COVID-19, Quelles leçons tirer de cette épidémie au SAUP?

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La COVID-19, un virus pédiatrique comme un autre?

- Oui

Table 2
Descriptive clinical characteristics of 1,214 RT-PCR confirmed COVID-19 cases for all 65 articles included in review.

		Number of children (N)	(%)
Symptomatic status		880	
	Symptomatic	834	94.7
	Asymptomatic	46	5.2
Symptoms reported [a]		196	
	Fever	75	38.2
	Upper Respiratory	69	35.2
	Lower Respiratory	10	5.1
	Gastrointestinal	15	7.7
	Other	27	13.8
Disease Severity [b]		345	
	Mild	155	44.9
	Moderate	173	50.1
	Severe	17	4.9
Medications		102	
	Antivirals [c]	64	62.7
	Antibiotics [d]	29	28.4
	Steroids	9	8.8
Disease Outcomes		121	
	Recovered/ Discharged	120	99.2
	Dead	1	0.8
Source		1211	
	Community	1186	97.9
	Family	12	0.9
	Vertical	13	1.2

Bhuiyan et al., « Epidemiology of COVID-19 Infection in Young Children under Five Years ». Vaccine 2021

La COVID-19, un virus pédiatrique comme un autre?

Voir même un peu moins grave!

TABLE 1 Patient Characteristics and Respiratory Pathogens in Infants With Severe Bronchiolitis in 2 US Cohort Studies

Variable	Solo RSV Infection	Coronavirus Infection	*P*	Solo Coronavirus Infection	*P*
N	1661	219	—	32	—
Age, mo, median (IQR)	2.8 (1.4–5.8)	3.7 (1.9–7.2)	<.001	3.7 (1.7–6.0)	.44
Female sex, *n* (%)	705 (42)	70 (32)	.003	9 (28)	.15
Race and/or ethnicity, *n* (%)			.19		.45
Non-Hispanic white	690 (42)	96 (44)	—	17 (53)	—
Non-Hispanic Black	326 (20)	52 (24)	—	7 (22)	—
Hispanic	554 (33)	64 (29)	—	7 (22)	—
Other	91 (6)	7 (3)	—	1 (3)	—
Prematurity (gestational age <37 wk), *n* (%)	319 (19)	53 (24)	.09	7 (22)	.65
Clinical presentation					
Onset of symptoms <24 h, *n* (%)	67 (4)	15 (7)	.08	6 (19)	.002
Body wt, kg, median (IQR)	5.7 (4.4–7.6)	6.3 (4.7–8.1)	.006	5.8 (4.5–7.6)	.94
Wheezing on examination, *n* (%)	965 (60)	144 (66)	.06	19 (61)	.99
Apnea, *n* (%)	117 (9)	13 (7)	.49	1 (4)	.72
Clinical course					
Intensive care use, *n* (%)[a]	286 (17)	45 (21)	.22	6 (19)	.81
ICU admission, *n* (%)	275 (17)	44 (20)	.21	6 (19)	.81
Intubation and/or CPAP use, *n* (%)	112 (7)	20 (9)	.20	2 (6)	.99
Hospital length of stay, d, median (IQR)	2 (1–4)	2 (1–4)	.93	2 (1–2)	.01
Region, *n* (%)			.06		.22
Northeast	325 (20)	54 (25)	—	9 (28)	—
Midwest	271 (16)	45 (21)	—	8 (25)	—
South	690 (43)	76 (35)	—	11 (34)	—
West	375 (23)	44 (20)	—	4 (13)	—
Hospitalization month, *n* (%)			.15		.55
November	131 (8)	22 (10)	—	3 (9)	—
December	323 (1)	38 (1)	—	8 (25)	—
January	503 (3)	73 (33)	—	12 (38)	—
February	445 (27)	43 (20)	—	4 (13)	—
March	236 (14)	40 (18)	—	5 (16)	—
April	23 (1)	3 (1)	—	0 (0)	—
No. detected pathogens, median (IQR)	1 (1–1)	2 (2–3)	<.001	1 (1–1)	—

Mansbach et al., « Severe Coronavirus Bronchiolitis in the Pre–COVID-19 Era ». Pediatrics. 2020

Quel impact aux urgences ?

