in severe cases. These include diarrhea (2% to 50%), anorexia (40% to 50%), vomiting (4% to 67%), nausea (1% to 30%), abdominal pain (2% to 6%) and gastrointestinal bleeding (4% to 14%). Patients with inflammatory bowel disease or chronic liver disease are not at greater risk of infection by SARS-CoV-2 relative to the general population. Nutritional support plays an important role in treatment of pediatric patients, particularly those with severe or critical forms of the disease. The digestive system may be a potential route of COVID-19 transmission. Further research is needed to determine whether the fecal-oral route may be involved in viral spread. Nutritional therapy is vital to prevent malnutrition and sarcopenia in severe cases.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32667418>

DOI: 10.31744/einstein_journal/2020rw5774

46. Perez Gaxiola G, Flores Rocha R, Valadez Vidarte JC, et al. Clinical and epidemiological characteristics of children with SARS-CoV-2 infection: case series in Sinaloa. *medRxiv*. 2020:2020.07.07.20146332. DOI: 10.1101/2020.07.07.20146332

ABSTRACT: Background: The SARS-CoV-2 virus may affect both adults and children. Although the disease, named COVID-19, has a lower prevalence in infancy and has been described as mild, the clinical characteristics may vary and there is a possibility

of complications. Objectives: To describe the clinical and epidemiological characteristics of pediatric cases confirmed in the state of Sinaloa, Mexico, during the first three months of the pandemic, and of children admitted with COVID-19 to a secondary hospital. Methods: This case series includes all patients with SARS-CoV-2 infection confirmed by PCR testing, identified in the state epidemiological surveillance system between March 1 and May 31, 2020. Confirmed patients admitted to the Sinaloa Pediatric Hospital (HPS) during the same dates are also described. Results: Fifty one children with SARS-CoV-2 were included, 10 of the admitted to HPS. The median age was 10 years. The more frequent symptoms were fever (78%), cough (67%) and headache (57%). Most cases were mild or asymptomatic. Three patients with comorbidities died. Only 4 of 10 patients identified in HPS had been admitted with the diagnosis of possible COVID-19. Conclusions: SARS-CoV-2 infection in children was mostly mild or asymptomatic, but with a wide range of clinical presentations. Competing Interest Statement The authors have declared no competing interest. Funding Statement Did not receive funding. Author Declarations I confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained. Yes The details of the IRB/oversight body that provided approval or exemption for the research described are given below: Approved by IRB of Sinaloa Pediatric Hospital. All necessary patient/participant consent has been obtained and the appropriate institutional forms have been archived. Yes I understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance). Yes I have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable. Yes Available per request.

URL: <http://medrxiv.org/content/early/2020/07/11/2020.07.07.20146332.abstract>

DOI: 10.1101/2020.07.07.20146332

47. Qian G, Zhang Y, Xu Y, et al. Reduced inflammatory responses to SARS-CoV-2 infection in children presenting to hospital with COVID19 in China. medRxiv. 2020:2020.07.02.20145110. DOI: 10.1101/2020.07.02.20145110

ABSTRACT: Background Infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in children is associated with better outcomes than in adults. The inflammatory response to COVID-19 infection in children remains poorly characterised. Methods We retrospectively analysed the medical records of 127 laboratory-confirmed COVID-19 patients aged 1 month to 16 years from Wuhan and Jingzhou of Hubei Province. Patients presented between January 25th and March 24th 2020. Information on clinical features, laboratory results, plasma cytokines/chemokines and lymphocyte subsets were analysed. Findings Children admitted to hospital with COVID-19 were more likely to be male (67.7%) and the median age was 7.3 [IQR 4.9] years. All but one patient with severe disease was aged under 2 and the majority (5/7) had significant co-morbidities. Despite 53% having viral pneumonia on CT scanning only 2 patients had low lymphocyte counts and no differences were observed in the levels of plasma proinflammatory cytokines, including interleukin (IL)-2, IL-4, IL-6, tumour necrosis factor (TNF)-alpha; and interferon (IFN)-gamma; between patients with mild, moderate or severe disease. Interpretations We demonstrated that the immune responses of children to COVID-19 infection is significantly different from that seen in adults. Our evidence suggests that SARS-CoV-2 does not trigger a robust inflammatory response or “cytokine storm” in children with COVID-19, and this may underlie the generally better outcomes seen in children with this disease. These data also imply anti-cytokine therapies may not be effective in children with moderate COVID-19. Competing Interest Statement The authors have declared no competing interest. Funding Statement This study was funded by the National Natural Foundation of China (No. 81970653). Author Declarations I confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained. Yes The details of the IRB/oversight body that provided approval or exemption for the research described are given below: This study was conducted in accordance with the Declaration of Helsinki and was reviewed and approved by the Medical Ethical Committees (2020-R120). All necessary patient/participant consent has been obtained and the appropriate institutional forms have been archived. Yes I understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance). Yes I have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable. Yes Please send email to Professor Jin Mei, E-mail: tibetcn@aliyun.com

URL: <http://medrxiv.org/content/early/2020/07/04/2020.07.02.20145110.abstract>

DOI: 10.1101/2020.07.02.20145110

48. Raissaki M, Shelmerdine SC, Damasio MB, et al. Management strategies for children with COVID-19: ESPR practical recommendations. *Pediatr Radiol.* 2020;50(9):1313-23. DOI: 10.1007/s00247-020-04749-3

ABSTRACT: During the outbreak of the COVID-19 pandemic, guidelines have been issued by international, national and local authorities to address management and the need for preparedness. Children with COVID-19 differ from adults in that they are less often and less severely affected. Additional precautions required in the management of children address their increased radiosensitivity, need for accompanying carers, and methods for dealing with children in a mixed adult-paediatric institution. In this guidance document, our aim is to define a pragmatic strategy for imaging children with an emphasis on proven or suspected COVID-19 cases. Children suspected of COVID-19 should not be imaged routinely. Imaging should be performed only when expected to alter patient management, depending on symptoms, preexisting conditions and clinical evolution. In order to prevent disease transmission, it is important to manage the inpatient caseload effectively by triaging children and carers outside the hospital, re-scheduling nonurgent elective procedures and managing symptomatic children and carers as COVID-19 positive until proven otherwise. Within the imaging department one should consider conducting portable examinations with COVID-19 machines or arranging dedicated COVID-19 paediatric imaging sessions and performing routine nasopharyngeal swab testing before imaging under general anaesthesia. Finally, regular personal hygiene, appropriate usage of personal protective equipment, awareness of which procedures are considered aerosol generating and information on how to best disinfect imaging machinery after examinations should be highlighted to all staff members.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32621013>

DOI: 10.1007/s00247-020-04749-3

49. Rajapakse N, Dixit D. Human and novel coronavirus infections in children: a review. Paediatr Int Child Health. 2020;1-20. DOI: 10.1080/20469047.2020.1781356

