

★★ INTRODUCTION ★★

Previous research and surveillance efforts have shown that pregnant people are at increased risk for severe outcomes from COVID-19, including ICU admission, invasive ventilation, and death, compared to non-pregnant individuals.¹⁻³ Additionally, infection with COVID-19 during pregnancy has been associated with increased rates of adverse maternal and infant outcomes, including maternal mortality, pre-eclampsia, and preterm birth when compared to pregnancy without COVID-19 infection.⁴⁻⁷

The data presented in this brief includes nearly 2,000 Chicago residents infected with COVID-19 during pregnancy in 2020 with a delivery or other pregnancy outcome in a Chicago hospital between March 2020 and September 2021. Data were obtained from Illinois Vital Records, the state infectious disease reporting system (Illinois' National Electronic Disease Surveillance System (I-NEDSS), and medical records.



Considering this data in the context of pregnancy-related health outcomes seen in Chicago before the pandemic is essential. Black non-Latinx pregnant people and those living in communities with higher economic hardship have borne the largest pregnancy-associated morbidity and mortality burden⁸. During the COVID-19 pandemic, Chicago's Black non-Latinx and Latinx communities were disproportionately affected by COVID-19,^{9,10} raising concerns that this may further exacerbate existing disparities in pregnancy-related health outcomes. Indeed, nationally, the rates of deaths related to COVID-19 in 2020 and 2021 among Black non-Latinx and Latinx pregnant people were 12.3 and 8.9 per 100,000 live births, respectively, while the rate among White non-Latinx pregnant people was 4.5.¹¹

CDPH aims to share this brief with clinical and community partners serving pregnant people and infants to improve understanding of the local experience of COVID-19 in pregnancy and inform interventions to improve pregnancy-related outcomes and disparities. Vaccination against COVID-19 and appropriate and timely use of therapeutics, in addition to patient education based on up-to-date and evidence-based guidelines, should be a priority for all pregnant people, especially those most vulnerable to the adverse outcomes of this disease.



KEY FINDINGS

1. The rate of COVID-19 in pregnancy was highest among Latinx pregnant Chicagoans.
2. Black non-Latinx pregnant Chicagoans had the highest rate of infections resulting in hospitalizations, and all deaths related to COVID-19 infection in pregnancy were among Black non-Latinx Chicagoans.
3. Similar to the general population, comorbidities (co-existing health conditions) increased a pregnant person's risk for more severe COVID-19 illness.
4. The preterm birth rate among people with COVID-19 in pregnancy was higher than the Chicago preterm birth rate prior to the COVID-19 pandemic.

★★ DEMOGRAPHIC CHARACTERISTICS OF PREGNANT PEOPLE WITH COVID-19 ★★

- ★ A total of 1,942 Chicagoans with a delivery or other pregnancy outcome at a Chicago birthing hospital were infected with COVID-19 during pregnancy in 2020, with an estimated rate of 6.3 infections per 100 live births (Figure 1). In comparison, the overall infection rate in Chicago in 2020 was 7.6 per 100 people and 9.1 per 100 women of reproductive age (15-44 years).
- ★ Latinx pregnant people had the highest rate of COVID-19 infection in pregnancy (10.9 infections per 100 live births) (Figure 1). Black non-Latinx pregnant people had an infection rate (5.7 per 100 live births) that was similar to the infection rate during pregnancy in Chicago overall. White non-Latinx and Asian non-Latinx pregnant people had lower rates of infection (3.5 per 100 live births).
- ★ Black non-Latinx pregnant people had the highest rate of infections resulting in hospitalizations (6.4%) (Table A).
- ★ All ICU admissions occurred among Black non-Latinx, Latinx and Asian non-Latinx pregnant people (Table A). There were no ICU admissions reported among White non-Latinx pregnant people.
- ★ All 3 deaths attributed to COVID-19 in pregnancy occurred in Black non-Latinx people (Table A).
- ★ 62% of pregnant people with COVID-19 during pregnancy were insured by Medicaid, while 36% had private insurance (Figure 2).
- ★ Communities with the highest rates of infection included Belmont-Cragin, Hermosa, Humboldt Park, Lower West Side, Brighton Park, New City, West Elsdon and Gage Park (Figure 3, areas in darkest blue).

