

# The Daily COVID-19 Literature Surveillance Summary

**October 29, 2020**



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# COVID-19 Daily Literature Surveillance

COVID19LST



Bringing you real time, distilled information for guiding best practices during the COVID-19 pandemic

# LEVEL OF EVIDENCE

Oxford Centre for Evidence-Based Medicine 2011 Levels of Evidence

Question	Step 1 (Level 1*)	Step 2 (Level 2*)	Step 3 (Level 3*)	Step 4 (Level 4*)	Step 5 (Level 5)
<b>How common is the problem?</b>	Local and current random sample surveys (or censuses)	Systematic review of surveys that allow matching to local circumstances**	Local non-random sample**	Case-series**	n/a
<b>Is this diagnostic or monitoring test accurate? (Diagnosis)</b>	Systematic review of cross sectional studies with consistently applied reference standard and blinding	Individual cross sectional studies with consistently applied reference standard and blinding	Non-consecutive studies, or studies without consistently applied reference standards**	Case-control studies, or "poor or non-independent reference standard"**	Mechanism-based reasoning
<b>What will happen if we do not add a therapy? (Prognosis)</b>	Systematic review of inception cohort studies	Inception cohort studies	Cohort study or control arm of randomized trial*	Case-series or case-control studies, or poor quality prognostic cohort study**	n/a
<b>Does this intervention help? (Treatment Benefits)</b>	Systematic review of randomized trials or n-of-1 trials	Randomized trial or observational study with dramatic effect	Non-randomized controlled cohort/follow-up study**	Case-series, case-control studies, or historically controlled studies**	Mechanism-based reasoning
<b>What are the COMMON harms? (Treatment Harms)</b>	Systematic review of randomized trials, systematic review of nested case-control studies, n-of-1 trial with the patient you are raising the question about, or observational study with dramatic effect	Individual randomized trial or (exceptionally) observational study with dramatic effect	Non-randomized controlled cohort/follow-up study (post-marketing surveillance) provided there are sufficient numbers to rule out a common harm. (For long-term harms the duration of follow-up must be sufficient.)*	Case-series, case-control, or historically controlled studies**	Mechanism-based reasoning
<b>What are the RARE harms? (Treatment Harms)</b>	Systematic review of randomized trials or n-of-1 trial	Randomized trial or (exceptionally) observational study with dramatic effect			
<b>Is this (early detection) test worthwhile? (Screening)</b>	Systematic review of randomized trials	Randomized trial	Non-randomized controlled cohort/follow-up study**	Case-series, case-control, or historically controlled studies**	Mechanism-based reasoning

\* Level may be graded down on the basis of study quality, imprecision, indirectness (study PICO does not match questions PICO), because of inconsistency between studies, or because the absolute effect size is very small; Level may be graded up if there is a large or very large effect size.

\*\* As always, a systematic review is generally better than an individual study.

## How to cite the Levels of Evidence Table

OCEBM Levels of Evidence Working Group\*. "The Oxford 2011 Levels of Evidence". Oxford Centre for Evidence-Based Medicine. <http://www.cebm.net/index.aspx?o=5653>

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# EXECUTIVE SUMMARY

## Epidemiology

- An online survey of 1777 pregnant and postpartum women conducted in Japan found [high prevalence of prenatal anhedonia, depression, and anxiety](#) (17%; evaluated via Edinburgh Postnatal Depression Scale [EDPS]), which was positively correlated with perceived risk of contracting COVID-19, concerns regarding financial effects of the pandemic, and lack of social support during the COVID-19 pandemic.

## Understanding the Pathology

- A prospective observational study conducted at Infanta Leonor University Hospital in Madrid, Spain from analyzed [26 COVID-19 positive patients with pulmonary embolisms \(PE\)](#) who were screened for deep vein thrombosis (DVT) via compression ultrasound and found just 2 had evidence of DVT on compression ultrasound, one in their left popliteal vein and the other in their left femoral vein.

## Transmission & Prevention

- Researchers from Brazil analyzed results of 4,353 RT-PCR SARS-CoV-2 tests and 2,275 SARS-CoV-2 antibody tests of patients with known blood types collected before June 22, 2020 and found an insignificantly higher infection rate in individuals with type A blood compared to type O blood, indicating that [ABO blood types may have a less direct effect on rates of SARS-CoV-2 infections](#) than previously predicted and that altered rates of infection may be mediated by other qualities of the population being studied.

## Management

- A prospective observational study conducted in Spain examined the complete blood count (CBC) and cell population data (CPD), via XN20 analyser, of 153 COVID-19 patients and 72 bacterial infection patients and found neutrophil-to-lymphocyte ratio (NLR) values helped distinguish COVID-19 and bacterial infections (positive predictive value 74.1%, negative predictive value 97.1%), suggesting that [NLR, along with other CBC and CPD values, may assist in accurately differentiating infectious etiologies](#) during the COVID-19 pandemic.

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## EPIDEMIOLOGY

### SYMPTOMS AND CLINICAL PRESENTATION

#### PREGNANT PERSONS

##### **THE COVID-19 PANDEMIC AND MENTAL WELL-BEING OF PREGNANT WOMEN IN JAPAN: NEED FOR ECONOMIC AND SOCIAL POLICY INTERVENTIONS**

Matsuhashima M, Horiguchi H.. Disaster Med Public Health Prep. 2020 Sep 10:1-11. doi: 10.1017/dmp.2020.334. Online ahead of print.

