



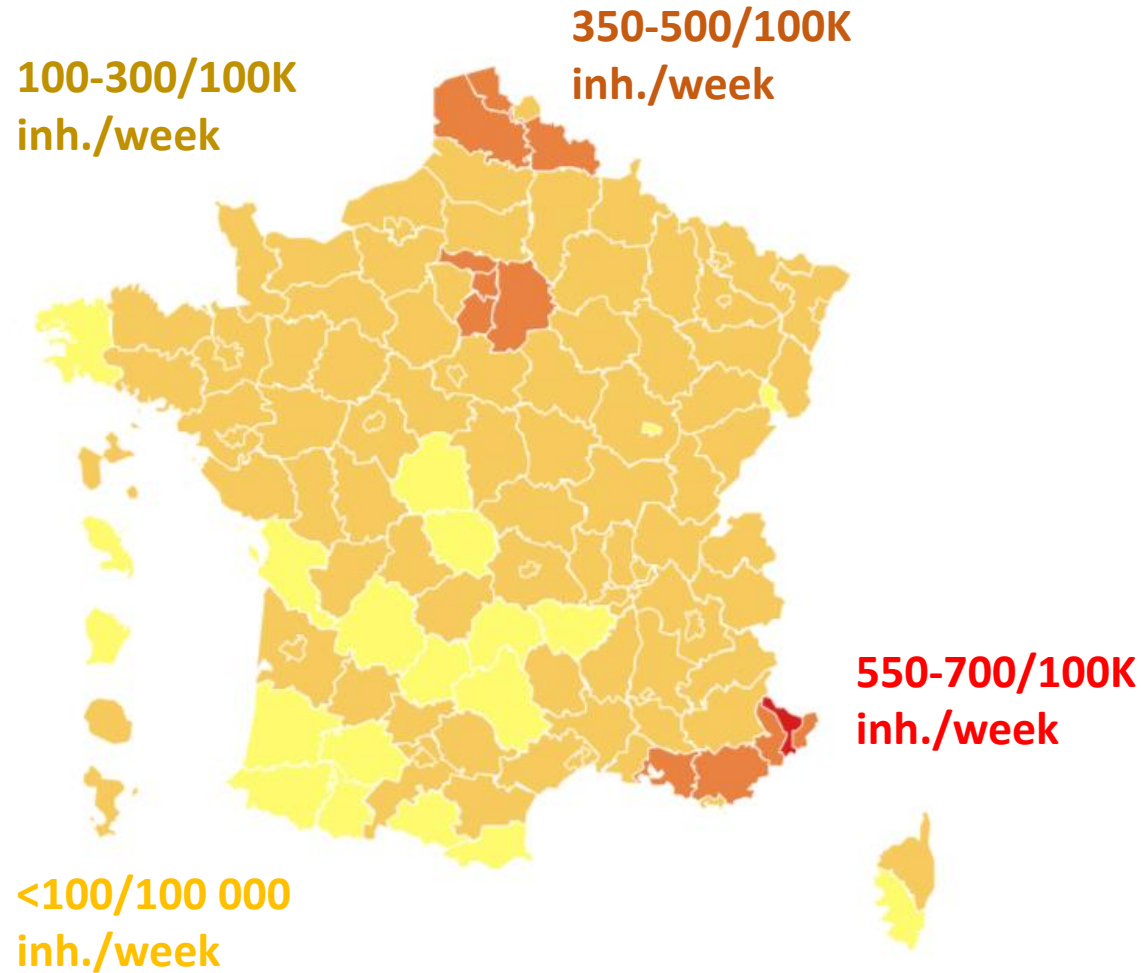
COVID-19 vs. the French Haemovigilance network

- post-donation information and lookback/traceback investigations -
 - RNAemia in blood donors and potential infectivity -