ABSTRACT: Coronaviruses, seven of which are known to infect humans, can cause a spectrum of clinical presentations ranging from asymptomatic infection to severe illness and death. Four human coronaviruses (hCoVs)-229E, HKU1, NL63 and OC43-circulate globally, commonly infect children and typically cause mild upper respiratory tract infections. Three novel coronaviruses of zoonotic origin have emerged during the past two decades: severe acute respiratory syndrome coronavirus (SARS-CoV-1), Middle East respiratory syndrome coronavirus (MERS-CoV) and the recently discovered severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) which is the cause of the ongoing coronavirus disease 2019 (COVID-19) pandemic. These novel coronaviruses are known to cause severe illness and death predominantly in older adults and those with underlying comorbidities. Consistent with what has been observed during the outbreaks of SARS and MERS, children with COVID-19 are more likely to be asymptomatic or to have mild-to-moderate illness, with few deaths reported in children globally thus far. Clinical symptoms and laboratory and radiological abnormalities in children have been similar to those reported in adults but are generally less severe. A rare multisystem inflammatory syndrome in children (MIS-C) which has resulted in critical illness and some deaths has recently been described. Clinical trials for therapeutics and vaccine development should include paediatric considerations. Children may play an important role in the transmission of infection and outbreak dynamics and could be a key target population for effective measures to control outbreaks. The unintended consequences of the unprecedented scale and duration of pandemic control measures for children and families around the world should be carefully examined. ABBREVIATIONS: 2019-nCoV, 2019 novel coronavirus; ADEM, acute demyelinating encephalomyelitis; AAP, American Academy of Pediatrics; ACE-2, angiotensin-converting enzyme 2; ARDS, acute respiratory distress syndrome; BCG, bacillus Calmette-Guerin; BNP, brain natriuretic peptide; CDC, Centers for Disease Control and Prevention; CRP, C-reactive protein; CSF, cerebrospinal fluid; COVID-19, coronavirus disease 2019; CT, computed tomography; CXR, chest X-ray; DOL, day of life; hCoV, human coronavirus; ICU, intensive care unit; IL, interleukin; IVIG, intravenous immunoglobulin; KD, Kawasaki disease; LDH, lactate dehydrogenase; MERS, Middle East respiratory syndrome; MERS-CoV, Middle East respiratory syndrome coronavirus; MEURI, monitored emergency use of unregistered and experimental interventions; MIS-C, multi-system inflammatory syndrome in children; PCR, polymerase chain reaction; PICU, paediatric intensive care unit; RNA, ribonucleic acid; RCT, randomised-controlled trial; RSV, respiratory syncytial virus; SARS, severe acute respiratory syndrome; SARS-CoV-1, severe acute respiratory syndrome coronavirus 1; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2; TNF-alpha, tumour necrosis factor alpha; UK United Kingdom; UNICEF, United Nations Children's Fund; USA, United States of America; WHO, World Health Organization.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32584199>

DOI: 10.1080/20469047.2020.1781356

50. Rowley AH. Understanding SARS-CoV-2-related multisystem inflammatory syndrome in children. Nat Rev Immunol. 2020;20(8):453-4. DOI: 10.1038/s41577-020-0367-5

ABSTRACT: A new multisystem inflammatory syndrome apparently related to infection with SARS-CoV-2 has recently been reported in older children (known as MIS-C), manifested by severe abdominal pain, cardiac dysfunction and shock. Here, I discuss the similarities and differences between MIS-C and Kawasaki disease, focusing on their epidemiology, aetiology and pathophysiological mechanisms.

In this Comment, Anne Rowley discusses what we know so far about the recently described multisystem inflammatory syndrome in older children associated with SARS-CoV-2 infection and how it differs from Kawasaki disease.

eng Provisional Patent 62/811,930 on Antibodies and Antigens of Kawasaki disease.

DOI: 10.1038/s41577-020-0367-5

51. Sabbour MA, El-Swaify ST, Farrag N, et al. Multisystem inflammatory syndrome in children (MIS-C) temporally associated with SARS-CoV-2 infection: a scoping review of the literature. medRxiv. 2020:2020.08.03.20167361. DOI: 10.1101/2020.08.03.20167361

ABSTRACT: Background: With the rise of the COVID-19 pandemic, a new severe life-threatening inflammatory syndrome has been reported in some pediatric populations. Global attention was shifted towards the syndrome termed multisystem inflammatory syndrome in children (MIS-C), with new case reports flooding in. Objectives: The aim of this scoping review is to summarize the existing reports on MIS-C and focus on the demographics, diagnosis, clinical presentation, laboratory investigations, imaging studies, treatment, and patient outcomes. Methods: We conducted a systemic search using LitCovid and MEDLINE electronic databases. We screened citations, titles and abstracts, then reviewed potentially relevant articles in full. After data extraction, we reported our final data under subheadings of demographics, diagnosis, clinical presentation, laboratory investigations, imaging studies, treatment, and patient outcomes. Results: Our search strategy yielded 42 original studies reporting 674 pediatric patients fitting the case definition of MIS-C. The studies included 21 case reports, 16 case series and 5 cohort studies. The most common reported symptom of MIS-C was fever (98%). Gastrointestinal symptoms were common (N=557, 83%). Interleukin-6 (IL-6) levels were measured in 125 patients and was elevated in 94 % (N=117). Echocardiography detected coronary artery lesions in 100 patients. Prophylactic and/or therapeutic heparin was required in 34% (N=227) of patients. The most commonly administered treatment modality targeting MIS-C was intravenous immunoglobulin (IVIG) (N=490). Corticosteroids (N=347) and aspirin (N=112) were also integral parts of the treatment regimens. Biologic therapy was integrated into the treatment regimen for 116 patients. Intensive care unit (ICU) admission was alarming (N=478, 71%). 9 fatalities were recorded due to MIS-C Conclusions: We believe MIS-C bears pathophysiological resemblance to the well-known Kawasaki disease but with some key differences highlighted. Understanding those differences will aid our management plan for such patients. Competing Interest Statement The authors have declared no competing interest. Funding Statement No funding received Author Declarations I confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained. Yes The details of the IRB/oversight body that provided approval or exemption for the research described are given below: Each individual study followed was approved by an ethical committee separately All necessary patient/participant consent has been obtained and the appropriate institutional forms have been archived. Yes I understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance). Yes I have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable. Yes All data are fully available

URL: <http://medrxiv.org/content/early/2020/08/04/2020.08.03.20167361.abstract>

DOI: 10.1101/2020.08.03.20167361

52. Saleem H, Rahman J, Aslam N, et al. Coronavirus Disease 2019 (COVID-19) in Children: Vulnerable or Spared? A Systematic Review. Cureus. 2020;12(5):e8207. DOI: 10.7759/cureus.8207