Level of Evidence: 3 - Local non-random sample

#### BLUF

An online survey of pregnant and postpartum women (n=1777) conducted in Japan from May 31 to June 6, 2020 found high prevalence of prenatal anhedonia, depression, and anxiety (17%; evaluated via Edinburgh Postnatal Depression Scale [EPDS]), which was positively correlated with perceived risk of contracting COVID-19, concerns regarding financial effects of the pandemic, and lack of social support during the COVID-19 pandemic (Table 2). These findings suggest an urgent need for increased social and financial support to improve the health and well-being of pregnant women during the COVID-19 pandemic.

#### ABSTRACT

**OBJECTIVE:** This study explores the mental well-being of pregnant women during the COVID-19 pandemic in Japan.

**METHODS:** We collected 1777 responses from pregnant women through an online survey. Using the Japanese version of the Edinburgh Postnatal Depression Scale (EPDS), we calculated the percentage of pregnant women above the cut-off ( $\geq 13$ ), and the factor scores of anhedonia, anxiety, and depression. Regression analyses were performed to identify factors and socio-economic characteristics correlated with depressive symptoms. **RESULTS:** The point prevalence of pregnant women with an EPDS score of  $\geq 13$  was 17%. The mean scores were 0.73, 3.68, and 1.82 for anhedonia, anxiety, and depression, respectively. The probability of becoming above the cutoff score positively correlated with the cancellation of planned informal support, higher perceived risk for infection of COVID-19, difficulties in household finances, and lack of social support. Moreover, being younger, less wealthy, unemployed, and without a partner showed a significantly higher possibility of having a score above the cutoff. **CONCLUSIONS:** The present study found a high percentage of pregnant women with depressive symptoms. Notably, COVID-19 related variables including perceived risk for the infection, fear of decreasing economic wealth, and social support were significantly associated with depressive symptoms.

## FIGURES

**Table 2 Results of regression analyses**

	EPDS≥13	Anhedonia	Anxiety	Depression
	Odds Ratio	Coefficients	Coefficients	Coefficients
	[95% CI]	[95% CI]	[95% CI]	[95% CI]
<b>Experiences during COVID-19</b>				
Cancellation of planned informal support	1.79 ** [1.22- 2.61]	0.29 [0.09- 0.49]	0.23 [-0.10- 0.55]	0.40 * [0.05- 0.75]
<b>Perceived risk (COVID-19 related)</b>				
Financial difficulties	1.19 *** [1.10- 1.28]	0.07 *** [0.04- 0.09]	0.14 *** [0.08- 0.21]	0.14 *** [0.08- 0.20]
COVID-19 infection	1.13 * [1.02- 1.25]	0.04 * [0.01- 0.08]	0.18 *** [0.09- 0.26]	0.07 [-0.00- 0.14]
Not receiving informal childcare support	1.13 ** [1.03- 1.23]	0.05 ** [0.02- 0.09]	0.15 *** [0.08- 0.22]	0.12 *** [0.06- 0.19]
<b>Respondents' socio-demographic, -economic information</b>				
Age of the respondents (Ref: Age≥35 years)				
Age <25 years	1.80 * [1.09- 1.97]	-0.12 [-0.03- 0.18]	1.03 *** [0.14- 0.58]	0.64 * [0.13- 0.54]
Lower income group (Ref: ≥ 5 million yen)	1.47 * [1.09- 1.97]	0.08 [-0.17- 0.14]	0.36 ** [0.13- 0.64]	0.33 ** [-0.07- 0.40]
Working/full-time housewife status (Ref: Full-time employed worker)				
Full-time housewife/student	1.43 * [1.03- 1.98]	0.01 [-0.17- 0.14]	0.39 ** [0.15- 1.20]	0.16 [-1.03- 1.08]
Unemployed (under job search)	2.51 * [1.08- 5.82]	0.68 * [0.15- 1.20]	0.02 [-1.03- 1.08]	0.64 [-0.40- 1.67]
Marital status (Ref: Married)				
Unmarried	2.16 * [1.11- 4.18]	0.20 [-0.15- 0.56]	-0.04 [-0.68- 0.59]	1.20 ** [0.48- 1.93]
Divorced/Widowed	3.43 * [1.14- 10.36]	1.14 * [0.28- 2.01]	1.82 ** [0.44- 3.19]	2.99 *** [1.46- 4.51]
Constant	0.02 ***	0.289	1.033	0.157
Log likelihood= -735.215				
R2=0.101				
F (31,1745)				
LR chi2(31)= 149.50***				
= 4.70***				
= 8.87***				
= 7.25***				

Note: \*\*\* p<.001, \*\* p<.01, \*p<.05

Number of observations: 1777

## UNDERSTANDING THE PATHOLOGY

### INCIDENCE OF DEEP VENOUS THROMBOSIS IN PATIENTS WITH COVID-19 AND PULMONARY EMBOLISM: COMPRESSION ULTRASOUND COVID STUDY

Franco-Moreno A, Herrera-Morueco M, Mestre-Gómez B, Muñoz-Rivas N, Abad-Motos A, Salazar-Chiriboga D, Duffort-Falcó M, Medrano-Izquierdo P, Bustamante-Fermosel A, Pardo-Guimera V, Ulla-Anés M, Torres-Macho J; Infanta Leonor Thrombosis Research Group.. J Ultrasound Med. 2020 Oct 5. doi: 10.1002/jum.15524. Online ahead of print.  
Level of Evidence: 3 - Local non-random sample

#### BLUF

A prospective observational study conducted at Infanta Leonor University Hospital in Madrid, Spain from March 30 to May 6, 2020 analyzed COVID-19 positive patients ( $n=26$ ) with pulmonary embolisms (PE) who were screened for deep vein thrombosis (DVT) via compression ultrasound and found just 2/26 had evidence of DVT on compression ultrasound, one in their left popliteal vein (Figure 1A) and the other in their left femoral vein (Figure 2A). Authors suggest that PE in the setting of COVID-19 is more likely attributed to local thrombo-inflammation syndrome as opposed to sequela from DVT.