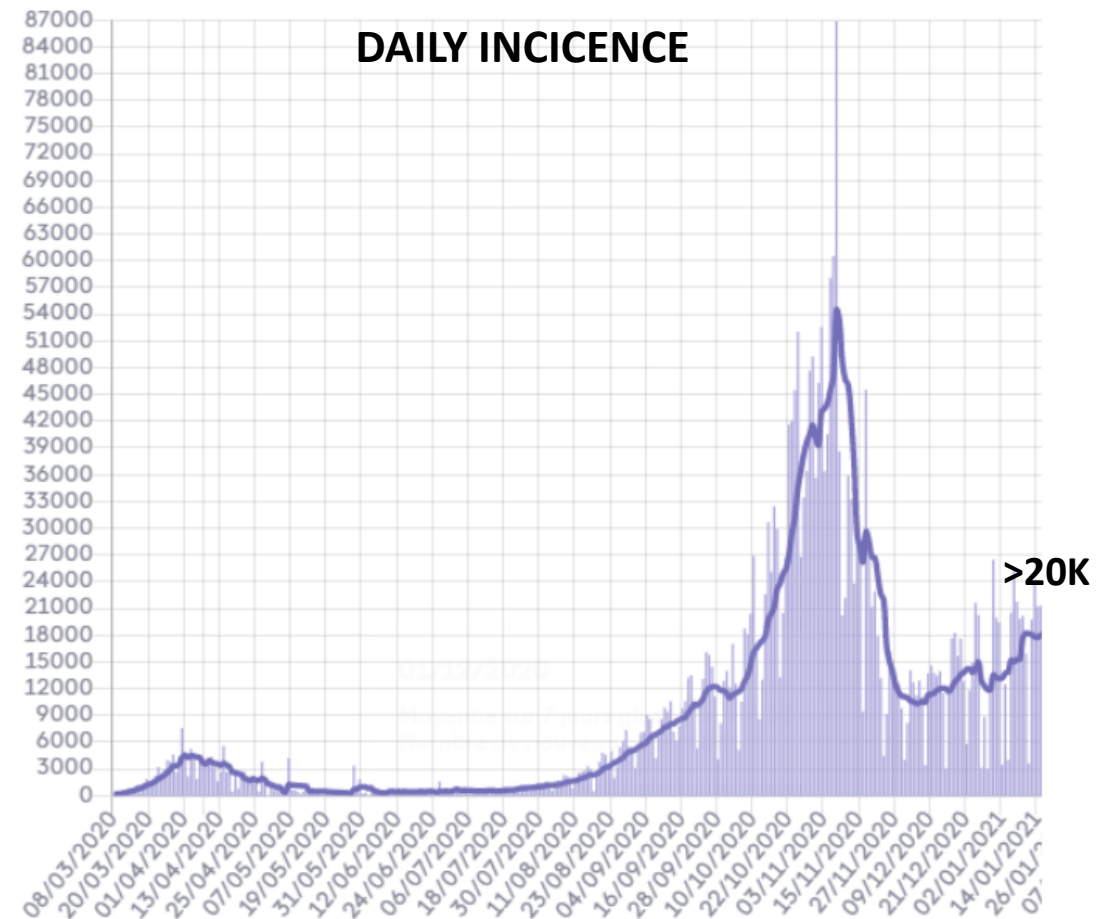
National Reference Centre for Transfusion Infectious Risks
Pierre Cappy, Virginie Sauvage, Daniel Candotti, Syria Laperche