ABSTRACT: The ongoing pandemic of coronavirus disease 2019 (COVID-19) has affected people from all cultures, religions, gender, and age groups around the world. In the last few months, several studies have been conducted on various aspects of COVID-19. Our goal was to see if the pediatric population is vulnerable to this infection. In this review, we conducted extensive research mainly by using the PubMed database. We used Medical Subject Headings (MeSH) and associated keywords to engage in an extensive search focussing on COVID-19 in the pediatric population. We discovered that most of the studies were from China, and some of them were in the Chinese language. However, English translations of many of the studies were available. For accessing the relevant statistical data, we relied on the World Health Organization (WHO) resources and the official website of the Ontario Government (ontario.ca). Most of the studies showed that the virus has affected the pediatric population. However, we found some differences among these studies regarding the severity of symptoms in children affected by COVID-19. While a few studies stated that the virus has presented with milder symptoms in the pediatric population, some studies have presented data of children who have suffered life-threatening complications due to COVID-19. Although the data is limited, we have been able to conclude from the studies we reviewed that COVID-19 does indeed affect children the same way as any other age group. Moreover, children can act as carriers of the virus and can endanger the lives of other individuals. Besides, neonates and infants can easily acquire the infection from family members without having any exposure to the outside

world. Hence, utmost care should be taken while handling this population. More trials and studies should be conducted to analyze the impact of early diagnosis of infection in children and its management.

DOI: 10.7759/cureus.8207

53. Sarangi B, Reddy VS, Oswal JS, et al. Epidemiological and Clinical Characteristics of COVID-19 in Indian Children in the Initial Phase of the Pandemic. Indian Pediatr. 2020;28:28.

ABSTRACT: OBJECTIVE: To assess the epidemiological and clinical characteristics of pediatric inpatients with COVID-19, early in the pandemic. METHODS: Clinical and laboratory profile and outcomes were studied for children (aged 1 month - 18 years) presenting between 1 April, 2020 and 20 May, 2020 with positive nasopharyngeal swab for SARS-CoV-2 by RT-PCR. RESULTS: 50 children (56% male) with median (IQR) age of 6 (2-12) years were included. Majority (56%) were from families belonging to Kuppaswamy upper lower socioeconomic class. 45 (90%) had positive household contact, and 33 (66%) had overcrowding at home. 29 (58%) children were asymptomatic while 20 (40%) had mild symptoms. Fever, cough, and sore throat were the most common symptoms. High C-reactive protein levels were seen in 15 (30%) children. There was no mortality. CONCLUSION: The disease burden appears high in lower socio-economic group with majority having a positive household contact. Milder disease pattern in the pediatric age group is reiterated.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32729850>

54. Shulman ST. Pediatric Coronavirus Disease-2019-Associated Multisystem Inflammatory Syndrome. J Pediatric Infect Dis Soc. 2020;9(3):285-6. DOI: 10.1093/jpids/piaa062

DOI: 10.1093/jpids/piaa062

55. Sun D, Zhu F, Wang C, et al. Children Infected With SARS-CoV-2 From Family Clusters. Front Pediatr. 2020;8:386.

DOI: 10.3389/fped.2020.00386

ABSTRACT: Background: The outbreak of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is ongoing globally. Limited data are available for children with SARS-CoV-2 infection. Methods: A retrospective case study was conducted in one designated hospital for children with SARS-CoV-2 infection in Wuhan. Results: Out of the 74 children with laboratory-confirmed SARS-CoV-2 infection, the median age was 5.8 years, with no notable variation based on gender. All of the children had had direct exposure to at least one family member with confirmed SARS-CoV-2 infection. The most common symptoms were cough in 41 (55.4%) and fever in 38 (51.4%). Typical CT patterns of viral pneumonia were exhibited in 40 (54.1%) children, including ground-glass opacity and interstitial abnormalities. However, 17 (23.0%) children were classified as asymptomatic carriers, with neither symptoms nor radiological findings. Also, 68 (91.9%) children recovered fully and showed negative results on RT-PCR assay by nasopharyngeal swabs during our observation period. In contrast to the negative result for nasopharyngeal swab, 34% of the anal swabs showed a continued positive result. The mean hospitalization days of the children discharged after full recovery was 10.0 days. Conclusion: Within family clusters that had SARS-CoV-2 infection, children had mild or even asymptomatic illness. Although CT is highly sensitive, it should be avoided in follow-up of the disease in consideration of the radiological hazards and limited clinical benefits for mild illness in children. Furthermore, it is advocated that both nasopharyngeal and anal swabs should be confirmed negative for viral load prior to declaring full recovery so as to avoid oral-fecal transmission. Asymptomatic children with family clusters are potentially a little-known source of COVID-19. This therefore warrants an urgent reassessment of the transmission dynamics of the current outbreak.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32656172>

DOI: 10.3389/fped.2020.00386

56. Swann OV, Holden KA, Turtle L, et al. Clinical characteristics of children and young people hospitalised with covid-19 in the United Kingdom: prospective multicentre observational cohort study. medRxiv. 2020:2020.07.14.20153320.

DOI: 10.1101/2020.07.14.20153320

ABSTRACT: Objective To characterise the clinical features of children and young people admitted to hospital with laboratory-confirmed severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection in the UK, and explore factors associated with admission to critical care, mortality, and development of multisystem inflammatory syndrome in children and adolescents temporarily related to covid-19 (MIS-C). Design Prospective observational cohort study with rapid data gathering and near real time analysis. Setting 260 acute care hospitals in England, Wales, and Scotland between 17th January and 5th June 2020, with a minimal follow-up time of two weeks (to 19th June 2020). Participants 451 children and young people aged less than 19 years admitted to 116 hospitals and enrolled into the International Severe Acute Respiratory and emergency Infections Consortium (ISARIC) WHO Clinical Characterisation Protocol UK study with laboratory-confirmed SARS-CoV-2. Main Outcome Measures Admission to critical care (high dependency or intensive care), in-hospital mortality, or meeting the WHO preliminary case definition for MIS-C. Results Median age was 3.9 years [interquartile range (IQR) 0.3-12.9 years], 36% (162/451) were under 12

