



# Health Care Disparities in the COVID-19 Pandemic in the United States: A Focus on Obstetrics

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**Abstract:** The influence of social determinants of health on disease dynamics and outcomes has become increasingly clear, making them a prime target of investigation and mitigation efforts. The obstetric population is uniquely positioned to provide insight into the health inequities exacerbated by the coronavirus disease 2019 pandemic given their susceptibility to infectious disease morbidity and frequent interactions with the health care system, which provide opportunities for ascertainment of disease incidence and severity. This review summarizes the data on disparities identified in the US obstetric population

during the coronavirus disease 2019 pandemic as they relate to race and ethnicity, built environment, insurance status, language, and immigration status.

**Key words:** COVID-19, SARS-CoV-2, obstetrics, disparities, social determinants of health, pregnancy

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## Introduction

The coronavirus disease 2019 (COVID-19) pandemic dramatically uncovered a long-standing reality as it relates to health—that not all disease burden is shared equally. While it is well known that biological differences and clinical risk factors (eg, genetic predisposition, comorbid conditions) impact health outcomes, the nuances of how

sociodemographic factors drive disparities have been less widely acknowledged. The Institute of Health defines *health disparity populations* as those in which “there is a significant disparity in the overall rate of disease incidence, prevalence, morbidity, mortality, or survival rates in the population as compared with the health status of the general population.”<sup>1</sup> Associations between sociodemographic differences and poor health outcomes have often been identified, but recognition of how these differences directly obstruct prevention and treatment efforts during the COVID-19 pandemic brought to the forefront a need for more rigorous investigation of the mechanisms linking the 2.

Infectious disease dynamics, and in particular how respiratory diseases are transmitted by contact, airborne, or droplets infectious agents, offer a tangible framework in which to understand how physical and social conditions directly influence health outcomes. Higher population density, mobility of people, and heterogeneity in the health of urban dwellers allow for more frequent contact points and higher risk substrate for infection burden. These factors result in a high risk of infectious disease transmission, typically impacting those of lower socioeconomic status disproportionately.<sup>2</sup>

The obstetric population is uniquely vulnerable to infectious disease morbidity in that even in the absence of comorbid conditions, the physiological adaptations of pregnancy render pregnant people more susceptible to severe disease than their nonpregnant counterparts. The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus has proved to be an example of this phenomenon, with pregnant people experiencing 5 times higher risk of hospitalization, one-and-a-half times higher risk of intensive care unit (ICU) admission, and being almost 2 times as likely to receive mechanical ventilation.<sup>3</sup> As data rapidly emerged in the obstetric population, it was not long

before the drastic disparities in this vulnerable population were also found to compound the crisis.

Much of the data on the epidemiology of COVID-19 in the obstetric population is strengthened by the early adoption of universal testing, particularly in large tertiary care centers.<sup>4,5</sup> This practice not only revealed disparities in prevalence (by capturing cases of asymptomatic or mild disease) but also in severity and obstetric outcomes. These disparities quickly became defined by social determinants of health, including racial and ethnic identity, built environment, and sociocultural characteristics influencing access to care. This review summarizes the literature on disparities in the COVID-19 pandemic as they relate to the obstetric population in patients tested for SARS-CoV-2.

### ***Racial and Ethnic Identity***

Predating the COVID-19 pandemic, racial and ethnic identity has been intimately linked to disparities in maternal morbidity and mortality.<sup>6–9</sup> Following the stark trends documented early on in the general population, much of the literature on COVID-19 disparities in the obstetric population has centered on racial and ethnic disparities in maternal COVID-19 disease transmission and severity and perinatal outcomes.

In a series of cross-sectional and retrospective cohort studies, the most consistently reported disparity among pregnant women has been in transmission and prevalence of SARS-CoV-2 by racial and ethnic groups. Traditionally marginalized groups, most commonly Hispanic and non-Hispanic black women, have been overrepresented in cohorts of SARS-CoV-2-positive pregnant women admitted for delivery compared with non-Hispanic white women.<sup>5,10–17</sup> The limited number of prospective cohort studies demonstrate similar findings<sup>18,19</sup> (Table 1).