SARS-CoV-2 and COVID-19 in France : incidence

WEEKLY INCINCENCE

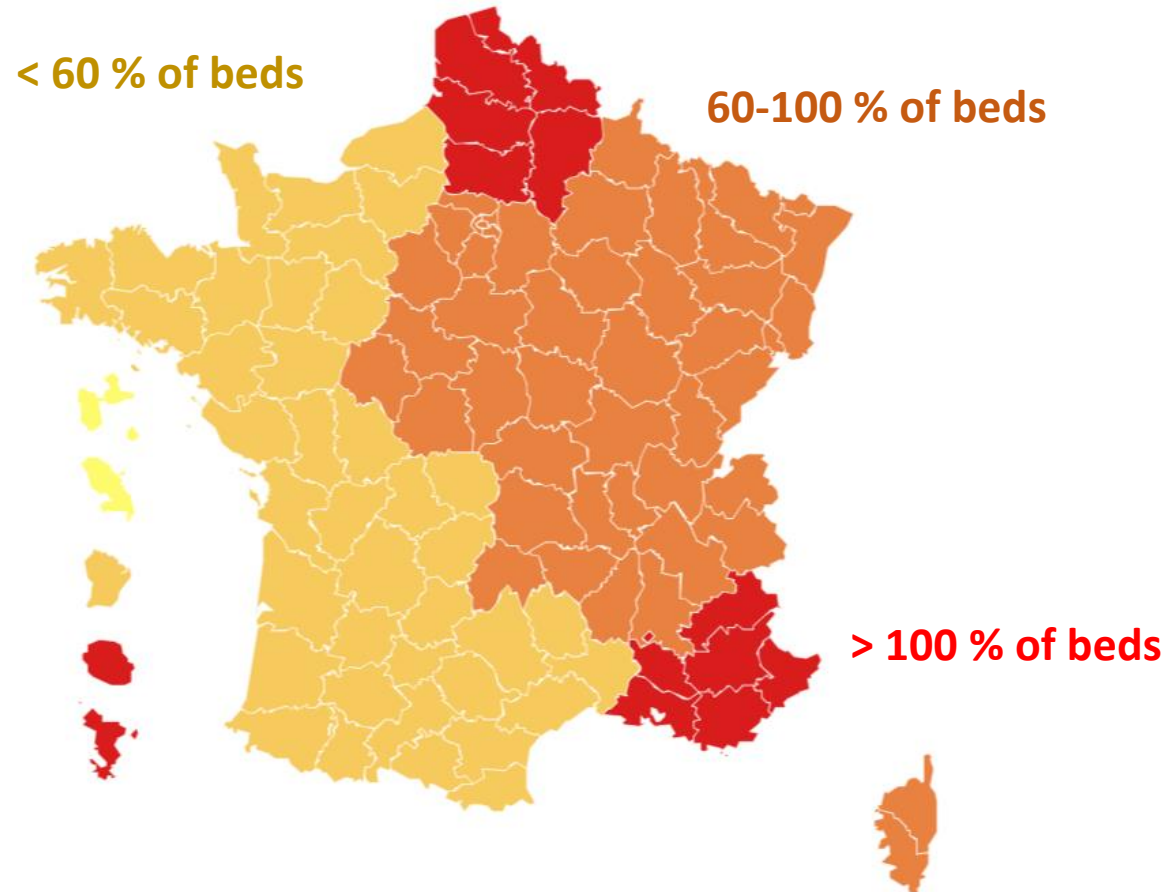


- Smoothed daily incidence (7-day sliding window)
- Daily new cases

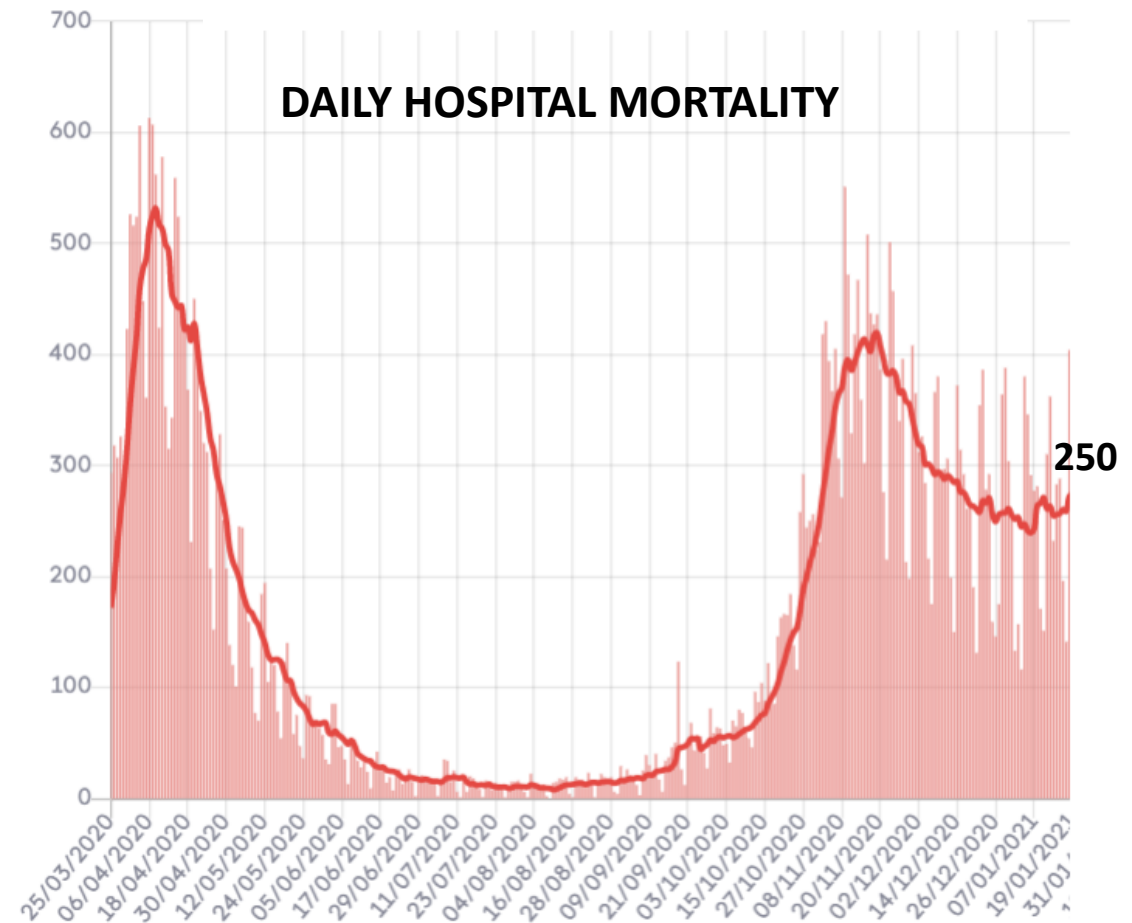