FIGURE 1

Rate of COVID-19 Infection in Pregnancy – Chicago, 2020

Infection rate per 100 live births

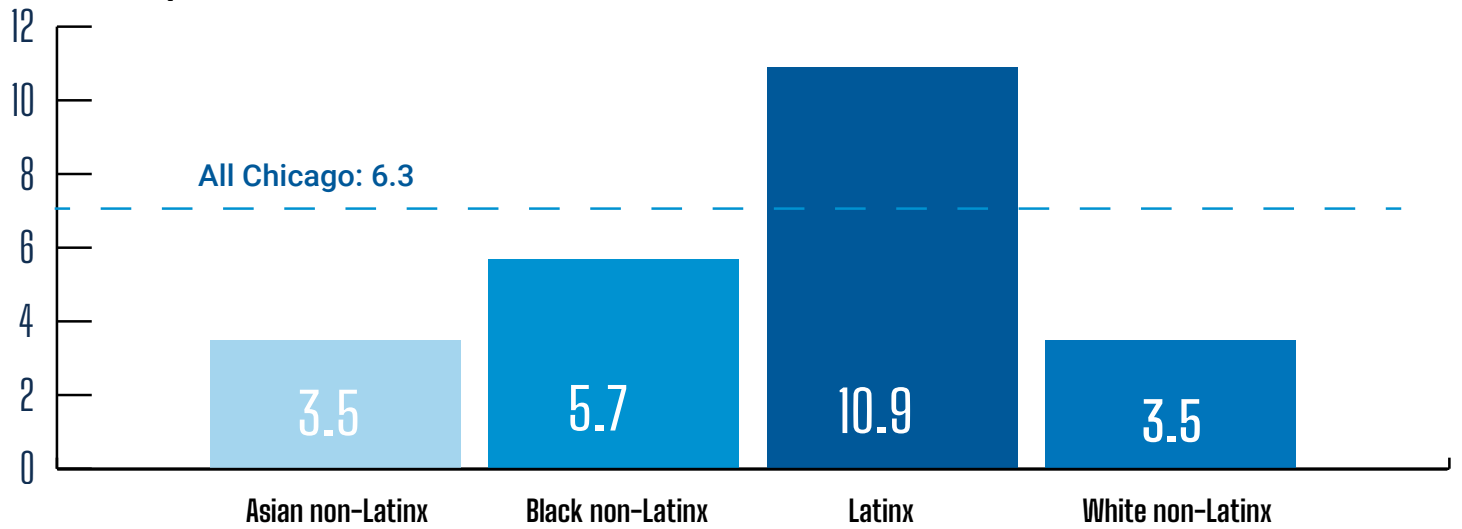


TABLE A

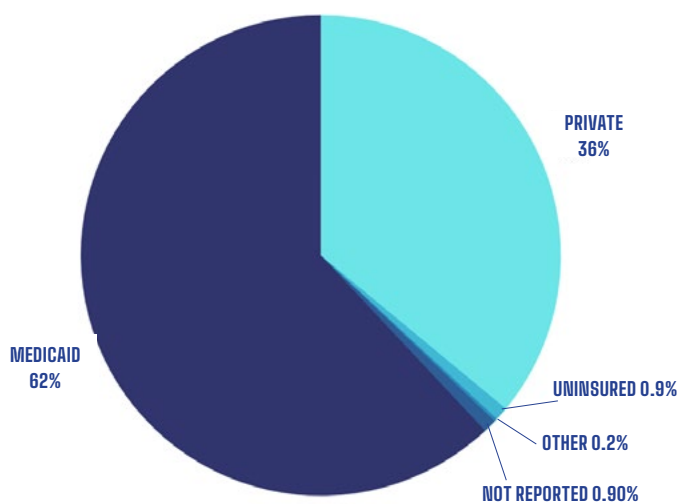
COVID-19 Infections, Hospitalizations, ICU Admissions and Deaths in Pregnancy by Race/Ethnicity – Chicago, 2020