Table 1 Overview of the effect of the COVID-19 pandemic on ED visits and hospitalization in general pediatrics compared to pre-COVID-19 periods

Country	Reduction of ED visits	Increase in hospital admission/ED ratio	Reduction of hospital admissions	Reference	Maximum stringency of the lockdown during the study period[†]
The Netherlands	59%	Remained stable at 35–45%	56%	Current study	79.63
Italy	62–88%	From 0.5–20 to 0.9–41%	31–71%; 19% increase in one hospital	[7, 14–24][#]	93.52
Spain	65%	-	-	[35]	85.19
Germany	64%	From 14 to 27%	38%	[37]	76.85
France	68%	-	45%	[40]	87.96
Austria	83%	-	-	[53]	81.48
UK	30–66%*	-	-	[6, 54]	79.63
Ireland	46–54%	Remained stable (14–15%)	41–54%	[36, 38]	90.74
Finland	65–65%	-	45–60%	[33][#]	67.59
South Africa	58%	-	-	[41]	87.96
Morocco	74%	-	42%	[55]	93.52
USA	48–87%	From 19–20 to 22–24%	73%	[25–32]	72.69
Argentina	89%	-	-	[34]	100
Australia	47%	-	-	[52]	73.15

Kruizinga et al., « The Impact of Lockdown on Pediatric ED Visits and Hospital Admissions during the COVID19 Pandemic ». EJP 2021

Quel impact aux urgences ?

Table 3
Visits per 2-month study period by diagnosis

Diagnosis group(s)	Pre-COVID ($n^{average}$)	COVID (n)	Relative change	*P-value*
All diagnoses	9256	4068	−56%	n/a
Injuries, severe[a]	549	318	−42%	<0.001
Injuries, minor[b]	677	181	−73%	<0.001
Abdominal pain	550	196	−64%	0.005
Nausea, vomiting, diarrhea[c,e]	760	184	−76%	<0.001
Appendicitis	80	85	+6.3%	<0.001
Asthma	368	103	−72%	<0.001
Foreign body	86	62	−28%	0.001
Otitis media	194	66	−66%	0.051
Urinary tract infections	103	48	−53%	0.74
Headache, including migraine	155	32	−79%	<0.001
Non-specific chest pain	93	26	−72%	0.031
Convulsions or epilepsy	167	89	−47%	0.10
Suicidal ideation/attempt or self-harm	11	22	+100%	<0.001
Psychiatric disorders[d,e]	497	180	−64%	0.015
Poisoning by drugs	21	14	−33%	0.15
Hemolytic jaundice and perinatal jaundice	27	22	−19%	0.011
Diabetes mellitus with complication	16	13	−19%	0.046
Burns	15	11	−27%	0.12
Maltreatment/abuse	28	3	−89%	0.01

Sokoloff et al., « Pediatric Emergency Department Utilization during the COVID-19 Pandemic in New York City ». AJEM. 2021

Et les pathologies infectieuses ? Bronchiolite

- Diminution du nombre d'H
- Diminution du temps d'H
- Virus : seul le rhinoV a survécu!!

Table 1 Number of hospitalised bronchiolitis cases before the end of the peak* and after the peak** in Antwerp hospitals

Hospital	Season 2017-2018		Season 2018-2019		Season 2019-2020		Season 2020-2021	
	Before	*After*	Before	*After*	Before	*After*	Before	*After*
GZA Sint-Vincentius	102	*41*	109	*30*	111	*31*	12	*unknown*
GZA Sint-Augustinus	139	*43*	169	*55*	112	*19*	2	*unknown*
ZNA Jan-Palfijn	140	*35*	124	*37*	126	*25*	20	*unknown*
ZNA Paola	213	*53*	155	*44*	176	*62*	15	*unknown*
UZA University Hospital	109	*32*	99	*25*	107	*37*	1	*unknown*
Total Antwerp hospitals	703	*204*	656	*191*	632	*174*	50	*unknown*

* Before the end of the peak = from the beginning of September until week 52, i.e. the latest end of the peak. ** After the peak = from week 52 onwards until the end of March

TABLE 3 | Average number of viral detections in pre-COVID-19 seasons and viral detections in 2020/2021 season for viral type.

	Pre-COVID-19 seasons average	COVID-19 season	Cumulative probability *p*-value
Influenza A and B	6.5	0	0.0015
Adenovirus	7	2	0.03
Bocavirus	7.5	2	0.02
Coronavirus (non-SARS-CoV2)	2	0	0.135
Enterovirus	5	1	0.04
Metapneumovirus	8	0	0.0003
Parainfluenzae (1;3;4)	3.5	0	0.03
Rhinovirus	17	14	0.28
RSV	54	0	<0.000001
CMV	1	1	0.735

CMV, cytomegalovirus; RSV, respiratory syncytial virus.
P-value of the cumulative probability using one-tail Poisson distribution.