#### ABSTRACT

**OBJECTIVES:** Several reports had observed a high risk of pulmonary embolism (PE) in patients with coronavirus disease 2019 (COVID-19), most of them in the intensive care unit. Reported findings indicate that a direct viral-mediated hyperinflammatory response leads to local thromboinflammation. According to those findings, the incidence of deep venous thrombosis (DVT) in patients with COVID-19 and PE should be low. The objective of this study was to evaluate the incidence of DVT in patients with COVID-19 who developed PE. **METHODS:** In this prospective observational study, consecutive patients hospitalized in the internal medicine ward with a diagnosis of COVID-19 who developed PE were screened for DVT in the lower extremities with complete compression ultrasound. **RESULTS:** The study comprised 26 patients. Fifteen patients (57.7%) were male. The median age was 60 years (interquartile range, 54-73 years). Compression ultrasound findings were positive for DVT in 2 patients (7.7%; 95% confidence interval, 3.6%-11.7%). Patients with DVT had central and bilateral PE. In both, venous thromboembolism was diagnosed in the emergency department, so they did not receive previous prophylactic therapy with low-molecular-weight heparin. Patients without DVT had higher median d-dimer levels: 25,688 mug/dL (interquartile range, 80,000-1210 mug/dL) versus 5310 mug/dL ( $P < .05$ ). **CONCLUSIONS:** Our study showed a low incidence of DVT in a cohort of patients with COVID-19 and PE. This observation suggests that PE in these patients could be produced mainly by a local thromboinflammatory syndrome induced by severe acute respiratory syndrome coronavirus 2 infection and not by a thromboembolic event.

#### FIGURES

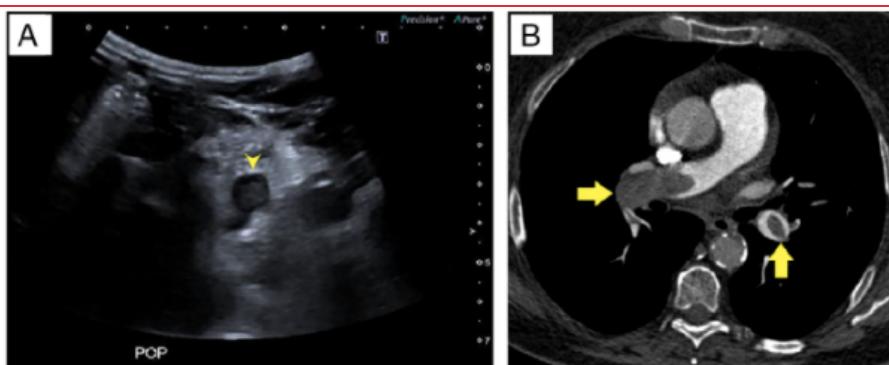


Figure 1. A, Thrombosed popliteal vein. Transverse ultrasound scan shows an echogenic clot in the left popliteal vein (arrowhead). B, Bilateral PE. Computed tomographic pulmonary angiography shows bilateral filling defects in the right pulmonary artery and the left lower lobar artery (arrows).

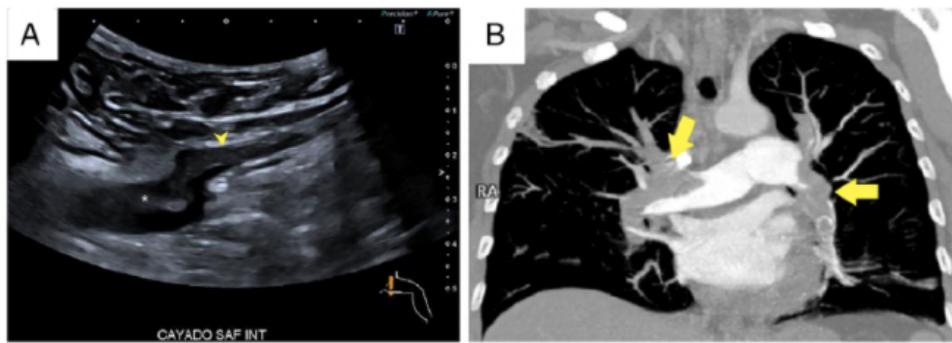


Figure 2. A, Thrombus in the common femoral vein (CFV). Transverse ultrasound scan shows a partial filling defect in the saphenous vein(arrowhead) and the common femoral vein (asterisk) just above the saphenous junction. B, Bilateral pulmonary embolism. Coronalmaximum-intensity projection CT pulmonary angiography shows bilateral filling defects in the two main pulmonary arteries and their lobarbranches (arrows).

