Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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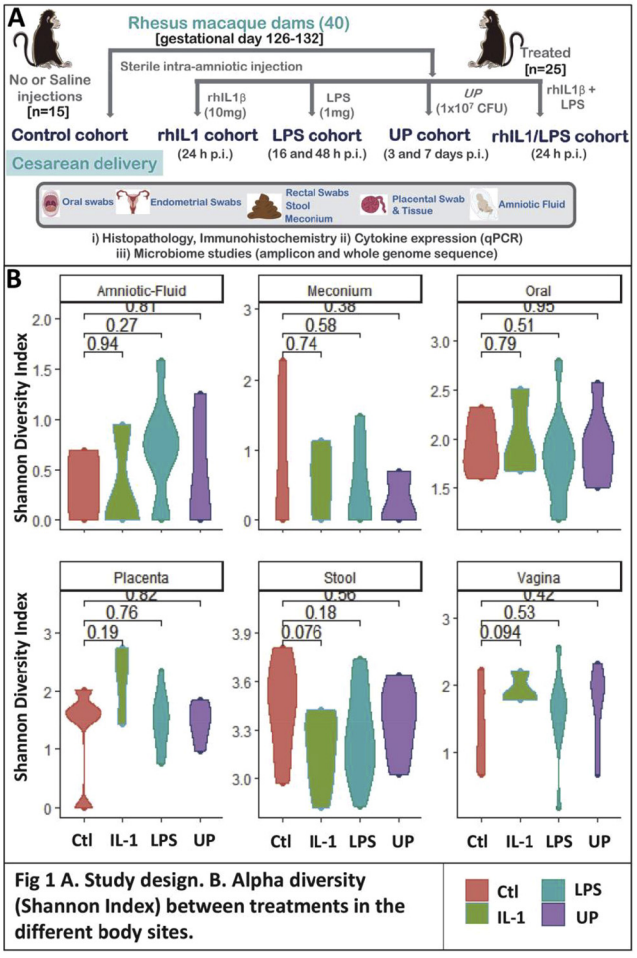

Fig 1 A. Study design. B. Alpha diversity (Shannon Index) between treatments in the different body sites.

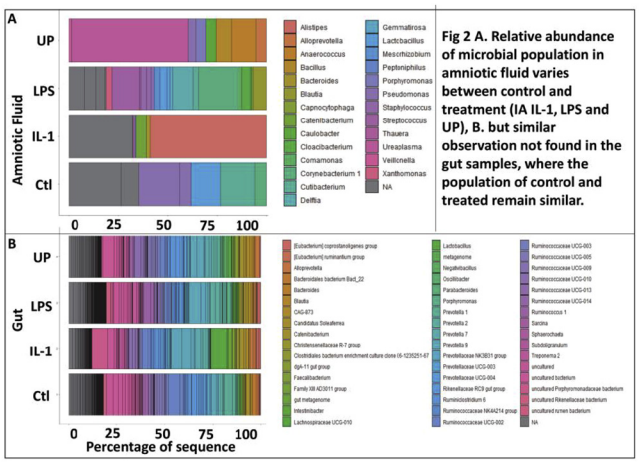

Fig 2 A. Relative abundance of microbial population in amniotic fluid varies between control and treatment (IA IL-1, LPS and UP), B. but similar observation not found in the gut samples, where the population of control and treated remain similar.

1142 Identifying Unique Inflammatory Cytokine Profiles in Maternal-Fetal Dyads with COVID-19

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OBJECTIVE: Dysregulated immunity plays a critical role in determining COVID-19 disease severity. Pregnancy increases the risk for severe morbidity, yet little is known about how this altered immune state influences maternal-fetal immunity. We investigated cytokine responses to SARS-CoV-2 in maternal-fetal dyad pairs.

STUDY DESIGN: Maternal plasma, cord plasma, and placental tissue samples were collected from 17 dyads enrolled in a prospective cohort of pregnant patients diagnosed with COVID-19. The levels of 24 cytokines were measured by Luminex multiplex bead assays. Differences in cytokine levels by disease severity (3 symptomatic vs. 14 moderate to severe disease cases) were analyzed by Mann-Whitney U tests. Spearman correlation matrices explored unique profile patterns between individual cytokines.