RACE AND ETHNICITY	INFECTIONS	HOSPITALIZATIONS	ICU ADMISSIONS	DEATHS
	n	n (%*)	n (%*)	n (%*)
Asian non-Latinx	81	3 (3.7%)	2 (2.5%)	0
Black non-Latinx	513	33 (6.4%)	12 (2.3%)	3 (0.5%)
Latinx	1005	41 (4.1%)	15 (1.5%)	0
White non-Latinx	344	1 (0.3%)	0	0
TOTAL	1942	78 (4.0%)	29 (1.5%)	3 (0.15%)

*Percentage of infections within each racial/ethnic group.

FIGURE 2

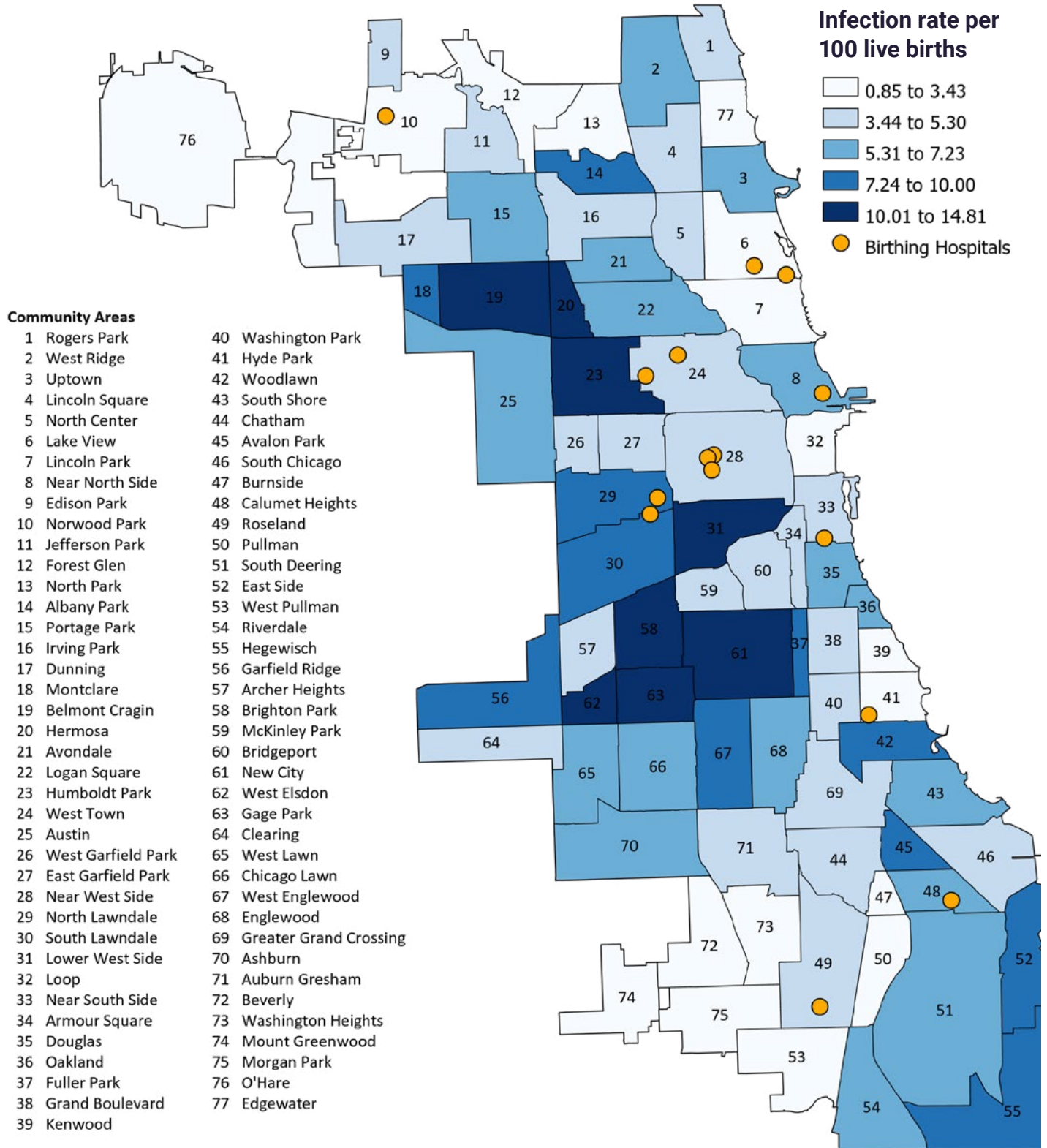
Medical Insurance at Delivery in Pregnant People with COVID-19 in Chicago, 2020