Owing to small sample sizes, few studies have been able to draw conclusions regarding the extent of disparities in SARS-CoV-2 prevalence in smaller racial and ethnic minority groups. Those that have attempted to do so report the disproportionate impact of the COVID-19 pandemic on these groups.<sup>20,21</sup> In a multicenter retrospective cohort study of pregnant women tested for SARS-CoV-2 across 7 hospitals in New York, Blitz et al<sup>20</sup> demonstrate that in addition to a disproportionate burden of SARS-CoV-2 in Hispanic and non-Hispanic black women (test positivity rate 18% and 14%, respectively), women identified as “other” or multiracial were overrepresented in the SARS-CoV-2-positive group (test positivity rate 12%) compared with non-Hispanic white women (test positivity rate 8%,  $P < 0.0001$ ). Similarly, in Washington State, there was a 1.3- to 3.9-fold higher prevalence of SARS-CoV-2 among American Indian/Alaska Native, Native Hawaiian or Other Pacific Islander, and multiracial women compared with non-Hispanic white women. Though not all statistically significant, all trended toward disproportionate representation in the infected cohort.<sup>21</sup>

Similar to non-Hispanic white women, Asian women are less often affected by COVID-19 and thus underrepresented in SARS-CoV-2-infected obstetric cohorts across the United States.<sup>12,13,20</sup> In New York, where other minority women had infectivity rates ranging 12% to 18%, Asian pregnant women had an infectivity rate of 5%.<sup>20</sup> In seroprevalence studies among parturient women in Philadelphia, 0.9% of Asian women tested positive for SARS-CoV-2 compared with 2% of non-Hispanic white women, whereas Hispanic and non-Hispanic black women had rates of 10.4% and 9.7%, respectively.<sup>13</sup> In Washington State, the prevalence ratio of SARS-CoV-2 among pregnant Asian women was 0.4 (ie, lower than expected based on birth data), compared with 0.6

for non-Hispanic white women, 2.1 for Hispanic women, and 2.0 for non-Hispanic black women.<sup>21</sup>

While clear disparities were identified in the prevalence of SARS-CoV-2 across racial and ethnic groups, the data are conflicting as to whether these inequities were further reflected in differences in disease severity, with reports ranging from no association to differences in specific racial and ethnic minorities.<sup>10–12,15,18,22,23</sup> Small reported cohorts of pregnant women with moderate and severe COVID-19 likely limit investigations into potential disparities, although where noted evidence suggests that non-Hispanic black experience disproportionately higher rates of morbidity and death. In November 2, 2020, Morbidity and Mortality Weekly Report (MMWR) released by the Centers for Disease Control and Prevention (CDC), non-Hispanic black women, who comprised 14.4% of the pregnant SARS-CoV-2-positive cohort, represented 26.5% of deaths.<sup>22</sup> A similar phenomenon has been described in Brazil, another country notoriously plagued by structural racism.<sup>24–27</sup> In a sample of 669 pregnant black and white women with COVID-19, black women were hospitalized with more severe disease and had higher rates of ICU admission, mechanical ventilation, and death.<sup>23</sup>

In contrast to their disproportionately lower risk of infection, pregnant Asian women appear to have higher rates of disease severity compared with non-Hispanic white women in cross-sectional and retrospective cohort analyses. In both June 16, 2020, and November 2, 2020, CDC MMWR, the risk of ICU admission for pregnant Asian women was significantly higher than that of other pregnant women, rising from a relative risk of 2.7 in June to 6.6 in November.<sup>3,22</sup>

Though Hispanic women represent a disproportionate amount of the SARS-CoV-2-infected population across the country, much of the literature demonstrates disease severity similar to that of

