methods or culture from a sterile body site. The study was conducted via the 12 centres of the Canadian Immunization Monitoring Program, Active (IMPACT) network from January 1, 2016 – December 31, 2020.

RESULTS: During 2016-2020, a total of 105 pediatric (<20 years of age) and 145 adult IMD cases occurred. Serogroup B accounted for the greatest proportion of pediatric cases (N=58, 55.2%), followed by W (n=19, 18.1%) and Y (n=9, 8.6%) and C (n=2, 1.9%). Among adults, serogroup W accounted for the majority of cases (n=55, 38.0%), followed by Y (n=41, 28.3%), B (n=33, 22.8%) and C (n=7, 4.8%). The age distribution for serogroups covered by MCV programs has shifted to adults. The median age was 24.2 years (33.4 mean). Whereas the median age of serogroup B cases was 7.7 years (19.4 years mean) with 63.7% of cases occurring in children < 19 years of age and 46.2% in children 0-4 years of age.

A total of 20 people died from meningococcal infections in 2016–2020. Five deaths were in children, four from serogroup B and one from serogroup W. Fifteen deaths were in adults, one from serogroup B, eight from serogroup W, three from serogroup Y, and three from Non-typeable/Other/Unknown serogroups.

CONCLUSION: Serogroup B, which is not covered by MCV programs, still accounts for the majority of pediatric IMD. Serogroup C has been controlled and rarely causes pediatric infection. With the implementation of MCV programs in children and adolescents, the median and mean age at infection has increased across all serogroups, except serogroup B. Serogroup W is still causing IMD among pediatric age groups.

58

CLINICAL MANIFESTATIONS AND DISEASE SEVERITY OF SARS-COV-2 INFECTION AMONG INFANTS IN CANADA

Pierre-Philippe Piché-Renaud[1], Luc Panetta[2], Daniel Farrar[3], Charlotte Moore Hepburn[4], Olivier Drouin[5], Jesse Papenburg[6], Marina Salvadori[7], Melanie Laffin-Thibodeau[4], Fatima Kakkar[8], Shaun Morris[1]

[1]The Hospital for Sick Children, [2]Hospices Civils de Lyon, Hôpital Femme Mère Enfant, Lyon, France, [3]Hospital for Sick Children, [4]Canadian Paediatric Society, [5]Division of General Pediatrics, Department of Pediatrics, CHU Sainte-Justine, [6]Montreal Children's Hospital, [7]Public Health Agency of Canada, McGill University, [8]CHU Sainte-Justine

BACKGROUND: There are limited data on outcomes of SARS-CoV-2 infection among infants (<1 year of age). In the absence of approved vaccines for infants, understanding characteristics associated with hospitalization and severe disease from COVID-19 in this age group will help inform clinical management and public health interventions.

OBJECTIVES: The objective of this study was to describe the clinical manifestations, disease severity, and characteristics associated with hospitalization among infants infected with the initial strains of SARS-CoV-2.

DESIGN/METHODS: This is a nationwide prospective observational study using the infrastructure of the Canadian Paediatric Surveillance Program. All cases of infants aged <1 year of age with microbiologically confirmed SARS-CoV-2 infection were reported from April 8th 2020 to May 31st 2021, and were classified by disease severity and primary cause of hospitalization. Multivariable logistic regression was performed to identify infants' characteristics associated with hospitalization.

RESULTS: A total of 531 cases were reported, including 332 (62.5%) non-hospitalized and 199 (37.5%) hospitalized infants. Among hospitalized infants, 141 of 199 infants (70.9%) were admitted because of COVID-19-related illness, and 58 (29.1%) were admitted for reasons other than acute COVID-19. Amongst all cases with SARS-CoV-2 infection, the most common presenting symptoms included fever (66.5%), coryza (47.1%), cough (37.3%) and decreased oral intake (25.0%). In our main analysis, infants with a comorbid condition had higher odds of hospitalization compared to infants with no comorbid conditions, and infants <1 month had higher odds of hospitalization than infants aged 1-3 months (Table). In total, 20 infants (3.8%) met criteria for severe disease.

CONCLUSION: We describe one of the largest cohorts of infants with SARS-CoV-2 infection. Overall, severe COVID-19 in this age group is uncommon with most infants having mild disease. Comorbid conditions and younger age were associated with COVID-19-related hospitalization amongst infants.

