Riverside University HEALTH SYSTEM
Public Health

HEALTH MATTERS BRIEF

Maternal Health in Riverside County, CA

Epidemiology & Program Evaluation • October 2024

INTRODUCTION

Maternal health refers to the wellbeing of mothers during pregnancy, childbirth, and the period after birth (WHO, 2009). In 2023, there were 507,866 women of reproductive age in Riverside County, accounting for 20% of the total population (CDPH, 2023c). According to the U.S. Health Resources and Services Administration, one of the most pressing challenges in maternal health includes the high prevalence of pregnancy-related mortality and morbidity, particularly for historically disadvantaged populations (HRSA, 2024). Racial and ethnic disparities in maternal health outcomes persist for Non-Hispanic Native Hawaiian and Pacific Islander, Black/African American, and American Indian/Alaska Native birthing parents. Additionally, many pregnancy-related deaths are considered preventable (HRSA, 2024). Maternal morbidities, defined as any short- or long-term health problems that result from being pregnant and giving birth, are associated with poor maternal and infant health outcomes (NIH, 2021).

Examples of comorbid conditions during or after pregnancy include asthma, diabetes, and hypertension. From 2020 to 2022, about 16% of all birthing parents in Riverside County had hypertension at the time of delivery (CDPH, 2024). Disparities in comorbidities during pregnancy are also seen by age and race/ethnicity (CDPH, 2024). Mental health conditions like prenatal and postpartum depression are prevalent in the birthing population in Riverside County, with an estimated 17.6% of birthing parents reporting symptoms of prenatal depression and 12.4% reporting symptoms of postpartum depression from 2019-2021 (CDPH, 2023b).

This brief focuses on the status of maternal health for Riverside County from the years 2018 to 2022. Data for maternal mortality, comorbidities, mental health, substance use, and neonatal abstinence syndrome are included in this report.

RIVERSIDE COUNTY KEY FINDINGS

12 women in Riverside County died from a pregnancy or childbirth-related condition from 2018-2022

All maternal comorbidities increased by 6% from 2018-2022

Asian pregnant people had the highest percentage of gestational diabetes at 9.6 %

Black/African American pregnant people experienced the highest percentage of gestational hypertension at 9.1%

Third trimester alcohol consumption was HIGHEST among White pregnant parents, whereas use of cannabis during pregnancy was HIGHEST among Black/African Americans.

17% of Black/ African American birthing parents experienced symptoms of post-partum depression

MATERNAL MORTALITY

Maternal mortality is the death of a woman during pregnancy or within 42 days after the end of the pregnancy, from any cause related to or worsened by the pregnancy or its management, but not due to accidental or incidental causes (WHO, 2009). Any maternal deaths occurring past 42 days post-pregnancy but within a year postpartum are considered late maternal deaths and are excluded when calculating maternal mortality rates (WHO, 2009). The overall birth rate in Riverside County decreased beginning in 2020 (Escobar, 2024). No maternal deaths were reported during 2018 nor 2019. However, Riverside County saw an increase in maternal mortality between 2020 (n=1) and 2022 (n=6) (Figure 1). In 2020, 33% of all deaths pertaining to pregnancy, childbirth, and the puerperium period occurred during pregnancy or 42 days after end of pregnancy. This percent increased to 75% in 2022 (Figure 1). A similar trend has also been seen at the State level, with California reporting 52 maternal deaths in 2022 up from 32 in 2020 (CDC, 2024b)[11]. Late maternal deaths, which include both direct and indirect obstetric deaths, decreased between 2018 and 2022 (Figure 1). Although maternal mortality in the County remains low, the overall reduction and prevention of maternal deaths remains a public health concern (U.S. DHHS, n.d.).