months old, and 57% (256/450) were male. 56% (224/401) were White, 12% (49/401) South Asian and 10% (40/401) Black. 43% (195/451) had at least one recorded comorbidity. A muco-enteric cluster of symptoms was identified, closely mirroring the WHO MIS-C criteria. 17% of children (72/431) were admitted to critical care. On multivariable analysis this was associated with age under one month odds ratio 5.05 (95% confidence interval 1.69 to 15.72, $p=0.004$), age 10 to 14 years OR 3.11 (1.21 to 8.55, $p=0.022$) and Black ethnicity OR 3.02 (1.30 to 6.84, $p=0.008$). Three young people died (0.7%, 3/451) aged 16 to 19 years, all of whom had profound comorbidity. Twelve percent of children (36/303) met the WHO MIS-C criteria, with the first patient developing symptoms in mid-March. Those meeting MIS-C criteria were older, (median age 10.8 years ([IQR 8.4-14.1] vs 2.0 [0.2-12.6]), $p<0.001$) and more likely to be of non-White ethnicity (70% (23/33) vs 43% (101/237), $p=0.005$). Children with MIS-C were four times more likely to be admitted to critical care (61% (22/36) vs 15% (40/267), $p<0.001$). In addition to the WHO criteria, children with MIS-C were more likely to present with headache (45% (13/29) vs 11% (19/171), $p<0.001$), myalgia (39% (11/28) vs 7% (12/170), $p<0.001$), sore throat (37% (10/27) vs 13% (24/183), $p=0.004$) and fatigue (57% (17/30) vs 31% (60/192), $p=0.012$) than children who did not and to have a platelet count of less than $150 \times 10^9/L$ (30% (10/33) vs 10% (24/232), $p=0.004$). Conclusions Our data confirms less severe covid-19 in children and young people than in adults and we provide additional evidence for refining the MIS-C case definition. The identification of a muco-enteric symptom cluster also raises the suggestion that MIS-C is the severe end of a spectrum of disease. Study registration [ISRCTN66726260](https://www.isaric4c.net/protocols/FundingStatement) Competing Interest Statement All authors have completed the ICMJE uniform disclosure form at www.icmje.org/coi_disclosure.pdf and declare: JSN-V-T reports grants from Department of Health and Social Care, England, during the conduct of the study; PWH reports grants from Wellcome Trust / Department for International Development / Bill and Melinda Gates Foundation, grants from NIHR, during the conduct of the study; PJMO reports personal fees from Consultancy, grants from MRC, grants from EU Grant, grants from NIHR Biomedical Research Centre, grants from MRC/GSK, grants from Wellcome Trust, grants from NIHR (HPRU), grants from NIHR Senior Investigator, personal fees from European Respiratory Society, grants from MRC Global Challenge Research Fund, outside the submitted work; and The role of President of the British Society for Immunology was an unpaid appointment but my travel and accommodation at some meetings is provided by the Society; AMD reports grants from Department of Health and Social Care, during the conduct of the study; grants from Wellcome Trust, outside the submitted work; JKB reports grants from DHSC National Institute of Health Research UK, grants from Medical Research Council UK, grants from Wellcome Trust, grants from Fiona Elizabeth Agnew Trust, grants from Intensive Care Society, grants from Chief Scientist Office, during the conduct of the study; MGS reports grants from DHSC National Institute of Health Research UK, grants from Medical Research Council UK, grants from Health Protection Research Unit in Emerging & Zoonotic Infections, University of Liverpool, during the conduct of the study; other from Integrum Scientific LLC, Greensboro, NC, USA, outside the submitted work; the remaining authors declare no competing interests; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; and no other relationships or activities that could appear to have influenced the submitted work.

Clinical Trial [ISRCTN66726260](https://www.isaric4c.net/protocols/FundingStatement) Clinical Protocol <https://www.isaric4c.net/protocols/FundingStatement> This work is supported by grants from: the National Institute for Health Research [award CO-CIN-01], the Medical Research Council [grant MC_PC_19059] and by the National Institute for Health Research Health Protection Research Unit (NIHR HPRU) in Emerging and Zoonotic Infections at University of Liverpool in partnership with Public Health England (PHE), in collaboration with Liverpool School of Tropical Medicine and the University of Oxford [NIHR award 200907], Wellcome Trust and Department for International Development [215091/Z/18/Z], and the Bill and Melinda Gates Foundation [OPP1209135], and Liverpool Experimental Cancer Medicine Centre for providing infrastructure support for this research (Grant Reference: C18616/A25153). JSN-V-T is seconded to the Department of Health and Social Care, England (DHSC). The views expressed are those of the authors and not necessarily those of the DHSC, NIHR, MRC, Wellcome Trust or PHE.

Author Declarations I confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained. Yes The details of the IRB/oversight body that provided approval or exemption for the research described are given below: Ethical approval was given by the South Central - Oxford C Research Ethics Committee in England (Ref 13/SC/0149), the Scotland A Research Ethics Committee (Ref 20/SS/0028), and the WHO Ethics Review Committee (RPC571 and RPC572, 25 April 2013). All necessary patient/participant consent has been obtained and the appropriate institutional forms have been archived. Yes I understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance). Yes I have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable. Yes We welcome applications for data and material access through our Independent Data and Material Access Committee (<https://www.isaric4c.net>). The lead author (the manuscript's guarantor) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any

discrepancies from the study as planned (and, if relevant, registered) have been explained.

https://isarc4c.nethttps://isarc4c.net/sample_access

URL: <http://medrxiv.org/content/early/2020/07/17/2020.07.14.20153320.abstract>

DOI: 10.1101/2020.07.14.20153320

57. Torres JP, Pinera C, De La Maza V, et al. SARS-CoV-2 antibody prevalence in blood in a large school community subject to a Covid-19 outbreak: a cross-sectional study. Clin Infect Dis. 2020;10:10. DOI: 10.1093/cid/ciaa955

ABSTRACT: BACKGROUND: A SARS-CoV-2 outbreak affecting 52 people from a large school community in Santiago, Chile was identified (March 12), nine days after the first country case. We assessed the magnitude of the outbreak and the role students and staff played using a self-administered antibody detection test and survey. METHODS: The school was closed on March 13, and the entire community was placed under quarantine. We implemented a home-delivery, self-administered, IgG/IgM antibody test and survey to a classroom stratified sample of students and all staff from May 4-19. We aimed to determine overall seroprevalence rates by age group, reported symptoms, contact exposure and to explore dynamics of transmission. RESULTS: Antibody positivity rates were 9.9% (95%CI: 8.2-11.8) for 1,009 students and 16.6% (95%CI: 12.1-21.9) for 235 staff. Among students, positivity was associated with younger age (P=0.01), lower grade level (P=0.05), prior RT-PCR positivity (P=0.03), and history of contact with a confirmed case (P<0.001). Among staff, positivity was higher in teachers (P=0.01) and in those previously RT-PCR positive (P<0.001). Excluding RT-PCR positive individuals, antibody positivity was associated with fever in adults and children (P=0.02; P=0.002), abdominal pain in children (P=0.001), and chest pain in adults (P=0.02). Within antibody positive individuals, 40% of students and 18% of staff reported no symptoms (P=0.01). CONCLUSIONS: Teachers were more affected during the outbreak and younger children were at higher infection risk, likely because index case(s) were teachers and/or parents from preschool. Self-administered antibody testing, supervised remotely, proved to be a suitable and rapid tool. Our study provides useful information for school re-openings.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32649743>