SARS-CoV-2 and COVID-19 in France: mortality

ICU OCCUPATION



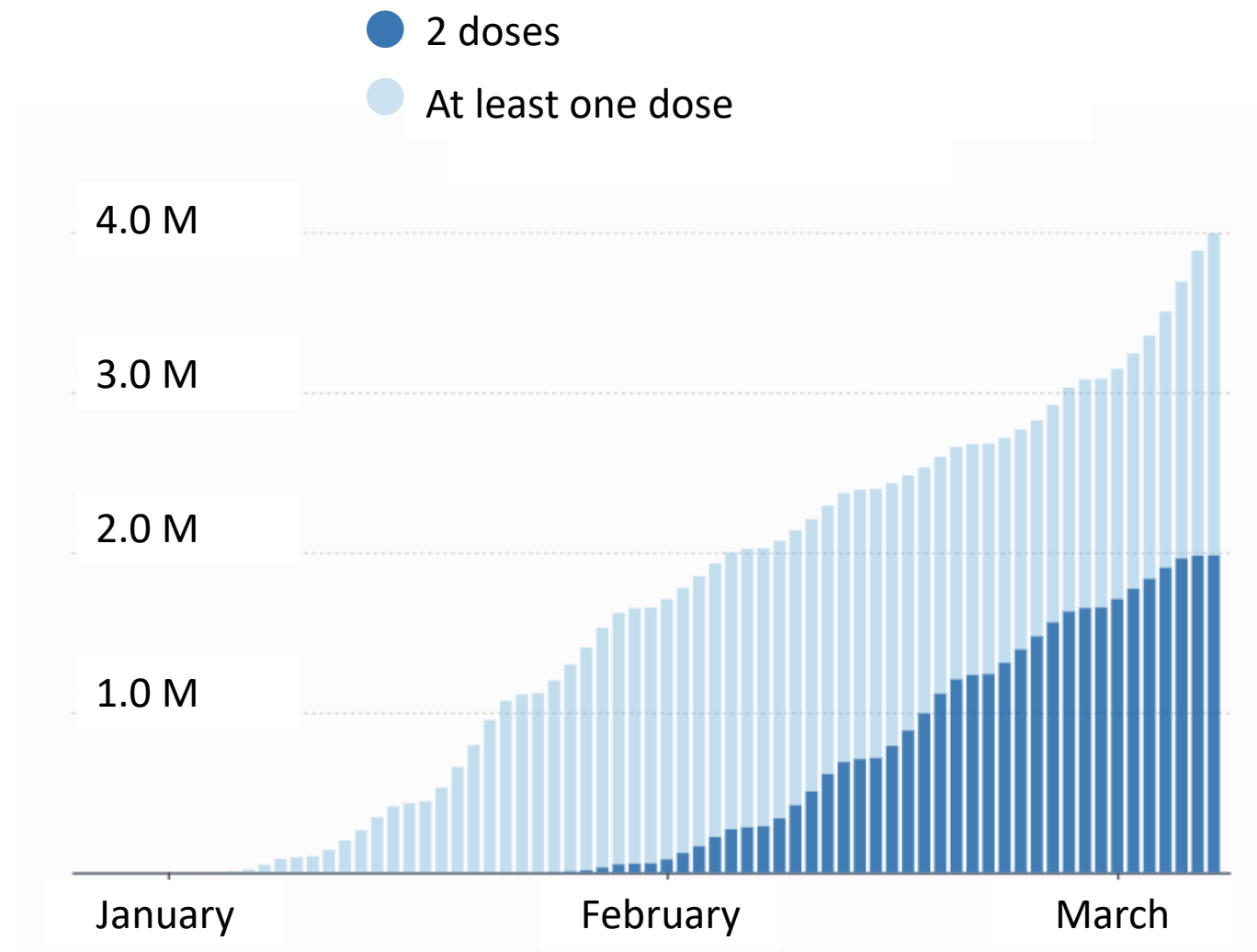
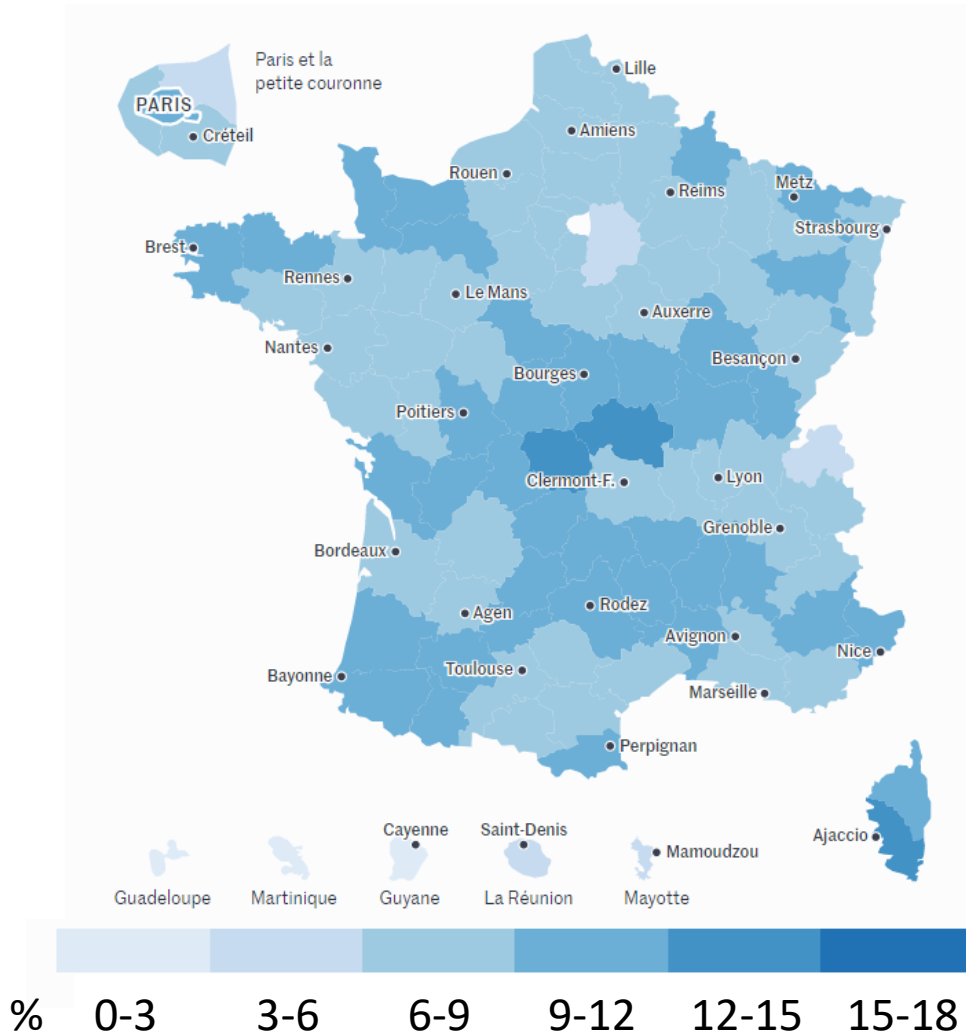
- Smoothed daily hospital mortality (7-day sliding window)
- Daily hospital mortality