# TRANSMISSION & PREVENTION

## LACK OF ASSOCIATION BETWEEN ABO BLOOD GROUPS AND SUSCEPTIBILITY TO SARS-COV-2 INFECTION

Levi JE, Telles PR, Scrivani H, Campana G.. Vox Sang. 2020 Oct 26. doi: 10.1111/vox.13015. Online ahead of print.  
Level of Evidence: 3 - Non-randomized controlled cohort/follow-up study

### BLUF

Researchers from Dasa Laboratorie (Brazil) present evidence that counters results from a group of studies (summarized by Focosi, 2020) who claimed that there is a higher rate of SARS-CoV-2 infection in individuals with blood type A than in patients with type O. From the Dasa database, the authors analyzed results of 4,353 RT-PCR SARS-CoV-2 tests and 2,275 SARS-CoV-2 antibody tests of patients with known blood types (collected before June 22, 2020) and found an insignificantly higher infection rate in individuals with type A blood compared to type O blood (Table 1, 2). These results indicate that ABO blood types may have a less direct effect on rates of SARS-CoV-2 infections than previously predicted and that altered rates of infection may be mediated by other qualities of the population being studied.

### FIGURES

	Patients in general <sup>#</sup>		SARS-CoV-2 suspects		SARS-CoV-2 positives <sup>*..#</sup>		
Blood group							
O	843	108	46.5%	3002	46.5%	913	44.8%
A	682	074	37.62%	2505	38.8%	816	40.1%
B	217	970	12.02%	713	11.0%	237	11.6%
AB	70	085	3.87%	237	3.7%	71	3.5%
Total	1 813	237	100%	6457	100%	2037	100%

\*Either by RT-PCR ( $n = 1589$ ), serology ( $n = 442$ ) or both ( $n = 6$ ).

<sup>#</sup>Chi-square for patients in general x SARS-CoV-2-positive patient comparison,  $P$ -value = 0.1405.

Table 1 Frequency of ABO blood group types in the general patient's population, SARS-CoV-2 testing patients and SARS-CoV-2-reactive patients

Blood group	SARS-CoV-2+	SARS-CoV-2-	Total	% COVID+
O <sup>a</sup>	913	2089	3002	0.30
A <sup>a</sup>	816	1689	2505	0.32
B	237	476	713	0.33
AB	71	166	237	0.29
TOTAL	2037	4420	6457	

<sup>a</sup>Chi-square for A x O blood group comparison,  $P$ -value = 0.085.

Table 2 SARS-CoV-2 reactivity (serology and/or qPCR) according to ABO blood group

# DIFFERENT TRANSMISSION DYNAMICS OF COVID-19 AND INFLUENZA SUGGEST THE RELATIVE EFFICIENCY OF ISOLATION/QUARANTINE AND SOCIAL DISTANCING AGAINST COVID-19 IN CHINA

Lei H, Wu X, Wang X, Xu M, Xie Y, Du X, Cowling BJ, Li Y, Shu Y.. Clin Infect Dis. 2020 Oct 20:ciaa1584. doi: 10.1093/cid/ciaa1584. Online ahead of print.

Level of Evidence: Other - Modeling

## BLUF

Public Health researchers, primarily from Zhejiang University (China), used 2018-2020 data on the spread of seasonal influenza to create models of COVID-19 transmission in 2020 and examine the relative effectiveness of isolation/quarantine protocols and social distancing. They found that the mean effective reproductive number in China prior to interventions like social distancing and isolation was about 2.12 (Figure 4A, 4B). Additionally, they estimated that isolation/quarantine and social distancing reduced COVID-19 spread by 48.1% and 34.6%, respectively, by March 11, 2020, suggesting that both interventions were needed to control COVID-19 spread.

## ABSTRACT

**BACKGROUND:** Non-pharmaceutical interventions (NPIs) against Coronavirus Disease 2019 (COVID-19) are vital to reducing the transmission risks. However, the relative efficiency of social distancing against COVID-19 remains controversial, since social distancing and isolation/quarantine were implemented almost at the same time in China. **METHODS:** In this study, surveillance data of COVID-19 and seasonal influenza in the year 2018-2020 were used to quantify the relative efficiency of NPIs against COVID-19 in China, since isolation/quarantine was not used for the influenza epidemics. Given that the relative age-dependent susceptibility to influenza and COVID-19 may vary, an age-structured Susceptible-Infected-Recovered model was built to explore the efficiency of social distancing against COVID-19 under different population susceptibility scenarios. **RESULTS:** The mean effective reproductive number,  $R_t$ , of COVID-19 before NPIs was 2.12 (95% confidential interval (CI): 2.02-2.21). By March 11, 2020, the overall reduction in  $R_t$  of COVID-19 was 66.1% (95% CI: 60.1%-71.2%). In the epidemiological year 2019/20, influenza transmissibility reduced by 34.6% (95% CI: 31.3%-38.2%) compared with that in the epidemiological year 2018/19. Under the observed contact patterns changes in China, social distancing had similar efficiency against COVID-19 in three different scenarios. By assuming same efficiency of social distancing against seasonal influenza and COVID-19 transmission, isolation/quarantine and social distancing could lead to a 48.1% (95% CI: 35.4%-58.1%) and 34.6% (95% CI: 31.3%-38.2%) reduction of the transmissibility of COVID-19. **CONCLUSIONS:** Though isolation/quarantine is more effective than social distancing, given that typical basic reproductive number of COVID-19 is 2-3, isolation/quarantine alone could not contain the COVID-19 pandemic effectively in China.