**TABLE 1. Disparities in SARS-CoV-2 Among Hispanic and Non-Hispanic Black Women in the Obstetric Literature**

References	Study Design	No. Participants	Measure of Association
Blitz et al <sup>5</sup>	Retrospective cohort	403	Racial-ethnic-specific prevalence of SARS-CoV-2
Emeruwa et al <sup>10</sup>	Retrospective cohort	673	Racial-ethnic-specific prevalence of SARS-CoV-2
Onwuzurike et al <sup>11</sup>	Retrospective cohort	44	Proportion of SARS-CoV-2-positive cohort (relative to proportion of clinic population)
Prasannan et al <sup>12</sup>	Cross-sectional	4873	SARS-CoV-2 test positivity rate (relative to proportion of delivering cohort) Odds ratio for prediction of SARS-CoV-2 PCR test positivity
Flannery et al <sup>13</sup>	Retrospective cohort	1293	Racial-ethnic-specific SARS-CoV-2 seropositivity rate
Sakowicz et al <sup>14</sup>	Retrospective cohort	1418	Proportion of SARS-CoV-2-positive cohort (relative to proportion of tested cohort) Odds ratio for outcome of SARS-CoV-2 infection status
Grechukhina et al <sup>15</sup>	Retrospective case series	1567	Proportion of SARS-CoV-2-positive cohort (relative to proportion of tested cohort)
Pineles et al <sup>16</sup>	Retrospective cohort	935	Proportion of SARS-CoV-2-positive cohort (relative to proportion of tested cohort) Adjusted risk ratio
Joseph et al <sup>17</sup>	Retrospective cohort	1882	Racial-ethnic-specific prevalence of SARS-CoV-2
Goldfarb et al <sup>18</sup>	Prospective cohort	136	Ethnicity-specific SARS-CoV-2 test positivity rate
Buhimschi et al <sup>19</sup>	Prospective cohort	369	Proportion of SARS-CoV-2-positive cohort (relative to proportion of tested cohort)

COVID-19 indicates coronavirus disease 2019; PCR, polymerase chain reaction; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.

non-Hispanic white women.<sup>3,10,12,18</sup> Of the studies examining racial and ethnic disparities in SARS-CoV-2 infection in the pregnant population, the largest, a cross-sectional study of 4873 delivered pregnant patients exploring the associations with social determinants of health at large, found race and ethnicity to be associated with SARS-CoV-2 prevalence but did not find any association between race and ethnicity and disease severity.<sup>12</sup> Emeruwa et al,<sup>10</sup> in their retrospective cohort study of 100 delivered

patients, similarly did not find any association. The November 2020 CDC MMWR did not investigate racial and ethnic differences across disease severity categories but found similar risks of ICU admission, invasive ventilation, and extracorporeal membrane oxygenation for pregnant versus nonpregnant Hispanic women as compared with pregnant versus nonpregnant non-Hispanic white women.<sup>3</sup>

Only one case series of 1567 pregnant and postpartum women with SARS-CoV-2 within 3 hospitals in the Yale-New Haven

TABLE 1. (Continued)

Hispanic	Non-Hispanic Black	Non-Hispanic White	P	Comments
31.9%	21.3%	14.1%	<0.008	Comparison across all racial-ethnic (R/E) groups
18.1%*	12.7%	9.4%	<0.01*	Reference group: non-Hispanic white
48% (30%) 32% (19%)	34% (30%) 16% (13%)	— (20%) 34% (46%)	<0.001	Comparison across all R/E groups
1.726 (1.134-2.677)*	1.769 (1.144-2.776)*	1.439 (0.976-2.175)†	<0.02* 0.08†	Reference group: Asian
10.4%*	9.7%†	2.0%†	0.04* <0.001†	Comparison against all others not in R/E category
53.5% (22%)	28% (12%)	23% (56%)	<0.001	Race and ethnicity analyzed as separate variables
4.71 (3.10-7.17)*	6.67 (3.73-11.91)†			Reference group*: non-Hispanic white†
43.8% (23.5%)	21.6% (13.8%)	27.3% (54.2%)	0.19	Comparison across all R/E groups ( <i>P</i> < 0.001 compared with non-Hispanic)
73% (56%)	8% (13%)	1% (3%)	0.015	Comparison across all R/E groups
3.11 (1.12-8.64)				Reference group: non-Hispanic
15.8%	3.8%	0%	<0.001	Comparison across all R/E groups
72% (vs. 27%)				Reference group: non-Hispanic
31% (20%)	66% (57%)	3% (11%)		