Ippolito et al., « Disappearance of Seasonal Respiratory Viruses in Children Under Two Years Old During COVID-19 Pandemic ». Frontier of P. 2020

Van Brusselen et al., « Bronchiolitis in COVID-19 Times ». EJP. 2021

Et les pathologies infectieuses ? Asthme

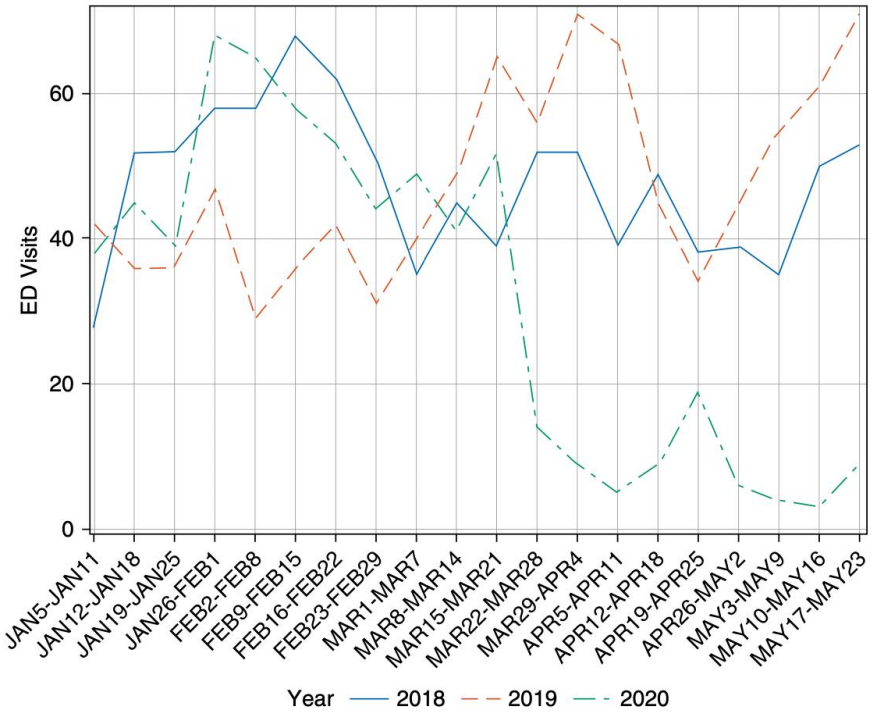


Figure 1. Run chart of asthma ED visits from January 5 to May 23 in 2018, 2019, and 2020 ($n = 2,543$). ED = emergency department.

- Diminution des crises graves
- Asthme mieux contrôlé

Simoneau et al., « Impact of the COVID-19 Pandemic on Pediatric Emergency Department Use for Asthma ». Annals of the American Thoracic Society. 2021.

Et les pathologies infectieuses ?

- GEA: pas de papier
- Fièvre néonatale : pas de papier
- Pneumopathie (bactérienne ou virale) : diminution de l'incidence.

Et le retard diagnostic ? Appendicite

Table 2
Outcomes of pediatric patients presenting to Morgan Stanley Children's Hospital (MSCH) for acute appendicitis between March 1 and May 31 of 2019 and 2020. Median with first and third quartile as well as range are reported for continuous variables. Frequency and percentage are reported for categorical variables. p-Values from Fisher's exact test are reported for categorical variables while p-values from Kruskal-Wallis test are reported for continuous variables.