## FIGURES

Figure 4A

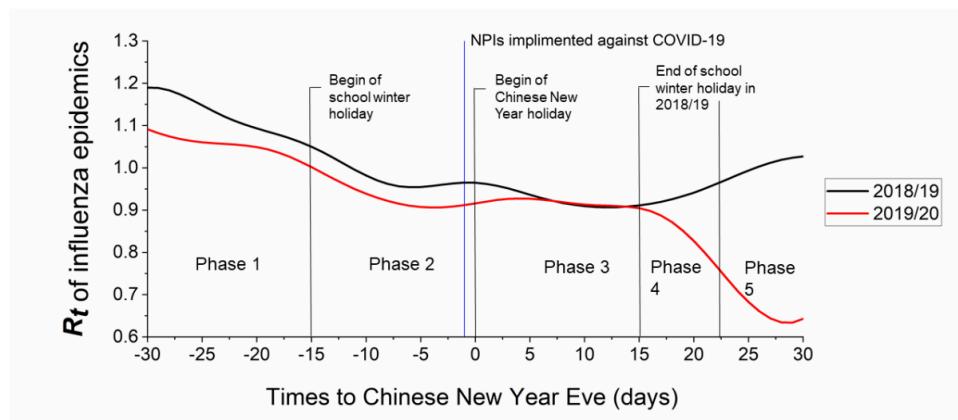


Figure 4A. Daily effective reproductive number of infections: Seasonal influenza in the epidemiological years 2018/19 and 2019/20, the daily effective reproductive number of influenza with 95% confidential interval is in the Supplementary 4

Figure 4B

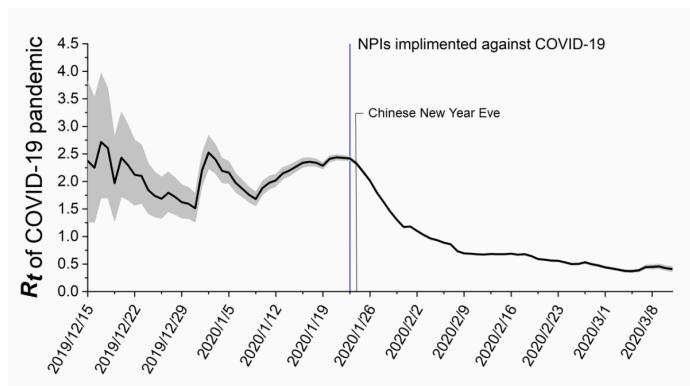


Figure 4B. Daily effective reproductive number of infections: COVID-19 pandemic, with grey area representing the 95% confidential interval.

## DEVELOPMENTS IN TRANSMISSION & PREVENTION

### UNDERSTANDING COVID-19 VACCINES AND THEIR DEVELOPMENT

Patel SS, Kalma J, Bluman EM.. J Bone Joint Surg Am. 2020 Oct 21;102(20):1759-1769. doi: 10.2106/JBJS.20.01191.

Level of Evidence: 2 - Review / Literature Review

#### BLUF

Investigators within Orthopaedic Surgery review the current vaccine developments against SARS-CoV-19, the importance of herd immunity (Figure 5), and the factors impacting populating immunity (Table 3). Vaccine types currently under development include attenuated, inactivated, subunit, mRNA, DNA plasmid, and recombinant adenovirus vector based (Table 2). The authors conclude that challenges still remain in creating a COVID-19 vaccine that is ready for universal use, however recombinant methods may help speed up the process.

#### FIGURES

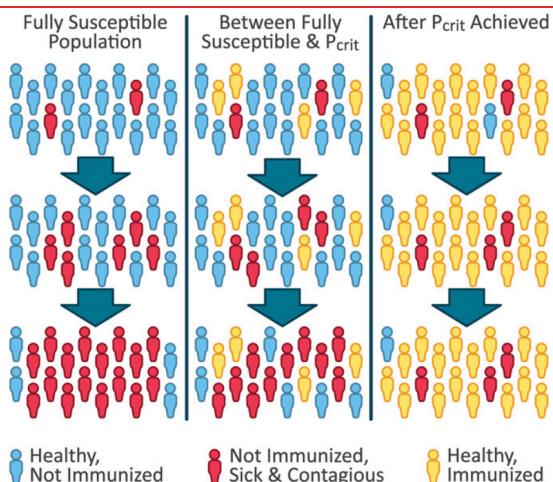


Figure 5. Illustration demonstrating herd immunity. The spread of a hypothetical illness within a population is shown under 3 different conditions. The top row is a time early after the introduction of the pathogen within a population. The second row represents 1 replication cycle and the third row represents 2 replication cycles following the time represented in the top row. In the left column, the population is fully susceptible (no naturally acquired immunity or immunity through vaccination) to the pathogen. The middle column represents an intermediate state between full susceptibility and achievement of the herd immunity threshold ( $P_{crit}$ ). The column on the right represents how spread is hindered in a population that has already achieved  $P_{crit}$ .

**TABLE II SARS-CoV-2 Candidate Vaccines Currently in Clinical Development\***

Vaccine Type	Clinical Phase of Development	Trial No. (Location)
Chimpanzee adenovirus vector-based (nonreplicating)	Phase 2b/3	2020-001228-32 (EU)
mRNA (lipid nanoparticle encapsulated)	Phase 2: scheduled to conclude September 2021	NCT04405076 (USA)
Adenovirus-5 vector-based (nonreplicating)	Phase 2: scheduled to conclude January 2021	ChiCTR2000031781 (China)
Subunit (recombinant spike protein)	Phase 1 and 2: scheduled to conclude July 2021	NCT04368988 (USA)
mRNA (lipid nanoparticle encapsulated)	Phase 1 and 2: scheduled to conclude June 2021	NCT04368728 (USA), 2020-001038-36 (EU)
Inactivated with aluminum adjuvant	Phase 1 and 2: scheduled to conclude July/August 2020	NCT04383574 (USA), NCT04352608 (USA)
Inactivated	Phase 1 and 2: scheduled to conclude November 2021	ChiCTR2000031809 (China)
Inactivated	Phase 1 and 2: scheduled to conclude November 2021	ChiCTR2000032459 (China)
DNA plasmid (with electroporation)	Phase 1: scheduled to conclude July 2021	NCT04336410 (USA)
Inactivated	Phase 1	China

\*As of June 2, 2020.

