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Differences in COVID-19 screening, diagnosis, and hospitalization rates among US pregnant women with and without a substance use disorder



OBJECTIVE: Pregnant women are at an increased risk of severe morbidity and mortality due to respiratory infections like SARS-CoV-2 (COVID-19) during pregnancy.¹ Those with substance use disorders (SUDs) may be especially vulnerable due to high rates of smoked tobacco, cannabis, and methamphetamine use which adversely affect pulmonary function.² However, little is

known about the differential effects of COVID-19 on pregnant women with and without SUD.

STUDY DESIGN: This was a retrospective cohort study of commercially insured pregnant women ages 15 to 44 years using national administrative healthcare data from Optum's

TABLE
COVID-19 screening, diagnosis, and related hospitalization rates among pregnant persons in the United States, overall and by SUD diagnosis

Characteristic	Overall (n = 65,009)	SUD diagnosis ^a (n = 2616)	No SUD diagnosis (n = 62,393)
Demographic characteristics			
Age at delivery, y ^b	32±5	30±6 ^c	32±5 ^c
Race and ethnicity ^d			
Non-Hispanic White	31,215 (48)	1400 (53.5) ^c	29,815 (47.8) ^c
Hispanic or Latino	6805 (10.5)	169 (6.5) ^c	6636 (10.6) ^c
Non-Hispanic Black	4583 (7.1)	251 (9.6) ^c	4332 (6.9) ^c
Non-Hispanic Asian	3467 (5.3)	44 (1.7) ^c	3423 (5.5) ^c
United States region			
Northeast	6501 (10)	198 (7.6) ^c	6303 (10.1) ^c
South	26,624 (41)	1052 (40.2)	25,572 (41)
Midwest	17,950 (27.6)	955 (36.5) ^c	16,995 (27.2) ^c
West	13,789 (21.2)	410 (15.7) ^c	13,379 (21.4) ^c
COVID-19 screening, diagnosis, and related hospitalization rates			
COVID-19 screening test performed ^e	17,231 (26.5)	632 (24.2) ^f	16,599 (26.6) ^f
COVID-19 diagnosis	2241 (3.4)	119 (4.5) ^f	2122 (3.4) ^f
First trimester	55 (2.5)	3 (2.5)	52 (2.5)
Second trimester	252 (11.2)	14 (11.8)	238 (11.2)
Third trimester	1934 (86.3)	102 (85.7) ^f	1832 (86.3) ^f
COVID-19—related hospitalizations ^g	215 (9.6)	43 (36.1) ^c	172 (8.1) ^c
Antepartum	149 (69.3)	34 (79.1) ^f	115 (66.9) ^f
Postpartum	66 (31.7)	9 (21.9) ^f	57 (33.1) ^f
Hospital length of stay, d ^h			
Median (IQR)	2 (3)	3 (3) ^f	2 (3) ^f
Min—max range	1—35	0—29	0—35
25%—75% percentile	1—4	2—5 ^f	1—4 ^f

IQR, interquartile range; SUD, substance use disorder.

^a Includes any diagnosis of the following SUDs in pregnancy (calculated as 280 days before delivery): tobacco, opioid, alcohol, cannabis, cocaine, amphetamine, sedative, hallucinogen, inhalants, and other psychoactive and nonpsychoactive substances; ^b Mean±standard deviation, statistical significance assessed with 2-sample *t* test; ^c *P*<.001; ^d Approximately 29% of race and ethnicity data were missing owing to a lack of collection or patient disclosure; ^e Screening includes encounters in which individuals had a charge for a COVID-19 test with negative or unknown test results; ^f *P*<.05; ^g Excludes delivery hospitalization; ^h Statistical significance assessed using quantile regression, excludes the delivery hospitalization.

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(Eden Prairie, MN) deidentified Clinformatics Data Mart Database version 8.1 (2007–2020). Women with a delivery hospitalization between January 1, 2020, and August 19, 2020, continuously enrolled in insurance for ≥ 8 weeks during pregnancy and 6 weeks after delivery were included. SUD was defined using the tenth revision of the International Classification of Diseases (ICD-10) diagnoses for ≥ 1 SUD during pregnancy, including alcohol, amphetamine, cannabis, cocaine, opioid, or other SUD.³ COVID-19 screening and diagnosis were defined using ICD-10 coding and reporting guidelines published by the Centers for Disease Control and Prevention.^{4,5} We used *t* tests, Fisher exact tests, and quantile regression (percentiles) to examine statistical differences. This study was exempt by the University of Pittsburgh Institutional Review Board because deidentified healthcare data were used.

RESULTS: Among 65,009 pregnancies, 2616 (4.0%) had ≥ 1 SUD diagnosis. Almost half of the pregnant women in the cohort were non-Hispanic White (48%), and most lived in the South (41%) or the Midwest (28%) region of the United States (Table). Pregnant women with an SUD diagnosis were significantly more likely to be younger (30 ± 6 vs 32 ± 5 ; $P < .05$). Compared with the overall sample, non-Hispanic Black (10% vs 7%; $P < .05$) and non-Hispanic White women (54% vs 48%; $P < .05$) were overrepresented among those with SUD as opposed to Hispanic and non-Hispanic Asian women. Overall, 27% of pregnant women were screened and evaluated for COVID-19 during pregnancy or postpartum. Women without an SUD diagnosis were significantly more likely to be screened for COVID-19 during pregnancy (27% vs 24%; $P < .001$) than those with an SUD. Overall, 3.4% of pregnant women were diagnosed as having COVID-19, mostly (86%) in the third trimester. The prevalence of a COVID-19 diagnosis was higher among those with an SUD than those without an SUD (5% vs 3%; $P < .05$). Furthermore, there was a higher percentage of COVID-19–related hospitalizations among pregnant women with an SUD (36%) than those without an SUD (8%) ($P < .001$). The median length of stay was 1 day longer among those with an SUD (3 vs 2 days; $P < .01$) than those without an SUD. There were no COVID-19–related deaths reported during pregnancy or postpartum.

CONCLUSION: In this national cohort, pregnant women with an SUD had a higher COVID-19 diagnosis rate than those without an SUD, despite lower screening rates. Among those with a COVID-19 diagnosis, pregnant women with an SUD

had a significantly higher rate of COVID-19–related hospitalizations (36% vs 8%, $P < .001$) and longer median length of stay (3 vs 2 days, $P < .01$) than those without an SUD. Efforts to improve COVID-19 screening rates and decrease morbidity associated with COVID-19 diagnosis among pregnant women with SUDs may be warranted. ■

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