RESULTS: 21 of 24 cytokines had detectable levels. In all samples, IL-7, IFN-β, and IL-28B levels were lower in symptomatic disease (p=0.040, 0.040, 0.088, respectively). In maternal samples, IFN-β levels were lower in symptomatic disease (p=0.062). In placenta, IL-10, IL12p70, and TFN-α levels were lower (p=0.023, 0.039, 0.062, respectively). In fetal cord blood, IL-7, TNFRI, TNF-α, IL-28B, and IL-10 levels were lower in symptomatic disease (p=0.062, 0.054, 0.050, 0.022, 0.062, respectively). Collectively, IL-1b levels correlated with IL-8 (r_s=0.78), CCL4 with CCL3 (r_s=0.84), and CCL17 with CCL22 (r_s=0.84). Evaluating sample types separately, 11/24 cytokines significantly correlated with other cytokine levels. In placenta, the strongest of these correlations were CCL3 with CCL4 (r_s=0.88), and CCL17 with CXCL9 (r_s=0.92). In cord blood, CCL3 correlated with CCL4 (r_s=0.95) and IL4 (r_s=0.86), and CCL17 with CCL22 (r_s=0.85). CXCL9 correlated with CCL3 in both maternal plasma and placenta (r_s=0.74, 0.83, respectively). TNFRI correlated with CCL4 in both maternal and cord plasma (r_s=072, 0.74 respectively).

CONCLUSION: Cytokine profiles significantly differ between maternal, fetal, and placental samples, as well as by disease severity. Further investigation is needed to better understand disease pathology in pregnancy.

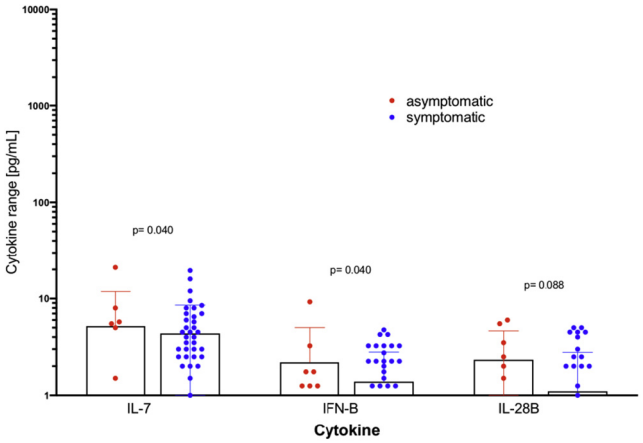

Figure 1. Maternal plasma, placental, and fetal plasma cytokine levels by presence of symptoms of SARS-CoV-2 infection. Plasma cytokines levels in at the time of delivery where evaluated by multiplex bead assay and stratified by presence of SARS-CoV-2 infection symptoms. Blue dots indicate maternal SARS-CoV-2 infection symptoms at any time during pregnancy. Red dots indicated maternal SARS-CoV-2 infection without symtpoms.

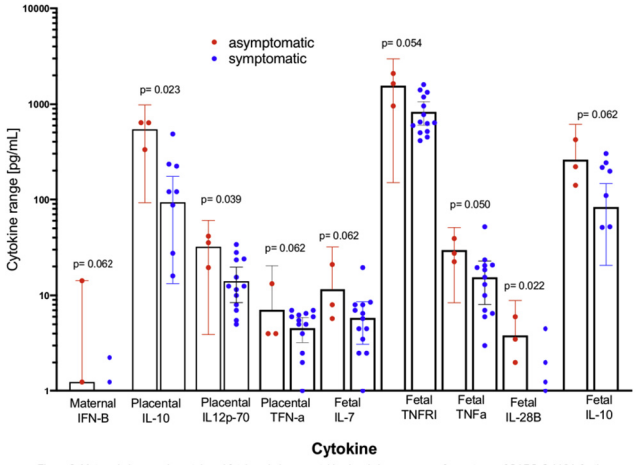

Figure 2. Maternal plasma, placental, and fetal cord plasma cytokine levels by presence of symptoms of SARS-CoV-2 infection. Plasma cytokines levels in at the time of delivery where evaluated by multiplex bead assay and stratified by presence of SARS-CoV-2 infection symptoms. Blue dots indicate maternal SARS-CoV-2 infection symptoms at any time during pregnancy. Red dots indicated maternal SARS-CoV-2 infection without symtpoms.