Figure 1. Counts of All Maternal Deaths by Year, 2018-2022

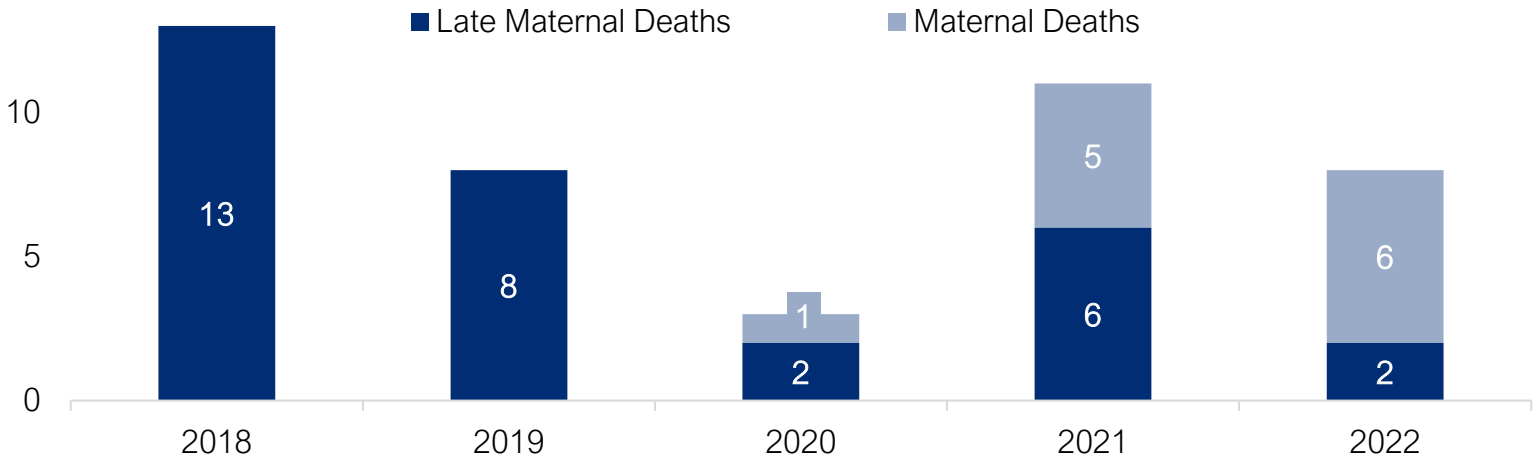


Figure 2. Final Causes of Death for Maternal Mortality and Late Maternal Mortality, 2018-2022[1]

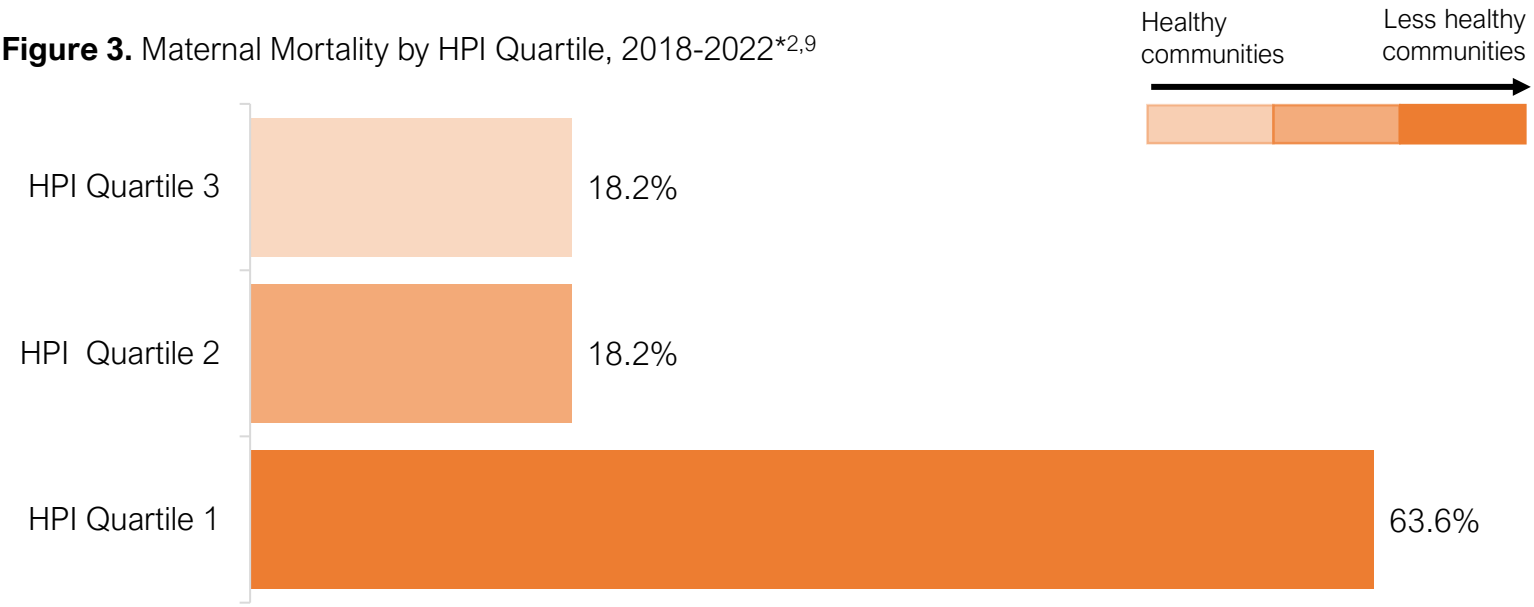
Category	Maternal Mortality Causes*		Late Maternal Mortality Causes	
	Count	Percent	Count	Percent
Pre-existing Medical Conditions	7	58.3%	5	16.1%
Pregnancy Related Conditions	4	33.3%	16	51.6%
Mental Health Conditions**	1	8.3%	6	19.4%
Other	0	-	4	12.9%

MOST maternal mortality cases in Riverside County from 2018 to 2022 were attributed to pre-existing medical conditions, while over **A THIRD** were related to conditions specific to pregnancy (Figure 2).