Table. Logistic regression analysis of infants' characteristics associated with COVID-19 hospital admission

Characteristics, n (%row)	Crude model		Adjusted model[1]		VOC adjusted model[2]	
	OR (95% CI)	*P* value	aOR (95% CI)	*P* value	aOR (95% CI)	*P* value
Infant age						
0–<1 month	3.59 (1.93–6.68)	**<0.001**	3.78 (1.97–7.26)	**<0.001**	3.47 (1.42–8.52)	**0.007**
1–3 months	1 [Reference]	NA	1 [Reference]	NA	1 [Reference]	NA
4–6 months	0.33 (0.18–0.60)	**<0.001**	0.24 (0.12–0.47)	**<0.001**	0.30 (0.12–0.78)	**0.01**
7–12 months	0.17 (0.09–0.31)	**<0.001**	0.13 (0.06–0.25)	**<0.001**	0.12 (0.05–0.34)	**<0.001**
Infant sex						
Female	1 [Reference]	NA	1 [Reference]	NA	---	---
Male	1.24 (0.83–1.86)	0.28	1.14 (0.71–1.84)	0.58	---	---
Gestational age at birth						
Term (≥37 weeks')	1 [Reference]	NA	1 [Reference]	NA	---	---
Late preterm (34–<37 weeks')	1.56 (0.62–3.92)	0.34	1.25 (0.42–3.72)	0.69	---	---
Moderate/very preterm (<34 weeks')	2.61 (1.03–6.58)	**0.04**	3.54 (1.19–10.46)	**0.02**	---	---
Comorbid conditions						
None/Unknown	1 [Reference]	NA	1 [Reference]	NA	1 [Reference]	NA
≥1 comorbid condition	1.97 (1.03–3.77)	**0.04**	4.53 (2.06–9.97)	**<0.001**	7.98 (2.74–23.29)	**<0.001**
Phase of COVID-19 pandemic						
1st wave (April–August 2020)	1 [Reference]	NA	1 [Reference]	NA	---	---
2nd wave (September 2020–February 2021)	1.20 (0.65–2.19)	0.56	1.37 (0.68–2.75)	0.38	---	---
3rd wave (March–May 2021)	1.16 (0.61–2.20)	0.64	1.57 (0.74–3.31)	0.24	---	---
Variant of concern						
Not a confirmed VOC[3]	1 [Reference]	NA	---	---	1 [Reference]	NA
Confirmed VOC	0.81 (0.37–1.76)	0.59	---	---	0.63 (0.27–1.48)	0.29

aOR = Adjusted odds ratio; OR = Odds ratio; VOC = variant of concern.

[1]Multivariable analysis was conducted among 440 complete cases, and excludes 58 non-COVID-19-related hospitalizations.

[2]Multivariable analysis conducted among 268 complete cases reported from the Centre Hospitalier Universitaire Sainte-Justine, Hospital for Sick Children, or Montreal Children's Hospital and occurring on or after September 1, 2020. Excludes 25 patients hospitalized for reasons other than COVID-19. Given a smaller available sample size, VOC status was forced into the multivariable model and other covariates were selected on the basis of p-values until an events-per-variable ratio of 1:10 was reached to avoid overfitting.

[3]Cases occurring before December 26, 2020 (i.e. first case of confirmed Alpha in Canada) were assumed as 'not a confirmed VOC'. Cases with no VOC screening and occurring on or after December 26, 2020 (n=119) were also assumed as 'not a confirmed VOC'. Excluding the latter cases from the multivariable analysis did not meaningfully change the aOR (0.62; 95% CI 0.24–1.66).

59

UNDERSTANDING ASYMPTOMATIC TESTING UPTAKE AMONGST SCHOOL AGED CHILDREN AND STAFF FOR SARS-COV-2 TESTING IN ELEMENTARY AND SECONDARY SCHOOLS

Analyssa Cardenas[1], Cindy Bruce-Barrett[1], Aaron Campigotto[1], Blossom Dharmaraj[1], Christine McGovern[2], Michelle Science[1], Julia Orkin[1]

[1]The Hospital for Sick Children, [2]SickKids

BACKGROUND: Enhanced health and safety measures, such as symptom screening, physical distancing, cohorting, masking, and asymptomatic testing for children have been introduced into schools to prevent SARS-CoV-2 transmission. Although asymptomatic testing has been considered a measure to reduce in-school transmission, it has not been broadly implemented or evaluated. To address this, a pilot project with public health, school boards, and hospital-based testing partners was established to assess the feasibility of offering on-site and low barrier SARS-CoV-2 polymerase chain reaction (PCR) testing across schools in the Toronto region.

OBJECTIVES: The primary objective of this study was to assess the feasibility of offering on-site and low barrier PCR asymptomatic testing across schools in the Toronto region.

DESIGN/METHODS: A six-week testing pilot across the Greater Toronto Area took place. Schools were selected to participate in expanded testing to determine case prevalence in high-risk settings of school-based SARS-CoV-2. Students and staff were excluded if they had tested positive for COVID-19 in the last 3 months. Different testing opportunities were offered based on the testing partner and school preference including location and modality. Descriptive methods were used to assess the uptake of testing and case positivity by individuals recommended to be tested.