DOI: 10.1093/cid/ciaa955

58. Tung Ho CL, Oligbu P, Ojbolamo O, et al. Clinical Characteristics of Children with COVID-19. AIMS Public Health. 2020;7(2):258-73. DOI: 10.3934/publichealth.2020022

ABSTRACT: Background: In December 2019, the infection caused by 2019 novel coronavirus (COVID-19) led to an outbreak in Wuhan, situated in the Hubei Province of China. Following this, there has been a rapid increase in the number of cases. On 12th March 2020, there were over 100,000 confirmed cases and almost 4,300 deaths worldwide. The clinical profile of children with COVID-19 is unknown due to the few number of cases reported. Currently, available data suggest they may have a milder form of illness. Methods: A review of the literature published from June 2019 to March 2020 was undertaken to evaluate the clinical presentation, management and outcomes of COVID-19 in children. Data sources included EMBASE, MEDLINE, Cochrane library, ISI Web of Knowledge and references within identified articles. Results: We identified 303 potential studies, and 295 were excluded for reasons including duplicates, experimental studies and case reports. Eight studies were eligible for inclusion, including a total of 820 paediatric cases of COVID-19. Asymptomatic cases represented 14.3% (n = 117) of the total number of cases identified, and thus the remaining 85.7% (n = 703) experienced symptoms. Fever was the commonest symptom in 53.9% (n = 48) of cases, followed by cough in 39.3% (n = 35) of cases, and rhinorrhoea or pharyngeal congestion in 13.5% (n = 12) of cases. Diarrhoea and sore throats were less common symptoms, 7.9% (n = 7) and 9.0% (n = 8) respectively. Other symptoms, including fatigue, headache and dizziness were rare. Conclusion: Children are disproportionately affected by COVID-19 and are more likely to run a milder cause of illness following this infection compared to adults. This outbreak only started 3 months ago, therefore, further population wide studies are needed to validate these findings.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32617354>

DOI: 10.3934/publichealth.2020022

59. Vieira RSR, Aguiar ELd, Evangelista NMdA, et al. Clinical Characteristics in Children and Adolescents with SARS-CoV-2 Infection: Experience in a highly complex Public Hospital in the city of Sao Paulo. medRxiv. 2020:2020.06.22.20136994. DOI: 10.1101/2020.06.22.20136994

ABSTRACT: Objective: Faced with the SARS-CoV-2 epidemic, the real impact of the disease on children and adolescents and the behavior of the disease in this population are questioned. This study aims to assess the clinical characteristics of children and adolescents with SARS-CoV-2 infection and the effectiveness of the measures adopted at the institution. Methods: This is a prospective study carried out from 11/04/2020 to 19/06/2020. Investigated 346 patients between zero and eighteen years old, with analysis of patients diagnosed with COVID-19 confirmed by RT-PCR, obtained from a nasopharynx and oropharynx swab, attended at a highly complex public pediatric hospital in the city of Sao Paulo. Protocols for clinical management and treatment of cases of SARS-CoV-2 infection were adopted during the assistance and implementation of a preoperative

screening protocol. They were evaluated according to sex, age, epidemiology, presence of comorbidities, clinical manifestations, therapy used, need for hospitalization in the ward and ICU, use of mechanical ventilation (MV) and evolution. Results: 66 confirmed patients with COVID 19 were identified. Median age was 7 years old, with the male gender predominant (2:1). 27 patients (40.9%) had contact with symptomatic respiratory individuals, comorbidity occurred in 50 cases (75.8%). Main clinical manifestations were: fever, 37 patients (56.1%); cough, 23 (34.8%); respiratory distress in 10 (15.2%) and gastrointestinal symptoms in 24 (36.4%). 38 patients (57.6%) received antibiotics and 13 (19.7%) received corticotherapy. 37 patients (56.1%) required hospitalization, eight (19.5%) in the ICU and six (75%) requiring MV. One death occurred and others with good evolution. Conclusion: This study corroborates the perception that the pediatric patient has a more benign manifestation, even in the presence of comorbidities, requiring the screening of surgical patients. The protocol adopted by the institution proved to be effective, with no contamination being observed among patients or between patients and collaborators. Keywords: Coronavirus Infections, Study Characteristics, Pediatric Competing Interest Statement The authors have declared no competing interest. Funding Statement Self funding. Author Declarations I confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained. Yes The details of the IRB/oversight body that provided approval or exemption for the research described are given below: Every ethical aspects were followed by its own ethical committee's Darcy Vargas Children Hospital. All necessary patient/participant consent has been obtained and the appropriate institutional forms have been archived. Yes I understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance). Yes I have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable. Yes All data can be obtained in Hospital Infantil Darcy Vargas at Sao Paulo, Brazil.

URL: <http://medrxiv.org/content/early/2020/07/19/2020.06.22.20136994.abstract>

DOI: 10.1101/2020.06.22.20136994

60. Wati DK, Manggala AK. Overview of Management of Children with COVID-19. Clin Exp Pediatr. 2020;17:17. DOI: 10.3345/cep.2020.00913

ABSTRACT: The widespread and contagious coronavirus disease (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 has become a burden in the global health domain. The subsequent discovery of the virus features and pathogenesis, and prompt and adequate management are still lacking and remain inconclusive. Children usually present milder symptoms than adults, and management focuses on providing symptomatic and respiratory supports. Several treatment modalities, including the utilization of mechanical ventilation, antivirals, immune-modulating drugs, or other agents, may present promising results in reducing the symptoms of COVID-19, particularly in severe cases. Although no randomized clinical trials have been published to date, it is interesting to explore potential modalities for treating COVID-19 in children, based on review articles, case reports, and recent guidelines.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32683801>

DOI: 10.3345/cep.2020.00913

61. Wilmont S, Neu N, Hill-Ricciuti A, et al. Active Surveillance for Acute Respiratory Infections among Pediatric Long-Term Care Facility Staff. American journal of infection control. 2020;25.

ABSTRACT: BACKGROUND: Transmission of respiratory viruses between staff and residents of pediatric long-term care facilities (pLTCFs) can occur. We assessed the feasibility of using text or email messages to perform surveillance for acute respiratory infections (ARIs) among staff. METHOD(S): From December 7, 2016 to May 7, 2017, 50 staff participants from two pLTCFs received weekly text or email requests to report the presence or absence of ARI symptoms. Those who fulfilled the ARI case definition (≥ 2 symptoms) had respiratory specimens collected to detect viruses by reverse transcriptase polymerase chain reaction assays. Pre- and post-surveillance respiratory specimens were collected to assess subclinical viral shedding. RESULT(S): The response rate to weekly electronic messages was 93%. Twenty-one ARIs reported from 20 (40%) participants fulfilled the case definition. Respiratory viruses were detected in 29% (5/17) of specimens collected at symptom onset (influenza B, respiratory syncytial virus, coronavirus [CoV] 229E, rhinovirus [RV], and dual detection of CoV OC43 and bocavirus). Four participants had positive pre-surveillance (4 RV), and six had positive post-surveillance specimens (3 RV, 2 CoV NL63 and 1 adenovirus). CONCLUSION(S): Electronic messaging to conduct ARI surveillance among pLTCF staff was feasible. Copyright © 2020. Published by Elsevier Inc.