1143 Substance use during pregnancy and obstetrical outcomes, a retrospective cohort population based study

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OBJECTIVE: Substance use complicates approximately 5% of all pregnancies and is known to be associated with adverse maternal and neonatal outcomes. The purpose of this study was to evaluate the obstetrical outcomes associated with individual substances of use.

STUDY DESIGN: Using The Healthcare Cost and Utilization Project-Nationwide Inpatient Sample from 2004 to 2014, a retrospective cohort analysis was performed, comparing women with and without substance use and their relation with pregnancy outcomes. All hospitalization for delivery, substance use and pregnancy outcomes were identified based on ICD-9 codes. Odds ratios (OR) of specific pregnancy outcomes were calculated using logistical regression adjusting for patient demographics, hospital characteristics, and medical comorbidities.

RESULTS: Amphetamine/methamphetamine, opioid, cannabis, and polysubstance use increased from 2004-2014 ($p< 0.001$), cocaine use decreased ($p< 0.001$), and alcohol use was unchanged ($p= 0.22$)(Figure 1). Pregnancies associated with substance use had an increased OR for premature rupture of membranes (PROM), placental abruption, preterm deliveries, fetal growth restriction, and stillbirth across all substances ($p< 0.001$)(Table 1). There was also a significant increased OR for cerebrovascular complications across all substances ($p< 0.05$). An increased OR of a cardiac arrest in pregnancy was seen in amphetamine/methamphetamine (OR 6.94, $p< 0.001$) and opioid use (OR 4.15 $p< 0.001$), when compared with those without substance use. Maternal death was associated with amphetamine/methamphetamine (OR 3.7, $p< 0.01$), cocaine (OR 2.92, $p< 0.001$), alcohol (OR 6.92, $p< 0.001$), and polysubstance use (OR 6.02, $p< 0.001$), when compared with those without any substance use.

CONCLUSION: These findings have important public health consequence, with a substance use continuing to increase in the United States. Substance use is associated with an increase in fetal and maternal morbidity and mortality, and need to be recognized to identify high-risk pregnancies.

Figure 1. Trends in percentage of deliveries complicated by substance use from 2004-2014.

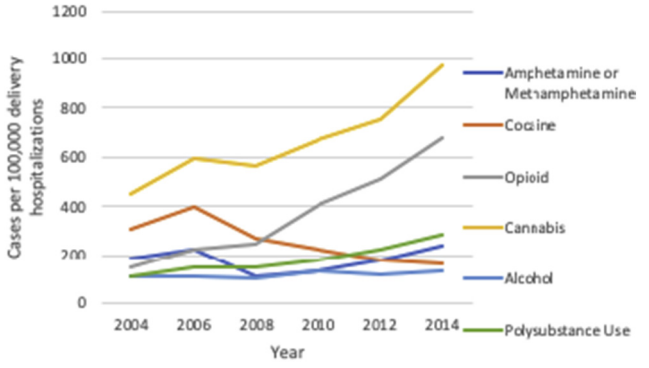

Table 1. Odds ratio of adverse pregnancy outcomes by substance of use compared to pregnancies without substance use adjusted for demographics, hospital characteristics, and comorbidities.