RESULTS: Eighteen schools participated in the pilot testing. All students and staff were invited to participate in asymptomatic testing. Testing was offered to 9282 students and 1000 staff, and testing uptake was 29% (2729 students) and 54% (544 staff), respectively. Forty-eight percent of tests (1645) were oral nasal tests, 18% (622) were NP swab tests and 33% (1120) were saliva tests. Of the saliva tests, 52% (590) were on-site saliva tests and 48% (530) were take-home saliva kits. The staff and student positivity rate for on-site testing was 1.9% and 4.9% for tests completed at the COVID-19 Assessment Center at SickKids.

CONCLUSION: Results from this pilot project demonstrate that on-site PCR testing uptake remained low despite offering in-school testing, specialized support, and reduced barriers by using non-invasive testing with the use of saliva/oral nasal/PCR testing kits. Results highlight the challenges of asymptomatic testing and the balance of resource utilization for low case counts. Future studies should examine alternate means of symptomatic testing.

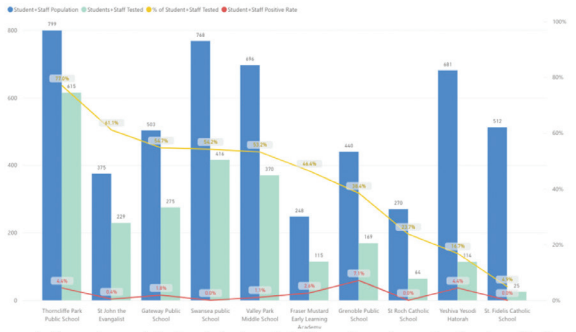

Figure 1: Percentage uptake by students and staff per elementary school and positivity rate

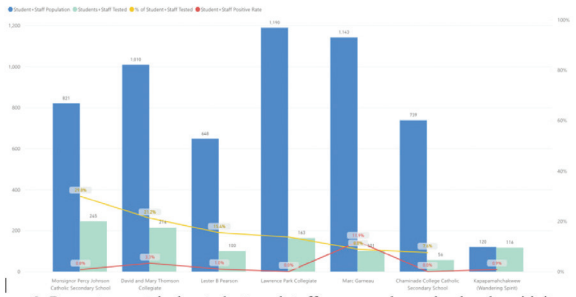

Figure 2: Percentage uptake by students and staff per secondary school and positivity rate

60

INHALED NITROUS OXIDE FOR DISTRESSING PROCEDURES IN CHILDREN: A SYSTEMATIC REVIEW

Naveen Poonai[1], Christopher Creene[1], Aldo Ariel Dobrowlanski[2], Rishika Geda[1], Lisa Hartling[3], Samina Ali[3], Maala Bhatt[4], Evelyne D. Trottier[5], Vikram Sabhaney[6], Katie O'Hearn[7], Martin Osmond[7], Rini Jain[7]

[1]Western University, [2]LHSC, [3]University of Alberta, [4]CHEO, [5]CHU Sainte-Justine, [6]BC Children's Hospital, [7]Children's Hospital of Eastern Ontario

BACKGROUND: Inhaled nitrous oxide (N_2O) is a potentially effective agent for pain and procedural distress in children but questions remain regarding indication specific effectiveness.

OBJECTIVES: Our objective was to synthesize the evidence for N_2O in children and youth regarding procedural distress, pain, and adverse events (AEs).

DESIGN/METHODS: We performed electronic searches of MEDLINE, EMBASE, Google Scholar, CINAHL, conference proceedings, and trial registries. We included randomized trials of N_2O in children and youth 0-21.99 years that reported procedural distress or pain. Methodological rigor and quality of evidence were evaluated using the *Cochrane Collaboration's Risk of Bias* tool and the *Grading of Recommendations Assessment, Development, and Evaluation* system, respectively. Where meta-analysis wasn't possible, we summarized results using Tricco et al.'s classification system of "favorable" or "unfavorable" ($p<0.05$), or "neutral" ($p>0.05$).