SARS-CoV-2 and COVID-19 in France: vaccination

(March 11, 2021)

VACCINATED TRENDS



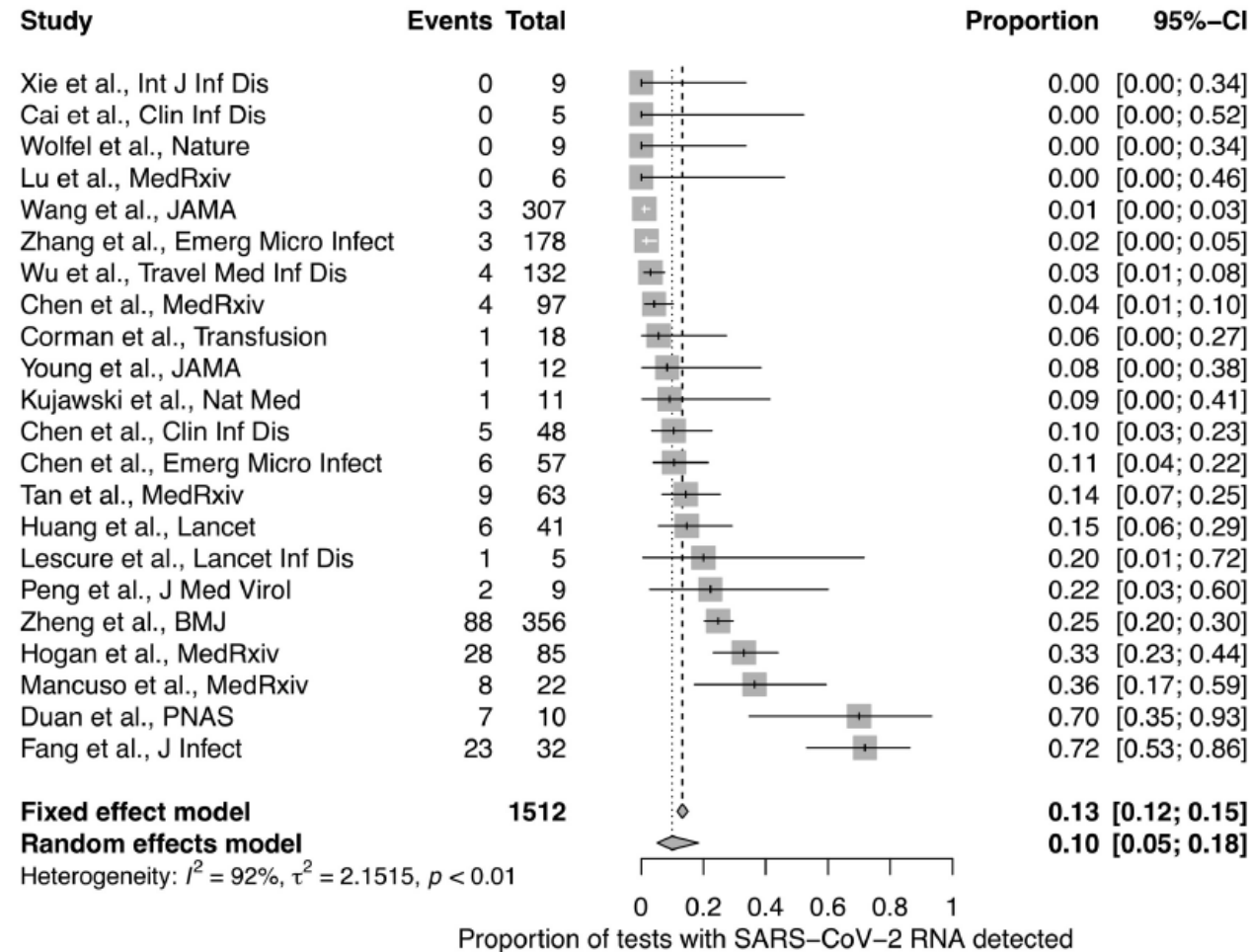
SARS-CoV-2: a potential threat to blood safety ?