Health delivery network suggests (using statistical analysis) that there may be a higher risk of moderate and severe disease in this population.<sup>15</sup> Other studies that found conflicting signals for disparities in disease severity were limited by small sample size. Goldfarb et al,<sup>18</sup> in their prospective study of 136 pregnant women, found comparable rates of COVID-related hospitalization between Hispanic and non-Hispanic women (33.3% vs. 36.4%) but did not perform statistical analysis on this outcome or other COVID-related indicators of disease severity (ie, ICU admission,

12.8% vs. 4.5% and intubation, 10.3% vs. 0%) due to small sample sizes. One study of 44 pregnant or recently postpartum women at a tertiary care facility in Boston reported disparities in COVID-19-related morbidity for Hispanic women (including hospitalization, severe or critical disease, ICU admission, mechanical ventilation, and death) similar to the non-Hispanic black women represented in their population.<sup>11</sup>

Of the literature examining racial and ethnic disparities in COVID-19 in the obstetric population, none reported differences in perinatal outcomes attributable to

SARS-CoV-2 disparities in prevalence and disease severity.<sup>10,16,28,29</sup> Perinatal outcomes examined included preterm birth, preterm prelabor rupture of membranes, maternal fever, cesarean delivery, perinatal death, birthweight, Apgars, and neonatal SARS-CoV-2 positivity immediately after birth. This data is strengthened by a large cross-sectional study of 8026 non-Hispanic black, Hispanic, and non-Hispanic white women who gave birth in New York City before and during the pandemic.<sup>28</sup> The study was designed to assess whether known racial and ethnic disparities in very preterm birth and preterm birth increased during the first wave of the COVID-19 pandemic and found no difference in racial and ethnic disparities compared with before the pandemic.

The aforementioned striking disparities in SARS-CoV-2 incidence by racial and ethnic identity have been appropriately coupled with increasing awareness and acknowledgment of the absence of a biological explanation for such differences in disease burden. The result has been that additional COVID-19 literature has come to focus on other social determinants of health more directly related to infection risk that have disadvantaged racial and ethnic minorities.

### ***Built Environment***

As social distancing orders became one of the mainstays of prevention during the pandemic, the practical challenges for structurally disadvantaged populations to comply with these mitigation efforts became apparent. Specifically, with urban neighborhoods at the center of the COVID-19 pandemic, the built environment came under investigation as both a driver of transmission and spread and a target of mitigation efforts.

In the US obstetric population, while many of the aforementioned studies examining racial and ethnic disparities in SARS-CoV-2 included some associated

sociodemographic factors, 3 studies specifically explored the relationship between elements of the built environment and disparities in COVID-19.<sup>12,17,30</sup>

In a cross-sectional study of 434 pregnant women delivering in New York City, the odds of SARS-CoV-2 infection in the obstetric population was found to be higher among women living in neighborhoods with high unemployment rates, large household membership (highest probability of infection), and greater household crowding, and lower in women living in buildings with more residential units, buildings with higher assessed values (lowest probability of infection), and neighborhoods with higher median incomes.<sup>30</sup> The findings of this study have since been followed by a larger cross-sectional study of 4873 pregnant patients who delivered in New York, which found that patients who had a positive test for SARS-CoV-2 were more likely to reside in neighborhoods with lower median household income, greater unemployment rates larger mean household size, and higher frequency of low educational attainment.<sup>12</sup>

Similar findings were noted in other major metropolitan cities.<sup>17,19</sup> In Atlanta, elements of the built environment were investigated in a similar fashion to the aforementioned New York study. Of 1882 women delivering in 2 urban hospitals, the prevalence of SARS-CoV-2 was higher among women living in census tracts with smaller average household size and increased neighborhood density.<sup>17</sup>

As evidenced by data on the associations between the built environment and SARS-CoV-2 transmission, household and neighborhood density unsurprisingly contribute largely to disparities in infectious disease prevalence in the obstetric population. Furthermore, the racial and ethnic disparities in the obstetric population can be partially attributed to the structural disadvantages and discrimination faced by racial and ethnic minorities, which place them in more crowded urban areas.