URL: <http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=emexb&AN=632221199>

62. Xu H, Liu E, Xie J, et al. A follow-up study of children infected with SARS-CoV-2 from western China. *Ann Transl Med.* 2020;8(10):623. DOI: 10.21037/atm-20-3192

ABSTRACT: BACKGROUND: To clarify the characteristic and the duration of positive nucleic acid in children infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), including asymptomatic children. METHODS: A total of 32 children confirmed with SARS-CoV-2 infection between January 24 and February 12, 2020 from four provinces in western China were enrolled in this study and followed up until discharge and quarantine 14 days later. RESULTS: Eleven children (34%) were asymptomatic, among whom six children had normal computed tomographic (CT) scan images. Age and gender were not associated with clinical symptoms or the results of CT scan in children infected with SARS-CoV-2. The concentrations of white blood cells and neutrophils were higher in children with asymptomatic infection than in children with clinical symptoms or CT abnormalities. Patients who presented with CT abnormalities had lower D-dimer or lower total bilirubin than those who had normal CT scan but clinical symptoms. All children recovered and no one died or was admitted to the pediatric intensive care unit (PICU). The mean duration of positive SARS-CoV-2 nucleic acid was 15.4 (SD =7.2) days and similar for both asymptomatic children and children with symptoms or CT abnormalities. We found a significant negative correlation between the lymphocyte count and the duration of positive nucleic acid test. CONCLUSIONS: Children with asymptomatic infection should be quarantined for the same duration as symptomatic patients infected with SARS-CoV-2. The clinical significance and mechanism behind the negative correlation between the number of lymphocytes and the duration of positive SARS-CoV-2 needs further study.

DOI: 10.21037/atm-20-3192

63. Yasuhara J, Kuno T, Takagi H, et al. Clinical characteristics of COVID-19 in children: A systematic review. *Pediatr Pulmonol.* 2020;29:29. DOI: 10.1002/ppul.24991

ABSTRACT: BACKGROUND: Limited pediatric cases with coronavirus disease 2019 (COVID-19) have been reported and the clinical profiles regarding COVID-19 in children remain obscure. Our aim was to investigate the clinical characteristics of COVID-19 in children. METHODS: PUBMED and EMBASE were searched through 20 June 2020, for case reports and case series reporting pediatric COVID-19 cases. Epidemiological, clinical, laboratory, and radiological data were collected and analyzed to compare by age. RESULTS: Our search identified 46 eligible case reports and case series. A total of 114 pediatric cases with COVID-19 were included. The main clinical features were mild symptoms including fever (64%), cough (35%), and rhinorrhea (16%), or no symptoms (15%). Ground-like opacities were common radiological findings (54%). The main laboratory findings were lymphopenia (33%) and elevated D-dimer (52%) and C-reactive protein (40%) levels. We identified 17 patients (15%) with multisystem inflammatory syndrome in children (MIS-C) manifesting with symptoms overlapping with, but distinct from, Kawasaki disease, including gastrointestinal symptoms, left ventricular systolic dysfunction, shock, and marked elevated inflammatory biomarkers. Twelve percent of the patients including 65% of the MIS-C cases required intensive care because of hypotension. No deaths were reported. CONCLUSION: This systematic review found that children with COVID-19 are generally less severe or asymptomatic. However, infants might be seriously ill and older children might develop MIS-C with severe illness. Early detection of children with mild symptoms or an asymptomatic state and early diagnosis of MIS-C are mandatory for the management of COVID-19 and the prevention of transmission and a severe inflammatory state.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32725955>

DOI: 10.1002/ppul.24991

64. Yoldas MA, Yoldas H. Pediatric COVID-19 Disease: A Review of the Recent Literature. *Pediatr Ann.* 2020;49(7):e319-e25. DOI: 10.3928/19382359-20200615-01

ABSTRACT: The first pediatric coronavirus disease 2019 (COVID-19) case was confirmed in Shenzhen, China on January 20, 2020. At the beginning of the outbreak, COVID-19 pneumonia was more common in adults than in children and adolescents, and the rate of confirmed pediatric cases was relatively lower. However, as screening tests and pathogen detection campaigns were initiated in more regions as the outbreak spread, the number of pediatric infection cases increased significantly. Currently, studies on pediatric COVID-19 are limited in the literature to case reports and case series, and a few epidemiological studies. COVID-19 has distinct characteristics in the pediatric population compared to adults; therefore, we need to better understand the characteristics of this disease in children. Discovering the characteristics of the pediatric COVID-19 disease is important for contributing to the diagnosis and treatment of the disease in this population. In this review, clinical characteristics, epidemiology, diagnosis, and management of pediatric COVID-19 pneumonia based on the recent literature are discussed. [*Pediatr Ann.* 2020;49(7):e319-e325.].

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32674170>

DOI: 10.3928/19382359-20200615-01

65. Yoon Y, Kim K-R, Park H, et al. Stepwise School Opening Online and Off-line and an Impact on the Epidemiology of COVID-19 in the Pediatric Population. medRxiv. 2020:2020.08.03.20165589. DOI: 10.1101/2020.08.03.20165589

