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Pre-procedural asymptomatic COVID-19 in obstetric and surgical units

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1 **TITLE:**

2 Pre-procedural asymptomatic COVID-19 in obstetric and surgical units

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28 **KEY WORDS:** COVID-19, SARS-CoV-2, asymptomatic pre-procedural infection

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30 **OBJECTIVE**

31 Asymptomatic severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection
32 remains a challenge, accounting for nearly half of all infections.¹ Infectivity of asymptomatic
33 patients can extend past 14 days, and samples isolated from their respiratory tracts have similar
34 viral loads to symptomatic patients.^{1,2} To mitigate surgical risk to patients and exposure of
35 healthcare workers (HCW), universal testing for SARS-CoV-2 has been suggested for all
36 patients prior to planned procedures,³ including delivery,⁴ regardless of symptoms. Pre-
37 procedural asymptomatic infection (PAI) rates in Obstetrics have been reported as high as
38 14%,⁴ but is unknown in the general surgical population. We sought to compare SARS-CoV-2
39 PAI rates between the obstetric unit (OU) and surgical units (SU) in one urban tertiary center.

40 **STUDY DESIGN**

41 We conducted a retrospective cohort study of universal pre-procedural SARS-CoV-2
42 tests performed before any surgery or delivery at Barnes-Jewish Hospital from May 28 - July 22,
43 2020, after resumption of elective cases. The study was deemed exempt as a quality
44 improvement initiative. The primary outcome was rate of SARS-CoV-2 PAI, compared between
45 an 18-bed OU and 72-room SU. All positive cases underwent chart review to confirm
46 asymptomatic presentation. Multivariable logistic regression was used to adjust for confounders
47 including age and race. Statistical analyses were conducted in R v4.0.2.⁵

48 **RESULTS**

49 5543 pre-procedural tests were performed: 532 (9.7%) obstetric and 5011 (90.4%)
50 surgical (Table a). Obstetric patients were younger (median age 29.0 vs 56.0, $p<0.001$), with a
51 greater proportion of females (100% vs 50.4%, $p<0.001$) and Black (40.4% vs 22.7%) or
52 Hispanic (9.4% vs 1.5%) race ($p<0.001$). Overall, there were 39 (0.7%) cases of PAI (25/532,

53 4.7% OU vs. 14/5011, 0.3% SU; $p < 0.001$). After adjusting for age and race, obstetric patients
54 had significantly higher odds of SARS-CoV-2 PAI compared to surgical patients (aOR 4.7, 95%
55 CI 2.3-10.6). After excluding males, the odds of PAI remained significantly higher in the OU
56 (aOR 9.6, 95% CI 92.8-48.3, Table b).

57 CONCLUSION

58 The SARS-CoV-2 PAI rate is 15.7 times higher on the OU (4.7%) compared to the SU
59 (0.3%) in one hospital. A significant difference persists after accounting for age, race, and sex.
60 As hospitals resume normal surgical volume and enact universal pre-procedural testing policies,
61 testing capacity remains limited and rationing of supplies is necessary. Our results emphasize the
62 need to prioritize testing and personal protective equipment in OUs, where higher rates of
63 asymptomatic infection increase the potential of spread, particularly during the second stage of
64 labor with prolonged HCW exposure in an aerosol-heavy environment.⁴ Whether different
65 background characteristics of obstetric and surgical patients can fully account for the discordance
66 of PAI rates, or whether pregnancy-induced immunomodulation increases the likelihood of
67 asymptomatic infection, is an important question that requires further investigation.

68 Our study is limited by generalizability due to sampling in one hospital. However, the
69 significant difference between the OU and SU underscores the importance of surveillance in
70 populations who are at increased risk for disease. Focused SARS-CoV-2 obstetric studies could
71 generate valuable information regarding asymptomatic infection, which remains a poorly
72 understood but critically important component of the pandemic.

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93 **TABLES**

94 Table. Background characteristics of patients undergoing pre-procedural testing for SARS-CoV-
 95 2 (a) and asymptomatic positive results of pre-procedural testing (b) compared between the
 96 obstetrical and surgical units.

a. Baseline characteristics of patients undergoing universal pre-procedural testing			
Background characteristic	Obstetric unit (N=532)	Surgical unit (N=5011)	p-value
Age in years			
Median (SD)	29.0 (6.0)	56.0 (18.1)	<0.001
<18 (%)	6 (1.1)	41 (8.2)	<0.001
18-45 (%)	525 (98.7)	1349 (26.9)	
>45 (%)	1 (0.2)	3621 (72.2)	
Sex			
Female (%)	532 (100.0)	2524 (50.4)	<0.001
Race (%)			<0.001
White	245 (46.2)	3708 (74.0)	
Black or African American	214 (40.4)	1136 (22.7)	
Asian	13 (2.4)	47 (0.9)	
Pacific Islander	3 (0.6)	4 (0.1)	
American Indian or Alaska Native	1 (0.2)	4 (0.1)	
Hispanic	50 (9.4)	73 (1.5)	
Unable to Answer	3 (0.6)	21 (0.4)	
Declined	3 (0.6)	18 (0.4)	
b. Asymptomatic positive results of universal pre-procedural testing			
Overall Asymptomatic Positive (%)	25 (4.7)	14 (0.3)	<0.001

OR (95% CI)	13.2 (6.9-25.2)	--	
aOR† (95% CI)	4.7 (2.3-10.6)	--	
Age			
Median (SD)	30.0 (5.9)	38.0 (19.8)	<0.001
<18 (%)	1 (4.0)	1 (7.1)	0.006
18-45 (%)	24 (96.0)	9 (64.3)	
>45 (%)	0 (0)	4 (28.6)	
Female (%)	25 (100)	5 (36)	<0.001
Race (%)			
White	0 (0.0)	4 (28.6)	0.036
Black or African American	2 (8.0)	9 (64.3)	
Asian	10 (40.0)	0 (0.0)	
Pacific Islander	0 (0.0)	0 (0.0)	
American Indian or Alaska Native	1 (4.0)	0 (0.0)	
Hispanic	0 (0.0)	1 (7.1)	
Unable to Answer	11 (44.0)	0 (0.0)	
Declines	1 (4.0)	0 (0.0)	
Surgical Service (%)			<0.001
Obstetrics	25 (100.0)		
Orthopaedic Surgery		7 (50.0)	
Ophthalmology		2 (14.2)	
Acute Critical Care Surgery		4 (28.6)	
Minimally Invasive Surgery		1 (7.1)	
Asymptomatic Positive, Men excluded (%)	25 (4.7)	5 (0.1)	<0.001
OR (95% CI)	24.8 (9.4-65.1)	--	
aOR† (95% CI)	9.6 (2.8-48.3)	--	

SARS-CoV-2: Severe acute respiratory syndrome coronavirus 2

OR: odds ratio; aOR: adjusted odds ratio; SD: standard deviation; CI: confidence interval

†Adjusted for age (as categorical variable) and race

Statistically significant results bolded

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