Are the criteria met ?

+/-

- presence of the agent in an infectious form in the blood of asymptomatic individuals
- survival of the agent during the processing of blood and the storage of the blood components +/-
- the transmission of the agent via the haematogenous route ?
- clinically apparent disease induced in the recipient of contaminated blood products ?

SARS-CoV-2 RNAemia in clinical cases



- Low
- Heterogenous (60-6000 cp/mL)
- Associated with increased risk of critical disease and death
- No evidence of infectious virus within RNA positive sera in cell culture

Figure 2. Prevalence of SARS-CoV-2 RNA in serum / plasma / whole blood samples from a systematic literature review. Point prevalence indicated for each study with confidence intervals showing citation and number of samples represented (Table 1).

SARS-CoV-2 RNAemia in blood donations

- 10 studies report prospective or retrospective screening of SARS-CoV-2 in blood donations, or PDIs due to COVID-19
 - 4 studies report RNAemia in pre- or asymptomatic blood donors
- (n= 10 individuals in total)

Authors	Journal	Nb of screened donations	RNA +	Transfused blood products			NP swab in recipient	Comments	DOI
				RBC	PC	PLU			
→ Cappy	Blood	268	3	1	1	-	ND	3+ PDI	10.1182/blood.2020008230
→ Chang	Emerging Infectious Diseases	7425	4	-	-	-	NA	1+ prospective/1+ retrospective/2+ PDI	10.1111/trf.15943
Chang	Transfusion	98 342	0	-	-	-	NA	prospective screening	
Cho	Journal of Infection and Public Health	1	ND	-	1	-	0+/1	PDI, case report	10.1016/j.jiph.2020.05.001
Kwon	Vox Sanguinis	7	0	3	6	-	0+/3	7+ PDI	10.1111/vox.12925
Lee	Transfusion Medicine	1	0	-	1	-	0+/1	PDI, case report	140.1111/tme.12724
Liapis	Annals of Hematology	1	ND	1	1	-	0+/1	PDI, case report	10.1016/j.tmr.2020.02.003
→ Pham	Annals of Internal Medicine	700	1	-	-	-	NA	prospective screening	10.1016/j.tmr.2020.02.003
Politis	Transfusion Clinique et Biologique	1	ND	-	1	-	0+/1	PDI, case report	10.1016/j.tracli.2020.10.007
→ Waheed	J Lab Physicians	690	2	2	-	-	0+/2	retrospective screening	10.1055/s-0040-1716663
Total		107436	10	7	11	0			

One-year COVID-19 experience of the French haemovigilance network/NRC

• Methods

- Outreach program on COVID-19 PDI in blood donors (national blood service, **EFS**)
- Detection of SARS-CoV-2 RNA with SARS-COV-2 R-GENE[®] assay (BioMérieux)
- Attempt to amplify and sequencing of positive samples: ARTIC PCR #77, 95
- Attempt to identify VOCs: ARTIC PCR #75, 76
- Attempt to isolate SARS-COV-2 on VERO E6 cells for each positive plasma