Outcomes			
Outcome	2019 (N = 41)	2020 (N = 48)	p-Value
Reported symptoms			
Abdominal pain			1.000
-Yes	41 (100.0%)	48 (100.0%)	
Fever			**0.009**
-No	31 (75.6%)	23 (47.9%)	
-Yes	10 (24.4%)	25 (52.1%)	
Nausea			1.000
-No	18 (43.9%)	20 (41.7%)	
-Yes	23 (56.1%)	28 (58.3%)	
Vomiting			0.268
-No	17 (41.5%)	14 (29.2%)	
-Yes	24 (58.5%)	34 (70.8%)	
Diarrhea			0.618
-No	30 (73.2%)	38 (79.2%)	
-Yes	11 (26.8%)	10 (20.8%)	
Decreased appetite			0.190
-No	29 (70.7%)	27 (56.2%)	
-Yes	12 (29.3%)	21 (43.8%)	
Duration of symptoms before presentation (Days)			**0.003**
-Median (Q1, Q3)	1.00 (1.00, 2.00)	2.00 (1.00, 4.00)	
-Range	0.50–10.00	0.50–14.00	
Suspicion for perforation on imaging			**< 0.001**
-No	37 (90.2%)	28 (58.3%)	
-Yes	4 (9.8%)	20 (41.7%)	
Abscess on imaging			**0.025**
-No	38 (92.7%)	35 (72.9%)	
-Yes	3 (7.3%)	13 (27.1%)	
Treatment			
Treatment on initial presentation			**0.044**
-Operative	38 (92.7%)	36 (75.0%)	
-Non-operative	3 (7.3%)	12 (25.0%)	
Type of non-operative treatment			0.505
-Antibiotics	3 (100.0%)	7 (58.3%)	
-Antibiotics and drain placement	0 (0.0%)	5 (41.7%)	
Type of operative treatment			**0.013**
-Appendectomy	33 (89.2%)	23 (63.9%)	
-Appendectomy and antibiotic course	4 (10.8%)	13 (36.1%)	
LOS (days)			**0.015**
-Median (Q1, Q3)	1.00 (1.00, 2.00)	2.00 (1.00, 7.00)	
-Range	0.50–9.00	0.50–22.00	

À population comparable :

- La durée des symptômes est plus longue
- Les formes sont + compliquées à l'admission.
- LOS + longue.

Gerall et al., « Delayed Presentation and Sub-Optimal Outcomes of Pediatric Patients with Acute Appendicitis during the COVID-19 Pandemic ». Journal of Pediatric Surgery 2021.

Et le retard diagnostic ? Cancer

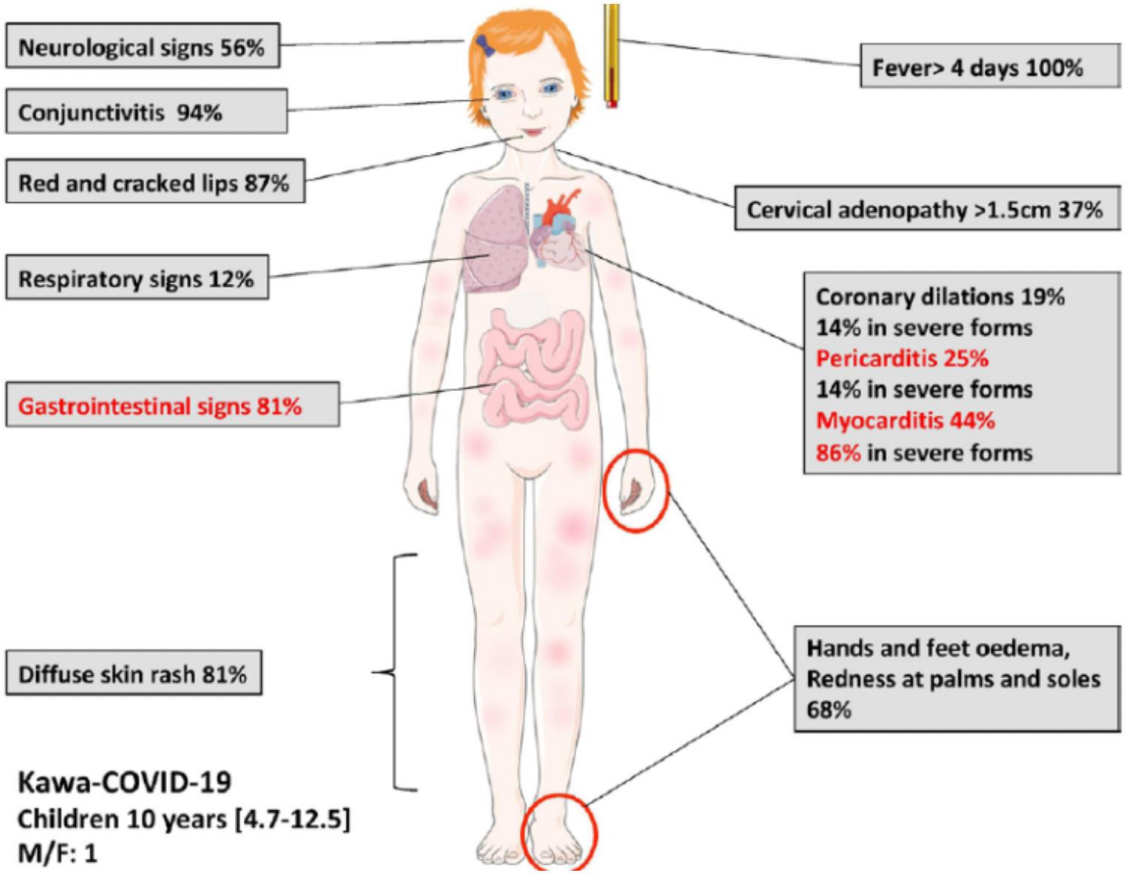
TABLE 1 Clinical characteristics, presentation, and outcomes of children who presented in critical condition and were subsequently diagnosed with cancer