RESULTS: We included 29 trials, involving 2,404 children aged 3 weeks-21 years. The overall quality of evidence for distress and pain was "low" and "moderate", respectively. For venous cannulation (n=12), three meta-analyses were possible: A) pain was significantly lower with 70% N_2O versus eutectic mixture of local anesthetics (EMLA) (mean difference: -16.5; 95% CI: -28.6 to -4.4; p=0.008; 85 participants; 3 trials; I^2= 0%); B) pain was not significantly different with 50% N_2O alone versus EMLA (mean difference: -0.4; 95% CI: -1.2 to 0.3; p=0.26; 65 participants; 2 trials; I^2= 15%); C) combination 50% N_2O plus EMLA was significantly better than EMLA alone (mean difference: -1.2; 95% CI: -2.1 to -0.3; p=0.007; 65 participants; 2 trials; I^2= 43%). For pain and distress during laceration repair (n=5), N_2O was deemed "favorable" versus subcutaneous lidocaine, oxygen, or oral midazolam, but "neutral" versus intravenous ketamine. For pain and distress during fracture reduction (n=3), N_2O was deemed "neutral" versus combination intramuscular meperidine plus promethazine, intravenous lidocaine, or combination intravenous ketamine plus midazolam. For pain and distress during lumbar puncture (n=1), N_2O was deemed "favorable" versus oxygen. Higher concentrations of N_2O were associated with more AEs per participant: 6.7% (1/15), 13.7% (64/468), and 25.3% (56/221) with 30%, 50%, and 70% N_2O, respectively. The most common AEs were nausea and agitation (both 3.5% [40/1128]). There were no AEs requiring resuscitative measures.

CONCLUSION: N_2O is a potentially effective agent for reducing procedural distress and pain in children, although high quality evidence is lacking. Most data exist for venous cannulation where safety and efficacy at reducing pain are optimized with combining 50% N_2O and topical anesthetic cream. For laceration repair, there is considerably less data. Still, N_2O appears to be superior to oral midazolam but equivalent to intravenous ketamine.

61

ANALGESIA AND SEDATION FOR PEDIATRIC ILEOCOLIC INTUSSUSCEPTION: A GLOBAL, MULTICENTER, CROSS-SECTIONAL STUDY (PAINT)

Naveen Poonai[1], Daniel M Cohen[2], Doug MacDowell[2], Rakesh Mistry[3], Simon Craig[4], Samina Ali[5], Graham Thompson[6], Damian Roland[7], Jocelyn Gravel[8], Vikram Sabhaney[9], Garth Meckler[10], Rini Jain[11], Michael Miller[12], Adrienne Davis[13], Itai Shavit[14], Sa Mintegi[15]

[1]Western University, [2]Nationwide Children's Hospital, [3]Children's Colorado, [4]Monash University, [5]University of Alberta, [6]Alberta Children's Hospital and University of Calgary, [7]University of Leicester, [8]CHU Sainte-Justine, [9]BC Children's Hospital, [10]UBC / BCCH, [11]Children's Hospital of Eastern Ontario, [12]Western University, [13]Hospital for Sick Children, [14]Rambam Health Care Campus, [15]Cruces University Hospital

BACKGROUND: Ileocolic intussusception requires timely reduction to prevent complications. Reduction can be distressing. Sedation is uncommon due to controversial beliefs surrounding an increased risk of perforation. Analgesia and sedation practices for children undergoing reduction of intussusception remain largely unknown.

OBJECTIVES: To characterize global practice patterns of analgesia and sedation for reduction of intussusception.

DESIGN/METHODS: We conducted a global, cross-sectional study involving 84 centres in 14 countries. We included children 4 to 48 months with a sonographic or radiographic diagnosis of ileocolic intussusception and attempted reduction between January 1, 2017, and December 31, 2019. The primary and secondary outcomes were analgesia and sedation, respectively, prior to reduction. An *a priori* explanatory analysis was performed to explore the association of sedation with (i) adverse events, (ii) perforation, and (iii) failed reduction.

RESULTS: We included 3203 children [2054/3203 (64.1%)] males, with median (IQR) age of 17 (9,27) months. Suspected abdominal pain was present in 2283/3187 (71.6%) children. At triage, a pain assessment tool was documented in 1859/3112 (59.7%) and analgesia was administered to 305/3171 (9.6%) children. After triage, pain was reassessed in 1448/3169 (45.7%) and analgesia was administered to 552/3158 (17.5%) children. Prior to reduction, 550/3161 (17.4%) children were sedated. Non-opioid and opioid analgesia were administered to 183/2945 (6.2%) and 560/3134 (17.9%), respectively. Reduction was performed using air enema in 2372/3184 (74.5%) children and 2700/3184 (84.8%) of all reductions were successful. Reduction related adverse events [65/3166 (2.1%)] were reported in 59 patients, most commonly vomiting [31/3166 (1.0%)] and perforation [13/3166 (0.4%)]. In the bivariate analyses, sedation was not associated with an increased odds of adverse events [OR: 1.1; 95% CI: 0.6-2.1; p=0.79] or perforation [OR: 2.1; 95% CI: 0.7-6.9; p=0.21]. Sedation was associated with an increased odds of failed reduction [OR: 1.4; 95% CI: 1.1-1.7; p=0.01], but this became non-significant in the multivariable