ABSTRACT: Background Data on SARS-CoV-2 transmission from a pediatric index patient to others at the school setting are limited. Epidemiologic data on pediatric COVID-19 cases after school opening is warranted. Methods We analyzed data of the pediatric patients with COVID-19 collected from the press release of the Korea Centers for Disease Control and Prevention. Information on the school opening delay and re-opening policies were achieved from the press release from Korean Ministry of Education. Findings The school openings were delayed three times in March 2020. Online classes started from April 9, and off-line classes started from May 20 to June 8 at four steps in different grades of students. 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. The proportions of pediatric patients without information on infection sources were higher in older age group (middle and high school students) than in younger age group (kindergarten and elementary school students) (47.6% vs 12.5%, $p=0.010$). In the younger age group, 79.1% of children were infected by family members, while only 28.6% of adolescents in the older age group were infected by family members ($p<0.001$). Interpretation Korea had a successful transition from school closure to re-opening with online and off-line classes. Although partial, off-line school opening did not cause significant school-related outbreak among pediatric population although young children and adolescents may have different epidemiologic features. Competing Interest Statement The authors have declared no competing interest. Funding Statement No funding. Author Declarations I confirm all relevant ethical guidelines have been followed, and any necessary IRB and/or ethics committee approvals have been obtained. Yes The details of the IRB/oversight body that provided approval or exemption for the research described are given below: This study analyzed the data that is publicly available from the reports by Korea Centers for Disease Control and Prevention and policy announcement by Korean Ministry of Education. Therefore, it was not considered that this study was subject to institutional review board approval. All necessary patient/participant consent has been obtained and the appropriate institutional forms have been archived. Yes I understand that all clinical trials and any other prospective interventional studies must be registered with an ICMJE-approved registry, such as ClinicalTrials.gov. I confirm that any such study reported in the manuscript has been registered and the trial registration ID is provided (note: if posting a prospective study registered retrospectively, please provide a statement in the trial ID field explaining why the study was not registered in advance). Yes I have followed all appropriate research reporting guidelines and uploaded the relevant EQUATOR Network research reporting checklist(s) and other pertinent material as supplementary files, if applicable. Yes Data of the confirmed patients with COVID-19 was collected from the press release by the Korea Centers for Disease Control and Prevention. Information on the school opening delay and re-opening policies was achieved from the press release by the Korean Ministry of Education.

URL: <http://medrxiv.org/content/early/2020/08/04/2020.08.03.20165589.abstract>

DOI: 10.1101/2020.08.03.20165589

66. Yousaf AR, Duca LM, Chu V, et al. A prospective cohort study in non-hospitalized household contacts with SARS-CoV-2 infection: symptom profiles and symptom change over time. Clin Infect Dis. 2020;28. DOI: 10.1093/cid/ciaa1072

ABSTRACT: BACKGROUND: Improved understanding of SARS-CoV-2 spectrum of disease is essential for clinical and public health interventions. There are limited data on mild or asymptomatic infections, but recognition of these individuals is key as they contribute to viral transmission. We describe the symptom profiles from individuals with mild or asymptomatic SARS-CoV-2 infection. METHODS: From March 22 to April 22, 2020 in Wisconsin and Utah, we enrolled and prospectively observed 198 household contacts exposed to SARS-CoV-2. We collected and tested nasopharyngeal (NP) specimens by RT-PCR two or more times during a 14-day period. Contacts completed daily symptom diaries. We characterized symptom profiles on the date of first positive RT-PCR test and described progression of symptoms over time. RESULTS: We identified 47 contacts, median age 24 (3-75) years, with detectable SARS-CoV-2 by RT-PCR. The most commonly reported symptoms on the day of first positive RT-PCR test were upper respiratory ($n=32$, 68%) and neurologic ($n=30$, 64%); fever was not commonly reported ($n=9$, 19%). Eight (17%) individuals were asymptomatic at the date of first positive RT-PCR collection; two (4%) had preceding symptoms that resolved and six (13%) subsequently developed symptoms. Children less frequently reported lower respiratory symptoms (age <18: 21%, age 18-49: 60%, age 50+ years: 69%; $p=0.03$). CONCLUSIONS: Household contacts with lab-confirmed SARS-CoV-2 infection reported mild symptoms. When assessed at a single time-point, several contacts appeared to have asymptomatic infection; however, over time all developed symptoms. These findings are important to inform infection control, contact tracing, and community mitigation strategies.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32719874>

DOI: 10.1093/cid/ciaa1072

67. Yu Y, Chen P. Coronavirus Disease 2019 (COVID-19) in Neonates and Children From China: A Review. Front Pediatr. 2020;8:287. DOI: 10.3389/fped.2020.00287

ABSTRACT: At the end of 2019, a novel coronavirus began to spread in Wuhan, Hubei Province, China. The confirmed cases increased nationwide rapidly, in part due to the increased population mobility during the Chinese Lunar New Year festival. The World Health Organization (WHO) subsequently named the novel coronavirus pneumonia Coronavirus Disease 2019 (COVID-19) and named the virus Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV-2). Soon, transmission from person to person was confirmed and the virus spread to many other countries. To date, many cases have been reported in the pediatric age group, most of which were from China. The management and treatment strategies have also been improved, which we believe would be helpful to pediatric series in other countries as well. However, the characteristics of neonatal and childhood infection still have not been evaluated in detail. This review summarizes the current understanding of SARS-CoV-2 infection in neonates and children from January 24 to May 1, as an experience from China.

DOI: 10.3389/fped.2020.00287

68. Yung CF, Kam KQ, Chong CY, et al. Household Transmission of SARS-CoV-2 from Adults to Children. The Journal of pediatrics. 2020;04:04. DOI: 10.1016/j.jpeds.2020.07.009

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32634405>

DOI: 10.1016/j.jpeds.2020.07.009

69. Yung CF, Kam KQ, Nadua KD, et al. Novel coronavirus 2019 transmission risk in educational settings. Clin Infect Dis. 2020;25. DOI: 10.1093/cid/ciaa794

ABSTRACT: Transmission risk of SARS-CoV-2 in schools is unknown. Our investigations especially in pre-schools could not detect SARS-CoV-2 transmission despite screening of symptomatic and asymptomatic children. The data suggests that children are not the primary drivers of SARS-CoV-2 transmission in schools and could help inform exit strategies for lifting of lockdowns.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32584975>

DOI: 10.1093/cid/ciaa794

70. Zhang L, Huang S. Clinical Features of 33 Cases in Children Infected With SARS-CoV-2 in Anhui Province, China-A Multi-Center Retrospective Cohort Study. Front Public Health. 2020;8:255. DOI: 10.3389/fpubh.2020.00255

ABSTRACT: Background: As of 23rd February 2020, China had 77,048 patients with confirmed SARS-CoV-2 infections, and only 2.1% of patients were under the age of 19 years. Morbidity among children was much lower, with milder or absent signs and symptoms; chest CT scans showed milder symptoms, if at all, compared to adults. Objective: Report the epidemiological, clinical features, laboratory, radiological characteristics, and treatment of SARS-CoV-2 infections. Compare additional signs and symptoms, investigate familial clustering, compare laboratory results, and find out relevance between age and typical chest CT scans in patients. Methods: We studied 33 young patients with laboratory-confirmed SARS-CoV-2 infection in Anhui Province of China by 16th February 2020. Their signs, symptoms, and familial clustering were analyzed. We compared the laboratory test results, age, and gender among three parts based on their chest CT scans. Results: Familial clustering was seen in 30 (30/33; 90.91%) patients; three families had seven confirmed members infected with the disease. Eight (8/33; 24.24%) patients had no symptoms, 12 (12/33; 36.36%) patients had only fever, nine (9/33; 27.27%) patients had fever and additional symptoms, and 12 (12/33; 36.36%) patients had no fever. Dry cough was the most common additional symptom. In 25 (25/33; 75.76%) patients, the percent of lymphocytes decreased; 26 (26/33; 78.79%) patients were older than 7 years. More male than female patients and patients older than 8 years showed typical abnormalities in the chest CT scans ($P = 0.038$). Only two 18 years old patients had hepatic injury. Conclusion: Children's infection is mild and familial clustering was the most common channel. The older patients had more typical ground glass opacity (GGO) or consolidation in chest CT scans. Cases without fever strongly suggested that non-symptomatic children should not be assumed to be free of infection when their family members have confirmed infection. Most children showed clinical features distinguishable from adults and with increased susceptibility within family members.