Data Notes: Other includes TRICARE and Medicare.



FIGURE 3



★★ SEVERITY OF COVID-19 ILLNESS IN PREGNANCY ★★

- ★ The severity of COVID-19 illness was categorized by the reported presence of symptoms, complications, and treatments for COVID-19 (Table C). 2.2% of pregnant people had a critical illness, and 12.6% had a moderate-to-severe illness. Most pregnant people had either mild illness (47.6%) or asymptomatic infection (37.7%).
- ★ Third-trimester COVID-19 infections, when compared to first and second-trimester infections combined, were not associated with a statistically significant increased risk of moderate to critical disease (Figure 4).
- ★ Among pregnancies resulting in live births, 14.1% of people whose COVID-19 infections occurred before 37 weeks gestation delivered prematurely (Appendix - Table 3). This was higher than the baseline prematurity rate of 11%⁸ in Chicago before the pandemic.
- ★ 53.6% of pregnant people with COVID-19 had at least one reported comorbidity (co-existing medical condition) before pregnancy (Table D). The most common comorbidities were obesity (32%), hypertension (13%), chronic lung disease (11%), and mental health conditions (10%), all of which are known to be associated with more severe COVID-19 illness in both pregnant and non-pregnant people.^{3, 12-14}
- ★ Pregnant people with pre-existing chronic lung disease, diabetes, cardiovascular disease, or hypertension had a 2 to 2.7 times greater risk of moderate-to-critical COVID-19 illness than those without pre-existing conditions (Figure 5).

TABLE C

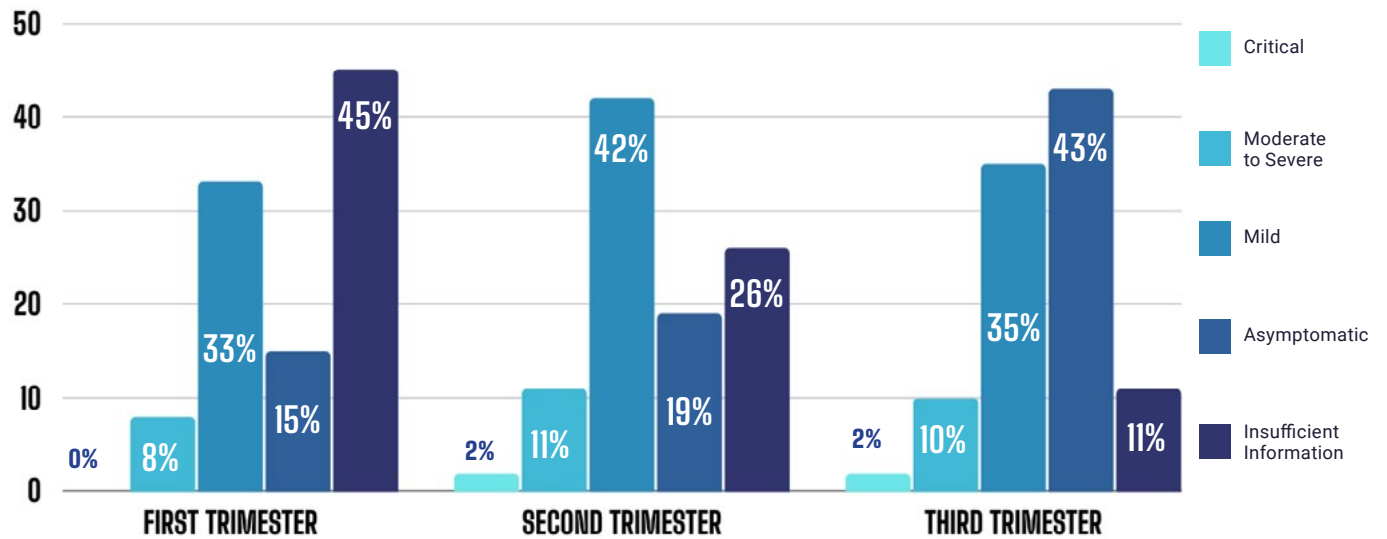
Severity of COVID-19 Illness in Pregnancy—Chicago, 2020