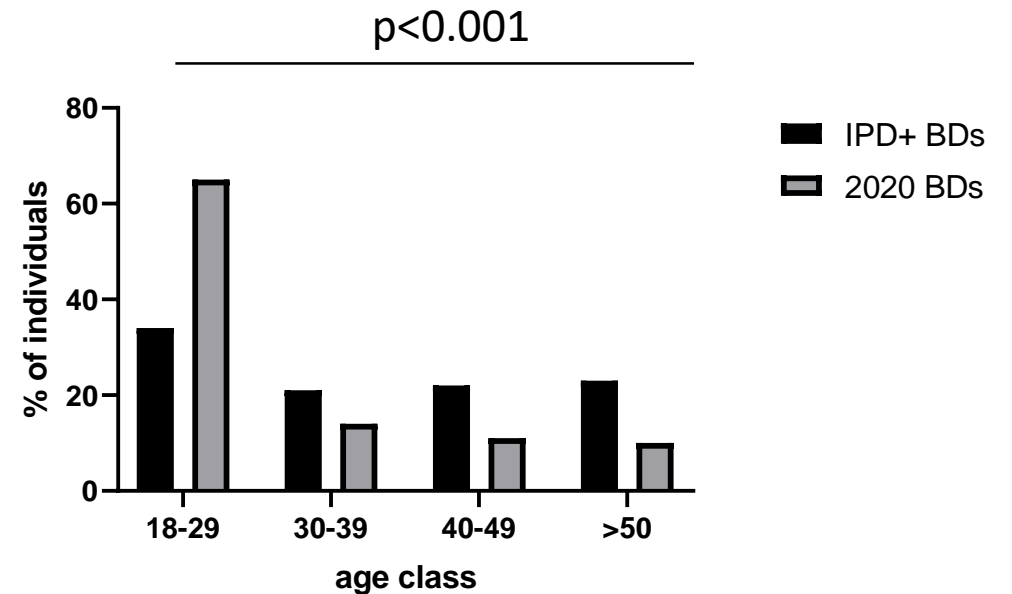
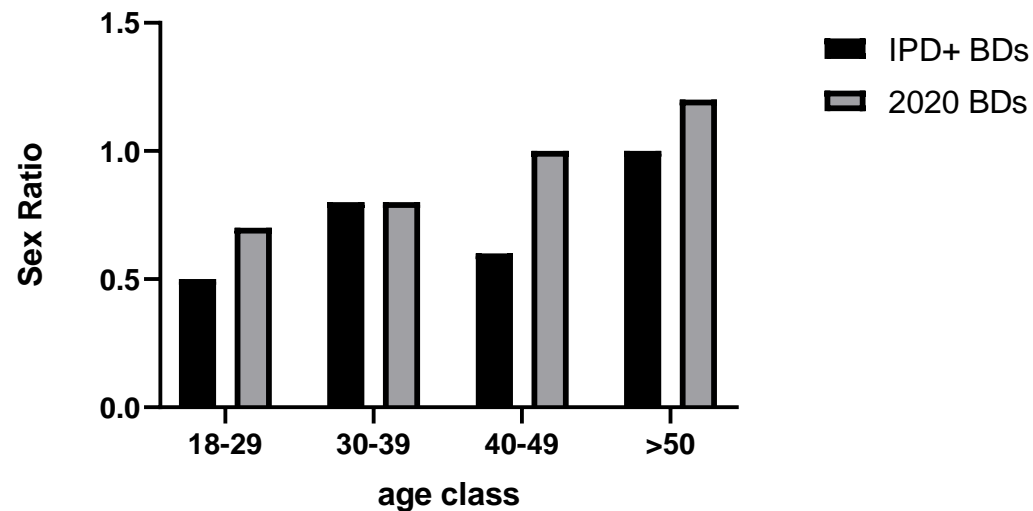
(NRC)

• First report (Cappy et al, Blood, DOI [10.1182/blood.2020008230](https://doi.org/10.1182/blood.2020008230))

- **268** blood donations with PDI => **3** (1.1 %) donations + for SARS-CoV-2 RNA in plasma
- **3** traceback investigations => **0/3** positive donations

IPDs - Population demographics

- 1092 donations investigated
 - 706 (67 %) confirmed SARS-CoV-2+ (nasopharyngeal swabs)
 - 185 (18 %) suspected SARS-CoV-2
 - 77 (7 %) contact cases
 - 87 (8 %) unknown status



IPDs - Detection of SARS-CoV-2 in BDs

- 1092 donations investigated
 - 37 donations positive with SARS-COV-2 R-GENE® assay PCR1
 - Ct between 36.5 and 42.0, in one target of the duplex PCR (FAM, NC)
 - 10 samples confirmed with another assays (qPCR and/or sequencing)
 - 7 samples confirmed by sequencing

	PDI #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37		
real-time	PCR1	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	n			
	Ct	37.9	38.0	37.5	36.9	36.5	38.9	38.8	37.9	41.3	37.8	39.1	38.8	39.2	37.4	38.2	39.5	39.2	39.8	39.0	39.9	41.4	38.6	39.0	39.1	39.4	39.1	39.5	39.4	40.2	37.7	38.6	42.0	37.2	40.1	38.1	38.8	38.7	37	
	PCR2	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
	IPP PCR	+	-	+	+	+	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	+	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	9	
SEQ	ART75	- x3	- x4	+	+	+																																	5	
	ART76	- x4	+	-	+	- x4																																		4
	ART77	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	
	ART95	+	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	
confirmed by another test		Y	Y	Y	Y	Y	Y																			Y		Y											10	
confirmed by seq		Y	Y	Y	Y	Y																						Y											7	

⇒ non repeat reactive: probably very low viral loads

⇒ Or problem of specificity ?

IPDs - Detection of SARS-CoV-2 in BDs

- Confirmation of non-repeat samples (to be done)
 - TMA on panther X10
 - COVID-seq / Illumina sequencing (98 amplicons)
- Investigation on infectivity
 - 3 first samples investigated in cell culture
 - Inoculation of Vera E6 cells with neat plasma and plasma after UC (10.5 mL)
 - Negative results after 1 subculture
 - 23 more samples will be investigated (plasma bag available)

Traceback investigations – 5 patients – 45 donations

- 5 patients, 5-67 years-old
- Received between 2 and 25 blood products
- 20 RBUs, 23 PCs

- None of the 44 traced-back repository samples tested + for SARS-CoV-2
- In particular, none of the RBUs (no pathogen reduction)

Traceback investigations: case reports

- Case 4

- 5-yo patient, sickle-cell disease => HCST (allograft)
- March 3-27: 21 APC + 8 PPC + 2 RCU
- March 23: cough + March 28: fever and facial diplegia
- March 30: SARS-CoV-2 +
- April 1-30: ICU