DOI: 10.3389/fpubh.2020.00255

71. Zhu J, Wu Y. COVID-19 Epidemic: Clinical Characteristics of Patients in Pediatric Isolation Ward. Clin Pediatr (Phila). 2020;9922820941228. DOI: 10.1177/0009922820941228

ABSTRACT: In order to accurately admit children with COVID-19 to an isolation ward, our study retrospectively analyzed the clinical characteristics of children in isolation wards during the COVID-19 epidemic. It was found that 55 cases (83.3%) had fever and 48 cases (72.7%) coughed in the isolated area, 31 cases (47%) had a history of exposure, 26 cases (39.4%) had a

decrease in lymphocytes (LYM), more than half had an increase in lactate dehydrogenase and creatine kinase isoenzyme, 14 cases (21.2%) had positive SARS-CoV-2 nucleic acid, 58 cases (87.9%) had abnormal chest computed tomography (CT), and 11 cases (16.7%) had sinus arrhythmia. Therefore, for some suspected children with COVID-19, we can make a comprehensive judgment through clinical symptoms, epidemiological history, LYM number, myocardial enzyme spectrum, chest CT, and electrocardiogram; put these children in an isolation ward for treatment; and then transfer them to a general ward for treatment after excluding COVID-19.

URL: <https://www.ncbi.nlm.nih.gov/pubmed/32646234>

DOI: 10.1177/0009922820941228

72. Wen Z, Wei J, Xue H, et al. Epidemiology, microbiology, and treatment patterns of pediatric patients hospitalized with pneumonia at two hospitals in China: a patient chart review study. Therapeutics and clinical risk management. 2018;14:501-10. DOI: 10.2147/tcrm.S143266

ABSTRACT: BACKGROUND: The etiology, epidemiology, treatment patterns, and clinical outcomes of neonatal and pediatric pneumonia patients in China are not well reported. This retrospective chart review study aimed to describe such information among neonatal (0 to 27 days) and pediatric (28 days to <18 years) pneumonia patients in two regions of China. METHODS: Electronic medical records of pneumonia hospitalizations (aged <18 years) admitted between 2008 and 2013 from four hospitals under Guangdong Provincial Hospital of Chinese Medicine (Southern China) and between 2010 and 2014 at Peking University People's Hospital (Beijing, Northern China) were reviewed. RESULTS: The average age of neonatal hospitalizations in Beijing (n=92) was 3.5 days. The mean length of hospital stay was 11.2 days, and no deaths occurred. Staphylococcus epidermidis was the most common bacteria found in Beijing patients, whereas Mycoplasma pneumoniae was the most common bacteria found in Guangdong patients. The average age of pediatric hospitalizations was 3.3 (\pm 3.1) and 6.5 (\pm 5.6) years in Guangdong (n=3,046) and Beijing (n=222), respectively. The mean length of hospital stay was 17.4 and 5.8 days, and overall mortality rates were 0.2% and 0.5%. CONCLUSION: The findings revealed a low level of bacterial isolation and hence microbiological diagnoses. There was a low level of in-hospital mortality due to pneumonia, and the majority of hospitalizations were discharged from hospital, suggesting that current practice was generally effective. Neonatal hospitalizations were greater than pediatric hospitalizations in Beijing along with disparity in bacterial profile when compared with Guangdong, intending a need to improve neonatal pneumonia prophylaxis and selection of appropriate treatment.

DOI: 10.2147/tcrm.S143266

SEARCH STRATEGIES

Database: Ovid MEDLINE(R) ALL <1946 to August 05, 2020>

Search Strategy:

- ```

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 preadolescenc* 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 preadolescenc* 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 coronavir* 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"
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or SARS coronavirus2 or "SARS-coronavirus-2" or "SARS coronavirus 2" or "SARS coronavirus2").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)

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Database: Embase <1974 to 2020 August 05>

Search Strategy:

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1 exp Coronavirinae/ or exp Coronavirus infection/ (26244)

2 (coronavirus disease 2019 or severe acute respiratory syndrome coronavirus 2).sh,dj. (35499)

3 ((corona\* or coronovirus\*) adj1 (virus\* or viral\* or virinae\*)).ti,ab,kw. (1231)

4 (coronavirus\* or coronovirus\* or coronavirinae\* or CoV).ti,ab,kw. (34856)

5 ("2019-nCoV" or 2019nCoV or nCoV2019 or "nCoV-2019" or "COVID-19" or "COVID19or 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 SARS coronavirus2 or "SARS-coronavirus-2" or "SARS coronavirus 2" or "SARS coronavirus2" or SARSCoronavirus2 or "SARS-coronavirus-2" or "SARS coronavirus 2" or "SARS coronavirus2").ti,ab,kw. (37058)

6 (respiratory\* adj2 (symptom\* or disease\* or illness\* or condition\*) adj10 (Wuhan\* or Hubei\* or China\* or Chinese\* or Huanan\*)).ti,ab,kw. (612)

7 (("seafood market\*" or "food market\*" or pneumonia\*) adj10 (Wuhan\* or Hubei\* or China\* or Chinese\* or Huanan\*)).ti,ab,kw. (1643)

8 ((outbreak\* or wildlife\* or pandemic\* or epidemic\*) adj1 (Wuhan\* or Hubei\* or China\* or Chinese\* or Huanan\*)).ti,ab,kw. (132)

9 "severe acute respiratory syndrome\*".ti,ab,kw. (9313)

10 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 (66938)

11 Pediatrics/ or exp Child/ or Adolescent/ (3399523)

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 premenarch\* 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 (1680736)

13 11 or 12 (3694613)

14 exp disease transmission/ (254242)

15 (Basic Reproduction Number or transmiss\* or communicab\* or infectivity or infectiousness or contagious\*).tw,kw. (478430)

16 14 or 15 (637324)

17 10 and 13 and 16 (931)

18 limit 17 to dd=20200702-20200806 (104)

**Google Scholar / Google**

pediatric|child|children AND covid|coronavirus AND transmission|transmissability|communicability|contagious

**Other search terms used**

transmiss\* or transmit\* or communicab\* or infectivity or infectiousness or contagious\*

child\* or pediatric\* or paediatric\* or adolescen\*