SEVERITY OF ILLNESS	NUMBER OF CASES
	n (%)
Critical <ul style="list-style-type: none"> • ARDS, mechanical ventilation, ECMO, ICU admission, or death 	32 (2.2%)
Moderate-to-Severe <ul style="list-style-type: none"> • Symptoms of shortness of breath AND fever or cough; OR • Pneumonia 	188 (12.6%)
Mild <ul style="list-style-type: none"> • At least one symptom reported, but not meeting criteria for moderate-to-severe illness 	709 (47.6%)
Asymptomatic Infection	561 (37.7%)

Data Notes: Percentages exclude the 451 cases (23%) with insufficient data to categorize the severity of illness. The severity of illness criteria were adapted from the Centers for Disease Control and Prevention Surveillance for Emerging Threats to Pregnant People and Infants Network's adaptation of COVID-19 severity of illness categories developed by the National Institutes of Health and World Health Organization.¹³

FIGURE 4

Severity of COVID-19 Illness During Pregnancy by Trimester of Infection – Chicago, 2020



Data Notes: There was limited information on symptom status and disease outcomes for first and second-trimester infections compared to third-trimester conditions. It was not possible to comprehensively identify cases of COVID-19 in pregnancies that ended before 20 weeks gestation as these are not all reported through Illinois Vital Records (fetal death certificates do not include fetal loss before 20 weeks gestation).

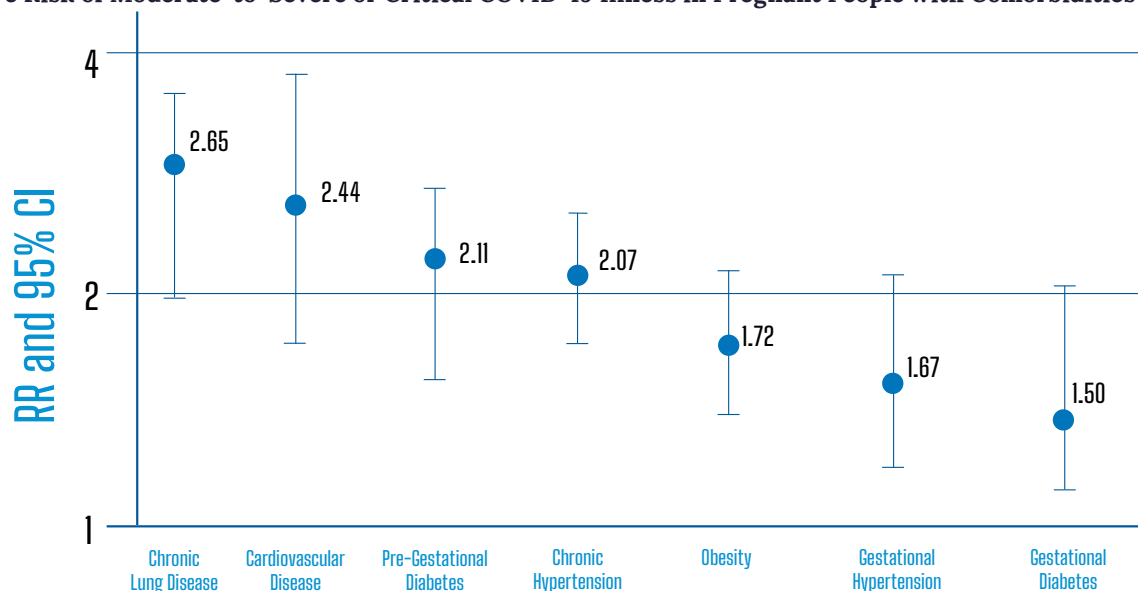
TABLE D

Prevalence of Pre-Pregnancy Comorbidities in Pregnant People with COVID-19 – Chicago, 2020