- Parents: asymptomatic and SARS-CoV-2 neg
- Medical staff asymptomatic but not tested
- 2 COVID+ children in the same haematology unit

- Donations from 17 APC + 8 PPC + 2 RCU tested neg for SARS-CoV-2 at NRC
- accountability of blood donations excluded

Traceback investigations: case reports

- Case 5

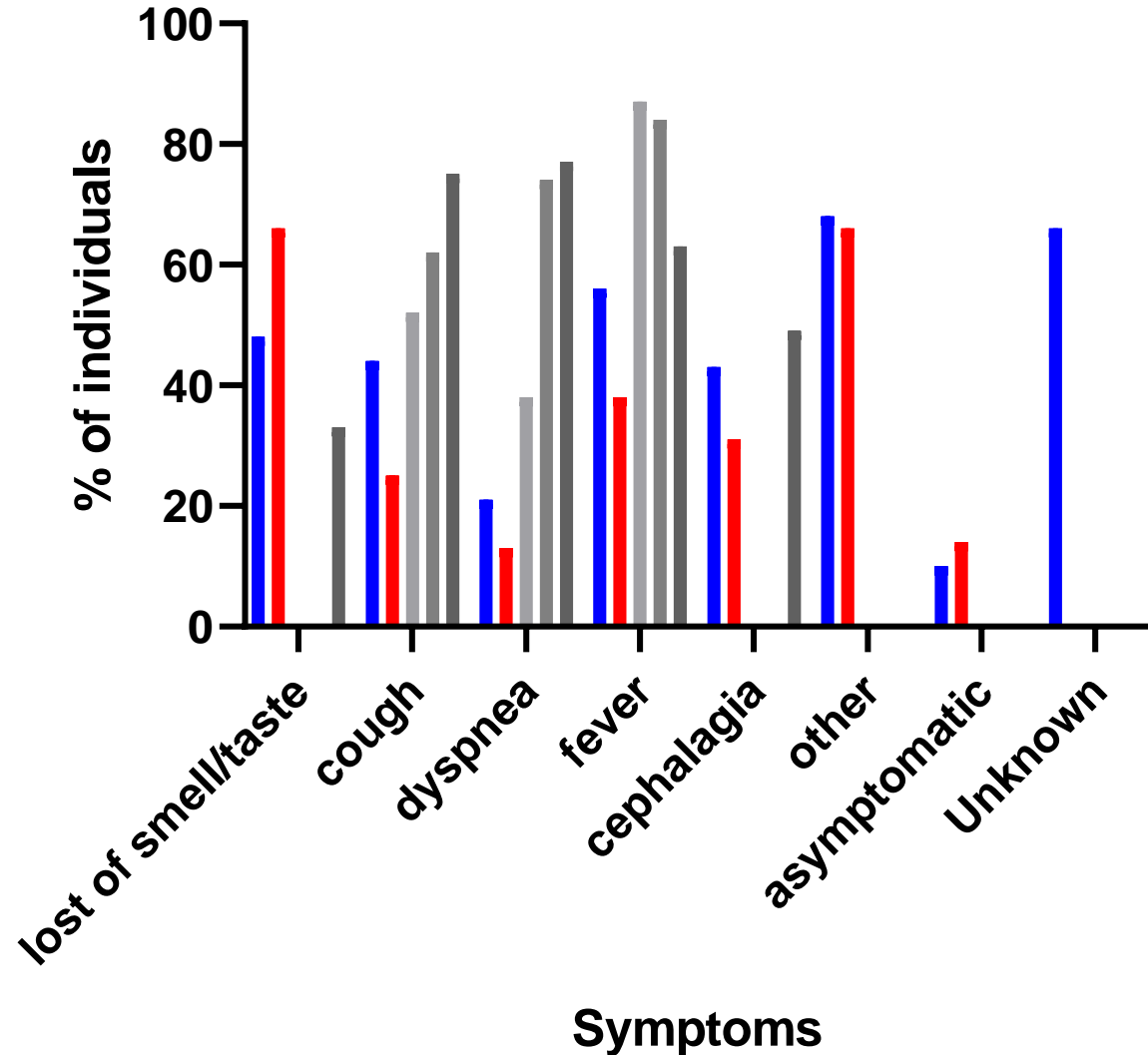
- October 20: 2 RBUs
- October 23: lung infection + fever
- October 28: patient died

- No symptomatic/RT-PCR+ relatives

- 2 donations tested neg for SARS-CoV-2

Thanks for attention 😊

IPDs- Clinical data



■ non RNAemic (n= 1055)

■ RNAemic (n= 37)

■ meta-analysis 1 (46959 patients)*

■ meta-analysis (3420 patients)**

■ Brendish et al (1054 patients)***

* Cao et al., J Med Virol, doi:10.1002/jmv.25822

** Hasani et al., BioMed Res, doi:10.1155/2020/3149020

*** Brendish et al., J Inf, doi:10.1016/j.jinf.2020.09.033

- Milder symptoms
- Anosmia/ageusia ++