**Table 2. SARS-CoV-2 Candidate Vaccines Currently in Clinical Development\*****TABLE III Factors Delaying and Driving the Achievement of Expedited Effective COVID-19 Vaccine and/or Immunization**

Factor	Explanation	Possible Effect on COVID-19 Vaccine and/or Immunization
<b>Delaying</b>		
Transient immunity	Coronaviruses are capable of reinfection <sup>47</sup>	Immunity in individuals may require repeat vaccination
Some vaccinated individuals may not be fully immune	Vaccine is only partially effective	May require repeat vaccination or vaccination of more individuals than $P_{crit}$
Vaccine hesitancy <sup>42</sup>	Individuals refuse, selectively use, or delay use of vaccines	More difficult to achieve $P_{crit}$
No precedent for expedited development	Previous record for vaccine development and approval is mumps (approximately 4 years) <sup>76</sup> ; experts caution the expedited development can occur only if all necessary steps "go perfect the first time" <sup>77</sup>	Vaccine takes years to develop
Prior similar (SARS-CoV) efforts have failed	After 17 years of SARS vaccine development, we still do not have a working vaccine	Vaccine takes years to develop
<b>Driving</b>		
Advanced molecular techniques now available	Allow more effective synthesis of recombinant components	Development accelerated
Vaccines produced "at risk" <sup>78</sup>	Scaling or manufacturing occurs before efficacy testing complete	Production accelerated
Prior SARS-CoV research	17 years of vaccine development completed	Previous work provides knowledge base to work from
Competition and collaboration	Over 100 teams worldwide working on vaccine	Development accelerated

**Table 3. Factors Delaying and Driving the Achievement of Expedited Effective COVID-19 Vaccine and/or Immunization**

# MANAGEMENT

## COMPLETE BLOOD COUNTS AND CELL POPULATION DATA FROM SYSMEX XN ANALYSER IN THE DETECTION OF SARS-COV-2 INFECTION

Urrechaga E, Aguirre U, España PP, García de Guadiana L.. Clin Chem Lab Med. 2020 Oct 20:/j/cclm.ahead-of-print/cclm-2020-1416/cclm-2020-1416.xml. doi: 10.1515/cclm-2020-1416. Online ahead of print.

Level of Evidence: 4 - Case-series, case-control, or historically controlled studies

### BLUF

A prospective observational study, conducted by researchers mainly from Biocruces Bizkaia Health Research Institute and Research Unit of the Barrualde-Galdakao IHO (Spain), examined the complete blood count (CBC) and cell population data (CPD), via XN20 analyser, of 153 COVID-19 patients and 72 bacterial infection patients (Galadakao-Usansolo Hospital, between March 30 to April 30, 2020). They found neutrophil-to-lymphocyte ratio (NLR) values helped distinguish COVID-19 and bacterial infections (positive predictive value 74.1%, negative predictive value 97.1%; Table 1, Table 2), suggesting that NLR, along with other CBC and CPD values, may assist in accurately differentiating infectious etiologies during the COVID-19 pandemic.

### FIGURES

	Study group				Validation group	
	COVID-19 (n=153)	Bacterial (n=72)	Viral (n=45)	p-value	COVID-19 (n=43)	Non-COVID-19 (n=49)
WBC	7.15 (5.32, 9.57)	17.5 (15.91, 20.53)	7.14 (6.23, 8.62)	0.053	7.21 (5.66, 9.07)	15.56 (14.72, 18.22)
NLR	5.17 (3.11, 8.39)	9.98 (5.86, 17.22)	1.18 (0.76, 2.10)	0.01	6.01 (4.11, 7.55)	10.5 (4.99, 15.5)
Neut	6.91 (4.52, 12.2)	14.71 (12.9, 17.31)	3.66 (2.33, 4.44)	0.05	6.1 (5.21, 11.2)	12.83 (11.8, 15.33)
Lymph	1.01 (0.72, 1.50)	1.57 (0.98, 4.49)	2.39 (1.66, 4.24)	0.05	1.11 (0.77, 1.33)	1.35 (1.1, 4.04)
NE X	155 (152, 159)	150 (147, 154)	154 (150, 157)	0.28	153 (153, 157)	152 (150, 154)
NE Y	50 (48, 51)	52 (49, 54)	50 (48, 51)	0.30	51 (49, 51)	52 (50, 53)
NE Z	85 (82, 88)	86 (83, 88)	90 (86, 93)	0.52	87 (84, 88)	88 (84, 88)
NE-WX	314 (302, 325)	315 (307, 330)	313 (303, 325)	0.345	316 (310, 323)	315 (309, 325)
NE-WY	630 (605, 669)	654 (617, 688)	589 (571, 608)	0.25	628 (605, 651)	648 (624, 658)
NE-WZ	641 (612, 668)	776 (738, 816)	762 (738, 798)	0.44	647 (615, 661)	770 (744, 781)
LY X	82 (80, 83)	80 (78, 82)	83 (81, 84)	0.69	82 (80, 82)	80 (78, 81)
LY Y	71 (68, 73)	71 (67, 75)	70 (68, 72)	0.69	72 (70, 73)	71 (68, 72)
LY Z	55 (55, 56)	58 (57, 60)	61 (60, 62)	0.63	56 (55, 56)	60 (58, 62)
LY-WX	500 (463, 543)	482 (446, 522)	466 (434, 516)	0.14	508 (471, 528)	486 (463, 523)
LY-WY	900 (864, 990)	896 (845, 1026)	891 (816, 1019)	0.04	920 (883, 963)	892 (816, 999)
LY-WZ	519 (492, 554)	660 (624, 695)	654 (621, 710)	0.41	515 (491, 543)	655 (633, 689)
MO X	125 (123, 126)	120 (118, 122)	124 (122, 125)	0.53	124 (123, 125)	121 (118, 124)
MO Y	117 (110, 123)	114 (110, 121)	115 (109, 120)	0.61	116 (110, 120)	115 (112, 120)
MO Z	62 (60, 64)	68 (67, 69)	71 (69, 74)	0.08	64 (60, 64)	68 (67, 69)
MO-WX	253 (237, 268)	261 (244, 277)	239 (225, 254)	0.52	256 (239, 267)	263 (254, 273)
MO-WY	694 (616, 774)	719 (673, 806)	676 (606, 731)	0.14	688 (636, 763)	706 (668, 753)
MO-WZ	583 (529, 624)	721 (674, 784)	736 (679, 817)	0.14	593 (540, 622)	727 (683, 779)