PRESENCE OF COMORBIDITIES, n (%)		MOST COMMON COMORBIDITIES	
NO COMORBIDITIES	534 (27.5%)		
AT LEAST ONE COMORBIDITY	1040 (53.6%)	Obesity	623 (32.1%)
		Hypertension	260 (13.4%)
		Chronic lung disease	205 (10.6%)
		Mental health condition	186 (9.6%)
		Diabetes (Type 1 or 2)	57 (2.9%)
NOT REPORTED	370 (19.1%)		

FIGURE 5

Relative Risk of Moderate-to-Severe or Critical COVID-19 Illness in Pregnant People with Comorbidities – Chicago, 2020



Data Notes: Illness severity could not be determined for 23% of the cases due to insufficient data. It was not possible to determine whether the onset of gestational hypertension and gestational diabetes occurred prior to or after COVID-19 infection.

☆☆ APPENDIX ☆☆

TABLE 1

COVID-19 PREGNANCY RATES BY DEMOGRAPHIC CHARACTERISTICS - CHICAGO, 2020

	NUMBER OF INFECTIONS	BIRTH RATE PER 1000 LIVE BIRTHS	INFECTION RATE PER 100 LIVE BIRTHS
	N = 1942 (%)		
RACE-ETHNICITY			
Asian non-Latinx	81 (4.2%)	7.57	3.46
Black non-Latinx	513 (26.4%)	29.23	5.68
Latinx	1005 (51.8%)	29.86	10.89
White non-Latinx	344 (17.7%)	31.96	3.48
Other	5 (0.3%)	1.38	1.17
AGE			
<20	103 (5.3%)	4.26	8.29
21-24	381 (19.6%)	14.96	8.46
25-29	559 (28.8%)	23.25	7.78
30-34	508 (26.2%)	32.47	5.06
35-39	303 (15.6%)	20.09	4.88
40+	88 (4.5%)	4.98	5.72
EDUCATION			
Less than high school	264 (13.6%)	10.31	8.29
High school or GED	613 (31.6%)	23.46	8.46
Associate's degree or some college	482 (24.9%)	21.68	7.20
Bachelor's degree	317 (16.3%)	22.92	4.48
Advanced degree (Master's, doctoral, or professional degree)	171 (8.8%)	19.48	2.84
Not reported	95 (4.9%)	2.15	14.31



TABLE 2

COVID-19 Illness Severity in Pregnancy by Demographic Characteristics – Chicago, 2020

	COVID-19 ILLNESS SEVERITY					
	TOTAL N = 1942 (%)	CRITICAL n = 32	MODERATE -TO-SEVERE n = 188	MILD n = 709	NO SYMPTOMS n = 561	INSUFFICIENT INFORMATION n = 452
RACE-ETHNICITY						
Asian non-Latinx	81 (4.2%)	2	6	42	20	11
Black non-Latinx	513 (26.4%)	15	68	173	170	87
Latinx	1005 (51.8%)	15	96	372	268	254
White non-Latinx	344 (17.7%)	0	19	129	99	97
Other	5 (0.3%)	0	0	0	2	3
Not Reported	2 (0.1%)	0	0	0	2	0
AGE						
Medicaid	1206 (62.1%)	27	138	434	362	245
Private	698 (35.9%)	5	46	258	187	202
None/ self-pay	17 (0.9%)	0	0	3	11	3
Other	3 (0.2%)	0	0	3	0	0
Not Reported	18 (0.9%)	0	4	11	1	2
EDUCATION						
Less than high school	264 (13.6%)	7	26	110	70	51
High school	613 (31.6%)	9	64	221	193	126
Associate's degree or some college	482 (24.9%)	8	52	167	149	106
Bachelor's degree	317 (16.3%)	3	25	111	76	102
Advanced degree (Master's, doctoral, or professional degree)	171 (8.8%)	1	5	69	42	54
Not reported	95 (4.9%)	4	16	31	31	13
AGE (YEARS)						
<20	103 (5.3%)	4	9	33	33	24
21-24	381 (19.6%)	6	40	138	115	82
25-29	559 (28.8%)	6	51	209	171	122
30-34	508 (26.2%)	9	45	195	137	122
35-39	303 (15.6%)	6	26	104	81	86
40+	88 (4.5%)	1	17	30	24	16