Patient	Age (years)	Sex	Symptoms at presentation	Onset of symptoms	# Visits prior to diagnosis			Presumed diagnosis	Time from initial presentation to diagnosis	Oncologic diagnosis	SARS-CoV-2 RT-PCR assay	Notable laboratory/radiologic findings	Clinical course	Survival status
					Telehealth	PMD/urgent care	ED							
1	4	F	Fevers, emesis, hallucinations	3 weeks	2	1	1	Viral syndrome	2 weeks	B-cell ALL	Negative ×2	WBC 1,000/μL Blasts 1.6% Hgb 2.3 g/dL Platelets 3,000/μL Lactate 13 mmol/L Uric acid 19 mg/dL Blood culture positive for Group G strep Many clusters of bacterial organisms on BMA	Presented in shock. Cardiac arrest with multisystem organ failure. Brain herniation. Hemodialysis delayed due to COVID-19-related staffing shortages.	Deceased (HD 5)
2	16	M	Fevers, cough, emesis, diarrhea, dyspnea	4.5 weeks	0	1	2	Asthma flare and acute otitis media	4 weeks	B-cell ALL	Negative ×3	WBC 1,000/μL Blasts 26% Hgb 3 g/dL Platelets 77,000/μL Lactate 15 mmol/L Uric acid 11.5 mg/dL	Presented in respiratory distress. Cardiac arrest with multisystem organ failure. Small cerebral hemorrhages.	Alive
3	17	F	Abdominal pain, cough, palpitations	2.5 weeks	4	0	1	Gastritis	2 weeks	Stage III DLBCL	Negative ×1	Echocardiogram: large circumferential pericardial effusion with right atrial and ventricular collapse CT chest: large anterior mediastinal mass	Presented in cardiac tamponade. 1.5 L malignant pericardial fluid emergently drained.	Alive
4	10	F	Shortness of breath, lethargy and cyanosis	3 days	Reported parental reluctance to present to care				3 days	T-cell lymphoblastic lymphoma	Negative ×2	pH of 6.9 pCO_2 100 Lactate of 9.2 CT chest: large anterior mediastinal mass	Presented in respiratory distress and obtunded. Emergently intubated	Alive
5	8	M	Fevers, throat pain, pallor, bruising, vomiting, fatigue, and eye pain	4 weeks	0	2	0	Tonsillitis	4 weeks	AML	Negative ×1	WBC 365,000/μL Blasts 89% Hgb 6.1 g/dL Platelets 28,000/μL INR 1.7 Fibrinogen 191	Presented with altered mental status. Status epilepticus and emergent intubation. Intracranial hemorrhage and herniation.	Deceased (HD 5)