WBC, leucocyte count,  $10^9/L$ ; Neut, neutrophils,  $10^9/L$ ; Lymph, lymphocytes,  $10^9/L$ ; NLR, neutrophil/lymphocyte ratio; NE-X, neutrophil complexity; NE-Y, neutrophil fluorescence; NE-Z, neutrophil size; NE-WX, width of dispersion of neutrophil complexity; NE-WY, width of dispersion of neutrophil fluorescence; NE-WZ, width of dispersion of neutrophil size; LY-X, lymphocyte complexity; LY-Y, lymphocyte fluorescence; LY-Z, lymphocyte size; LY-WX, width of dispersion of lymphocyte complexity; LY-WY, width of dispersion of lymphocyte fluorescence; LY-WZ, width of dispersion of lymphocyte size; MO-X, monocyte complexity; MO-Y, monocyte fluorescence; MO-Z, monocyte size; MO-WX, width of dispersion of monocyte complexity; MO-WY, width of dispersion of monocyte fluorescence; MO-WZ, width of dispersion of monocyte size.

Table 1: Median and 25–75 percentile range (P25, P75) data for leucocytes (absolute counts,  $10^9/L$ ) and cell population data (arbitrary optical units) in the study and validation groups.

Validation group	Clusters		True +	True-	False +	False-
	n	COVID-19	Non-COVID-19			
COVID-19	43	42 (97.7)	1 (2.3)	42		1
Non-COVID-19	49	15 (30.6)	34 (69.4)		34	15
Total	92	57	35			

Table 2: Comparison of the diagnoses in the validation group, COVID-19 (n=43) and non-COVID-19 (n=49), with the predicted classification, applying K-means technique; 42 out of 43 COVID-19 patients were correctly classified into the corresponding cluster.

# ADJUSTING PRACTICE DURING COVID-19

## SURGICAL SUBSPECIALTIES

### OTOLARYNGOLOGY

#### QUANTIFICATION OF AEROSOL CONCENTRATIONS DURING ENDONASAL INSTRUMENTATION IN THE CLINIC SETTING

Murr AT, Lenze NR, Gelpi MW, Brown WC, Ebert CS Jr, Senior BA, Thorp BD, Kimple AJ, Zanation AM.. Laryngoscope. 2020 Oct 5. doi: 10.1002/lary.29122. Online ahead of print.

Level of Evidence: Other - Guidelines and Recommendations

#### BLUF

A prospective quantification study from the Department of Otolaryngology/Head and Neck Surgery at University of North Carolina analyzed concentration and size of aerosol particles at various time point during 30 nasal endoscope procedures, both with and without debridement in SARS-CoV-2 negative participants. The results revealed no statistically significant changes in aerosol concentration during the procedure (Figure 2), however significant increase in particle quantity was noted when comparing procedure time versus pre-procedure quantity (Figure 3), suggesting potential aerosol transmission of SARS-CoV-2 during aerosolization procedures (i.e. nasal endoscope). Authors call for increased caution, PPE, and deferment of non-essential upper airway testing procedures.