While some markers of the built environment indicate physical barriers to SARS-CoV-2 prevention and control, indicators such as neighborhood unemployment rates, neighborhood median income, building value, and educational attainment suggest other means by which social determinants play a role in COVID-19 disparities in the obstetric population. These indicators, which are a proxy for socioeconomic status, reflect the ways in which populations may face obstructed access to care, all while being subject to the increased risks of disease transmission associated with a greater proportion of service industry positions and limited ability to work from home.<sup>31,32</sup>

### **Access**

Various financial and social characteristics have been linked to disparities in COVID-19 in the obstetric population, presumably by means of affecting access to care.

#### **INSURANCE STATUS**

Studies analyzing the association between COVID-19 and insurance status in the obstetric population consistently demonstrate that both uninsured status and publicly funded insurance status were significantly associated with SARS-CoV-2 infection.<sup>10,12,14,16,17</sup> Where provided, odds ratios of the association between public insurance and SARS-CoV-2 infection ranged from 1.39 to 4.38.<sup>12,14,16</sup> In one study in which uninsured patients were represented in the cohort, the prevalence of SARS-CoV-2 was 10.1% in uninsured patients, compared with 4.8% in publicly insured patients and 1.6% in commercially insured patients.<sup>17</sup>

#### **PRIMARY LANGUAGE**

Language barriers are an understudied challenge that have been shown to impede access to health care, lower the quality of care, and result in dissatisfaction with care.

The mechanism by which they reduce quality and satisfaction are most often cited as an increase in both linguistic and cultural miscommunication.<sup>33,34</sup> As such, as is the case in the COVID-19 obstetric literature, language discordance, and barriers should be recognized as social determinants of health that can be reflected in observed health disparities.

Non-English language has been disproportionately represented in the SARS-CoV-2-positive obstetric population, with 2 studies providing an estimate of the association between non-English language and SARS-CoV-2. Lokken and colleagues report that the proportion of pregnant patients with SARS-CoV-2 infection receiving medical care in a non-English language was higher than estimates of pregnant patients receiving care with limited English proficiency in Washington State (30.4% vs. 7.6%). Of note, 70.7% of the cohort of 240 pregnant patients with SARS-CoV-2 in this study were from racial and ethnic minority groups.<sup>21</sup> In a cross-sectional study of diverse patients in New York tested for SARS-CoV-2, the odds of SARS-CoV-2 infection in patients whose preferred language was Spanish compared with those whose preferred language was English was 1.67 (95% confidence interval: 1.44-2.43).<sup>12</sup> While not analyzed separately, Liu et al<sup>29</sup> note that the top primary languages in their population of disproportionately infected minority patients were non-English languages including Haitian Creole, Spanish, Arabic, Bengali, Russian, French, and French Creole.

#### **IMMIGRANTS**

One commentary considers the unique challenges faced by pregnant immigrants and the impact of these challenges on the population (and the public at large) during the COVID-19 pandemic. While specific estimates of the association between immigration status and SARS-CoV-2 were not provided, the commentary

highlighted the combination of barriers to care such as exclusion from publicly funded insurance, exclusion from relief efforts, and

fear of being deemed a public charge (Public charge is loosely defined as someone who is considered as primarily dependent on the