Pathologie rare
- Multiple téléconsultation.
- Diagnostic à des stades avancées

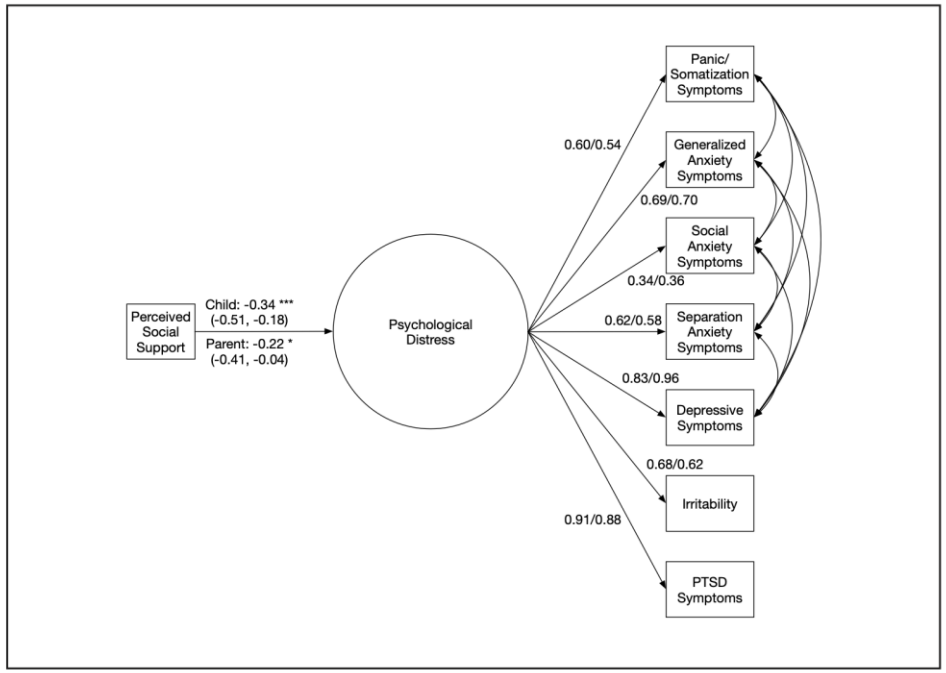
Ding et al., « Delayed Cancer Diagnoses and High Mortality in Children during the COVID-19 Pandemic ». Pediatric blood cancer. 2021.

Emergence d'autres pathologies ? PIMS



Emergence d’autres pathologies ? IDS

Figure 1. Regression of overall psychological distress on perceived social support



Au CHU GA en 2021:

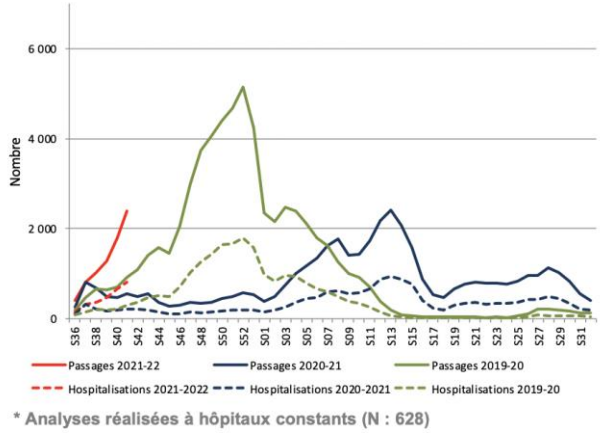
- Autant d’H pour motif psychiatrique
- Mais des pathologies plus grave

Alexandra Mactavish. Children’s Mental Health in Southwestern Ontario during Summer 2020 of the COVID-19 Pandemic. Journal of canadiand child psychiatry. 2021

Quand est il de l’avenir ?

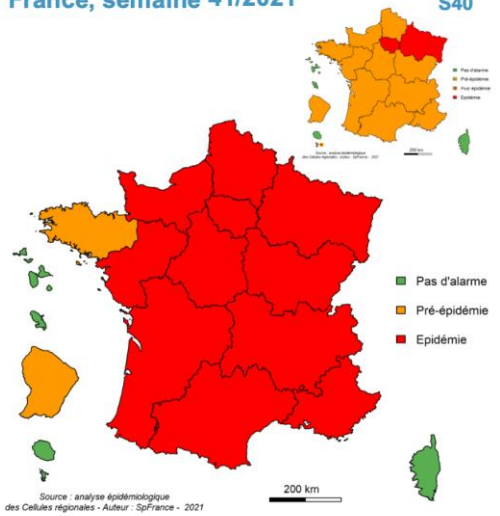
- Recrudescence d’asthme au mois de septembre
- Santé publique France: épidémie explosive de bronchiolite

Fig.1-Passages et hospitalisations suite aux passages aux urgences* pour bronchiolite en France métropolitaine, enfants de moins de 2 ans, 2019-2021



* Analyses réalisées à hôpitaux constants (N : 628)

Fig.2-Niveau d’alerte régional de la bronchiolite, enfants de moins de 2 ans, France, semaine 41/2021



Données en Ile-de-France hors AP-HP en raison d’un problème technique

- Crise de santé mentale

MERCI 😀

- Pour toute question : ekatranji@chu-grenoble.fr