	Amphetamines/ methamphetamine	Cocaine	Opioid	Cannabis	Alcohol	Polysubstance
Oligohydramnios [1]	1.12 (1.00, 1.27)	1.16 (1.06, 1.28)**	1.53 (1.40, 1.67)***	1.00 (0.93, 1.07)	1.32 (1.15, 1.51)***	1.37 (1.21, 1.54)***
Premature rupture of membranes [1]	1.62 (1.46, 1.79)***	1.76 (1.65, 1.88)***	1.41 (1.30, 1.51)***	1.47 (1.38, 1.59)***	1.39 (1.24, 1.57)***	1.47 (1.34, 1.62)***
Placental abruption [1]	4.55 (4.13, 5.03)***	5.51 (5.09, 5.95)***	3.38 (3.10, 3.68)***	2.85 (2.65, 3.06)***	2.80 (2.41, 3.25)***	3.29 (2.94, 3.69)***
Preterm delivery [1]	2.83 (2.65, 3.04)***	3.75 (3.59, 3.92)***	2.62 (2.49, 2.75)***	2.11 (2.02, 2.19)***	2.41 (2.21, 2.62)***	2.20 (2.05, 2.37)***
Intrauterine growth restriction [1]	1.43 (1.26, 1.62)***	2.19 (1.99, 2.40)***	3.76 (2.55, 2.98)***	1.99 (1.87, 2.12)***	2.74 (2.41, 3.12)***	2.25 (2.02, 2.51)***
Stillbirth [1]	2.35 (1.96, 2.83)***	3.11 (2.72, 3.55)***	1.91 (1.61, 2.26)***	2.44 (2.19, 2.72)***	3.11 (2.51, 3.85)***	2.12 (1.68, 2.67)***
Severe preeclampsia or eclampsia [1]	1.61 (1.37, 1.88)***	1.56 (1.37, 1.78)***	1.14 (0.94, 1.33)	1.13 (1.03, 1.26)*	1.33 (0.99, 1.54)	1.32 (1.10, 1.59)**
Postpartum hemorrhage [1]	1.24 (1.11, 1.38)***	1.21 (1.11, 1.34)***	1.21 (1.10, 1.34)***	0.96 (0.90, 1.02)	1.20 (1.04, 1.37)*	1.09 (0.97, 1.23)
Transfusion [1]	2.27 (1.94, 2.66)***	2.13 (1.90, 2.38)***	1.73 (1.54, 1.93)***	1.09 (0.97, 1.20)	1.63 (1.36, 1.94)***	1.67 (1.42, 1.96)***
Cesarean delivery [1]	0.81 (0.75, 0.86)***	0.68 (0.64, 0.72)***	0.95 (0.91, 1.00)	0.77 (0.75, 0.80)***	0.77 (0.71, 0.83)***	0.96 (0.91, 1.02)
Anesthesia complications [1]	0.60 (0.39, 0.92)*	0.71 (0.52, 0.94)*	0.81 (0.60, 1.09)	0.85 (0.70, 1.02)	0.78 (0.50, 1.23)	0.89 (0.59, 1.34)
Sepsis [1]	4.20 (2.67, 6.60)***	3.53 (2.44, 5.13)***	4.93 (3.40, 6.76)***	1.00 (0.65, 1.55)	2.13 (1.05, 4.32)*	4.99 (3.36, 7.40)***
Cerebrovascular complications [1]	2.53 (1.34, 4.79)**	3.65 (2.34, 5.70)***	1.99 (1.06, 3.76)*	1.68 (1.03, 2.77)*	2.71 (1.21, 6.06)*	3.19 (1.69, 6.04)***
Cardiac arrest [1]	6.94 (3.47, 13.8)***	2.35 (0.96, 5.76)	4.15 (1.92, 8.96)***	0.70 (0.17, 2.86)	1.14 (0.16, 8.20)	2.08 (0.51, 8.32)
Maternal death [1]	3.70 (1.55, 8.82)**	2.92 (1.34, 6.31)**	6.92 (3.79, 12.6)***	0.48 (0.12, 1.99)	3.52 (1.14, 10.9)*	6.02 (2.68, 13.5)***

*P<0.05 **P<0.01 ***P<0.001

1144 Severe maternal morbidity in pregnant patients with severe acute respiratory syndrome coronavirus 2 infection

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OBJECTIVE: To evaluate the risk of severe maternal morbidity (SMM) associated with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection in pregnancy.

STUDY DESIGN: A multicenter retrospective cohort study of all pregnant patients who had SARS-CoV-2 testing and delivered in a New York health system between March 1st, 2020 and March 1st, 2021. Patients with missing test results were excluded. The primary outcome of SMM, derived from the American College of Obstetricians and Gynecologists and Society for Maternal-Fetal Medicine example list of diagnoses and complications, was compared between two groups: patients who tested positive for SARS-CoV-2 during pregnancy ($n = 1,653$) versus patients who tested negative ($n = 20,785$). Secondary outcomes included subgroups of SMM. Multivariable logistic regression was used to adjust for potential confounders such as maternal demographics, neighborhood socioeconomic status, hospital location, and pregnancy-related complications.

RESULTS: Baseline characteristics that differed significantly between the two groups are displayed in Table 1. Patients with SARS-CoV-2