**TABLE 2. Summary of Disparities in SARS-CoV-2 in the Obstetric Population**

Disparity	Summary	Risk Factors and Areas for Future Research
Race and ethnicity	<p>Disproportionate representation of Hispanic and non-Hispanic black women in SARS-CoV-2-infected obstetric population</p> <p>Disproportionately higher rates of COVID-related morbidity and mortality among non-Hispanic black women</p> <p>Conflicting data on disparities in disease severity for Hispanic women</p> <p>Asian and non-Hispanic white women least affected by SARS-CoV-2 infection</p> <p>Though underrepresented with regard to prevalence, disproportionately higher rates of COVID-related morbidity and mortality among Asian women</p> <p>Likely disproportionate representation of other (non-Asian) minority women in SARS-CoV-2-infected obstetric population</p> <p>No racial or ethnic disparity in perinatal outcomes identified in SARS-CoV-2-positive obstetric population</p>	<p>Structural and systemic disparities related to social determinants of health, which impact:</p> <p>Frequency of comorbidities<sup>36</sup></p> <p>Access to care<sup>37,38</sup></p> <p>Quality of care<sup>39</sup></p>
Built environment	<p>Physical attributes associated with high prevalence</p> <p>Larger mean household membership</p> <p>Greater household crowding</p> <p>Smaller household size</p> <p>Fewer residential units in building</p> <p>Increased neighborhood density</p> <p>Neighborhood socioeconomic attributes associated with high prevalence</p> <p>Higher unemployment rates</p> <p>Lower assessed building value</p> <p>Lower median income</p> <p>Higher frequency of low educational attainment</p>	<p>Increased proximity to and frequency of contacts<sup>2</sup></p> <p>Variation in usual source of care<sup>40</sup></p> <p>Individual-level financial barriers to obtaining care (proxy)<sup>37</sup></p> <p>Economic limitations on adherence to social distancing and ability to work from home<sup>31,32</sup></p>
Access to care	<p>Uninsured status and publicly funded insurance status are associated with higher rate of SARS-CoV-2 infection</p> <p>Disproportionate representation of non-English language in SARS-CoV-2-infected obstetric population</p> <p>Potential for disproportionate impact of SARS-CoV-2 on pregnant immigrants</p>	<p>Financial barriers to obtaining care and insurance-based discrimination<sup>41</sup></p> <p>Lack of language/cultural concordance between patients and providers<sup>33,34</sup></p> <p>Exclusion from publicly funded insurance<sup>35</sup></p> <p>Exclusion from relief efforts<sup>35</sup></p> <p>Fear of immigration enforcement<sup>35</sup></p>

COVID-19 indicates coronavirus disease 2019; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.



government for subsistence, which thereby impacts eligibility for green cards and other visas) or of immigration enforcement as potential contributors to inadequate prenatal care.<sup>35</sup> As a result, immigrant communities, in particular those with low incomes, have likely been disproportionately impacted by the COVID-19 pandemic. The suspected disparities this population and all the aforementioned populations are summarized in Table 2.

## Conclusions

The US obstetric population has offered a unique insight into the COVID-19 pandemic by way of its combination of vulnerability to infectious disease, universal testing across multiple epicenters, and in-depth investigation into not only biological but social mechanisms for disease transmission. The result, in addition to informing the epidemiology of the pandemic, has been a highlight of the ways in which social determinants of health compound morbidity and perpetuate health inequities.

A review of the literature to date demonstrates that disparities in SARS-CoV-2 in the obstetric population can be observed across racial and ethnic categories, built environment, and various markers of access to care—insurance status, primary language, and potentially immigration status. While disparities in SARS-CoV-2 infection rates are consistently observed, disparities in disease severity have only been demonstrated in some racial and ethnic minorities, and no disparities in perinatal outcomes are evident. Given the ways in which structural racism and systemic disenfranchisement of these disadvantaged populations impact the prevalence of underlying comorbidities and the ability to comply with mitigation efforts, the documented associations between these social determinants of health and disease incidence are unsurprising. However, documentation

and ongoing comprehensive investigation of the specific ways in which social determinants of health impact COVID-19 epidemiology in each population can be critical in efforts to reduce morbidity. For example, whether COVID-19 severity (in most) and perinatal outcomes are largely unaffected by sociodemographic differences or whether the ability to detect existing differences has been limited by small sample sizes is important to discern for the purposes of identifying targets of intervention. With the continuance of the COVID-19 pandemic and the emergence of new variants, further research on larger cohorts can provide clarity on the nuanced ways in which sociodemographic factors impact outcomes in the obstetric population.

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