TABLE 3

COVID-19 Illness Severity in Pregnancy by Comorbidities, Trimester of Infection and Pregnancy Complications - Chicago, 2020

	COVID-19 ILLNESS SEVERITY					
	TOTAL N = 1942 (%)	CRITICAL n = 32	MODERATE -TO-SEVERE n = 188	MILD n = 709	NO SYMPTOMS n =561	INSUFFICIENT INFORMATION n = 452
COMORBIDITIES						
At least one comorbidity	1040 (53.6%)	26	134	398	257	225
Obesity	623 (32.1%)	15	79	242	140	147
Chronic lung disease	205 (10.6%)	9	46	67	47	36
Diabetes mellitus	57 (2.9%)	1	14	14	15	13
Chronic hypertension	260 (13.4%)	13	45	105	47	50
Cardiovascular disease	45 (2.3%)	2	13	15	13	2
Immunosuppression	8 (0.4%)	0	2	4	2	0
Mental health condition	186 (9.6%)	1	25	85	38	37
Other	597 (30.7%)	19	95	240	130	113
No comorbidities	534 (27.5%)	4	35	169	212	114
Not reported	368 (18.9%)	2	19	142	92	113
TRIMESTER OF INFECTION						
First	451 (23.2%)	0	34	148	68	201
Second	595 (30.6%)	11	67	248	112	157
Third	896 (46.1%)	21	87	313	381	94
PREGNANCY COMPLICATIONS						
Preterm delivery (n = 1534)	215 (14%)	11	29	77	63	35
IUFD or stillbirth (>=20 weeks gestation) (n=1942)	14 (0.7%)	2	2	5	3	2
Gestational Diabetes	222 (11.4%)	5	32	79	63	43
Gestational Hypertension	374 (19.3%)	8	55	153	77	81
IUGR/SGA	173 (8.8%)	4	16	62	58	33

Data Notes: Because fetal loss prior to 20 weeks is not reportable to Illinois Vital Records, it was not possible to comprehensively identify cases of fetal loss occurring before 20 weeks gestation. However, hospital partners did identify a limited number of cases from their medical records of patients with fetal loss before 20 weeks gestation who sought care at their facilities, and these cases were included in this analysis. IUFD=Intrauterine Fetal Demise, IUGR= Intrauterine Growth Restriction, SGA=Small for Gestational Age

TABLE 4

Relative Risk of Moderate-to-Severe and Critical COVID-19 Illness in Pregnant People with Comorbidities - Chicago, 2020

COMORBIDITY	RELATIVE RISK	95% CI
Chronic lung disease	2.65	1.97 - 3.53
Cardiovascular disease	2.44	1.53 - 3.65
Pre-gestational diabetes	2.11	1.34 - 3.12
Chronic hypertension	2.07	1.60 - 2.66
Obesity	1.72	1.33 - 2.23
Gestational hypertension	1.67	1.28 - 2.17
Gestational diabetes	1.58	1.09 - 2.05

DATA SOURCES

Data was collected from the time of an individual's first positive COVID-19 molecular test (i.e., PCR test) during pregnancy in 2020 through end of pregnancy. Sources of data included Illinois Vital Records (birth certificates and fetal death certificates), the Illinois National Electronic Disease Surveillance System (I-NEDSS) and medical record abstractions, resulting from collaboration with the Illinois Department of Public Health (IDPH) and Chicago's 16 birthing hospitals. Population denominators to calculate rates were sourced from census data.

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