#### ABSTRACT

**OBJECTIVE:** Recent anecdotal reports and cadaveric simulations have described aerosol generation during endonasal instrumentation, highlighting a possible risk for transmission of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) during endoscopic endonasal instrumentation. This study aims to provide a greater understanding of particle generation and exposure risk during endoscopic endonasal instrumentation. **STUDY DESIGN:** Prospective quantification of aerosol generation during office-based nasal endoscopy procedures. **METHODS:** Using an optical particle sizer, airborne particles concentrations 0.3 to 10 microns in diameter, were measured during 30 nasal endoscopies in the clinic setting. Measurements were taken at time points throughout diagnostic and debridement endoscopies and compared to preprocedure and empty room particle concentrations. **RESULTS:** No significant change in airborne particle concentrations was measured during diagnostic nasal endoscopies in patients without the need for debridement. However, significant increases in mean particle concentration compared to preprocedure levels were measured during cold instrumentation at 2,462 particles/foot<sup>3</sup> (95% CI 837 to 4,088;  $P = .005$ ) and during suction use at 2,973 particle/foot<sup>3</sup> (95% CI 1,419 to 4,529;  $P = .001$ ). In total, 99.2% of all measured particles were  $\leq 1 \mu\text{m}$  in diameter. **CONCLUSION:** When measured with an optical particle sizer, diagnostic nasal endoscopy with a rigid endoscope is not associated with increased particle aerosolization in patient for whom sinonal debridement is not needed. In patients needing sinonal debridement, endonasal cold and suction instrumentation were associated with increased particle aerosolization, with a trend observed during endoscope use prior to tissue manipulation. Endonasal debridement may potentially pose a higher risk for aerosolization and SARS-CoV-2 transmission. Appropriate personal protective equipment use and patient screening are recommended for all office-based endonasal procedures. **LEVEL OF EVIDENCE:** 3 Laryngoscope, 2020.

## FIGURES

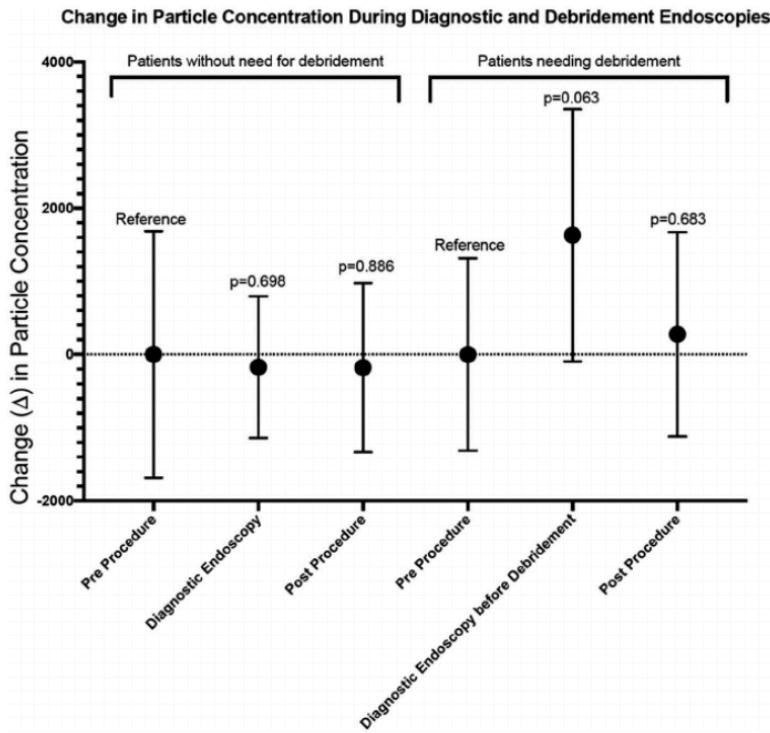


Figure 2. Difference in mean particle concentrations between diagnostic nasal endoscopy and nasal endoscopy with debridement. Zero reference normalized to combined preprocedure data in the cohort. Endoscope use during diagnostic endoscopy was associated with a nonsignificant mean particle difference of 173 p/ft<sup>3</sup>(95% CI -1,139 to 793; P = .698) compared to preprocedure levels. Endoscope use prior to tissue manipulation in nasal endoscopy with debridement was associated with a trending mean increase of 1,629 p/ft<sup>3</sup>(95% CI -96 to 3,354; P = .063).

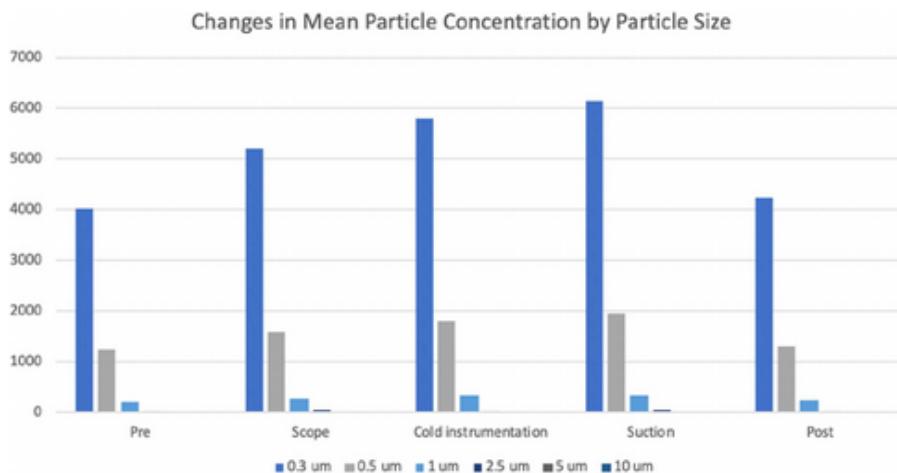


Figure 3. Mean particle concentrations with particle size distribution during nasal endoscopy with debridement. Particle measurements obtained during nasal endoscopies with debridement showed greater than 72% of all measured particles were 0.3 μm in diameter, greater than 22% were measured at 0.5 μm in diameter, and greater than 4% was measured at 1.0 μm in diameter. Particles sizes in the range of 2.5 to 10 μm in diameter composed less than 1% of all particles measured during nasal endoscopies with debridement. [Color figure can be viewed in the online issue, which is available at [www.laryngoscope.com](http://www.laryngoscope.com).

# ACKNOWLEDGEMENTS

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Tyler Gallagher  
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