*The total reflects the 12 maternal deaths in the County from 2018-2022 and only includes pregnant at time of death or maternal deaths only up to 42 days postpartum. Percent total does not equal to 100% due to rounding.
**Substance use/self-harm was included under the category for Mental Health Conditions.

MATERNAL MORTALITY

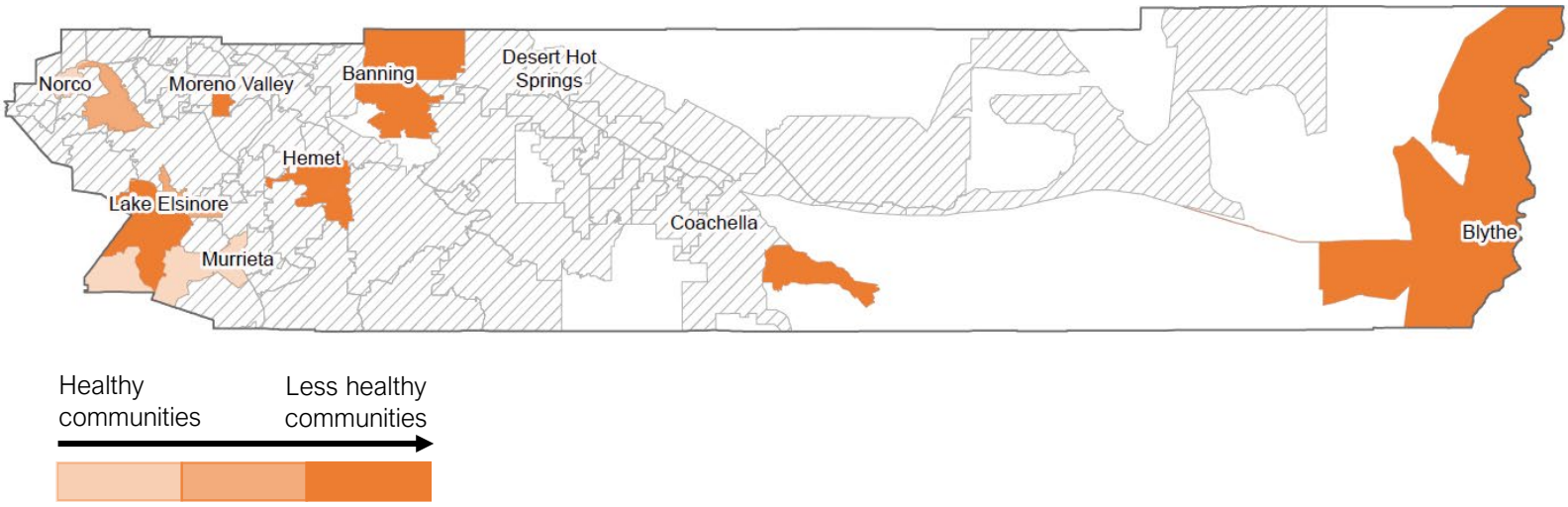
Figure 3. Maternal Mortality by HPI Quartile, 2018-2022*[2,9]



The Healthy Places Index (HPI) includes several indicators such as income, employment, education, clean air, and water quality to measure the conditions of communities and their environments (HPI, n.d.). HPI quartiles range from one to four, with quartiles one and two indicating less healthy community conditions and quartile three indicating healthier communities. Disparities in maternal mortality are seen in rural communities, communities with lower socioeconomic status, and in Black/African American and other communities of color (Singh, 2021). This is attributed to a gap in access to adequate prenatal and postpartum care, inequities in social conditions, and health-risk factors that increase the risks associated with maternal mortality and morbidity (Singh, 2021). As seen in Figure 3, **two-thirds**[2] of all maternal deaths occurred in zip codes that fell within HPI Quartile 1.

Most maternal deaths occurred in the more populated Northwest, Mid, and Southwest regions of the County. Maternal deaths that occurred in the East region of the County were in zip codes within HPI Quartile 1 (Figure 4).

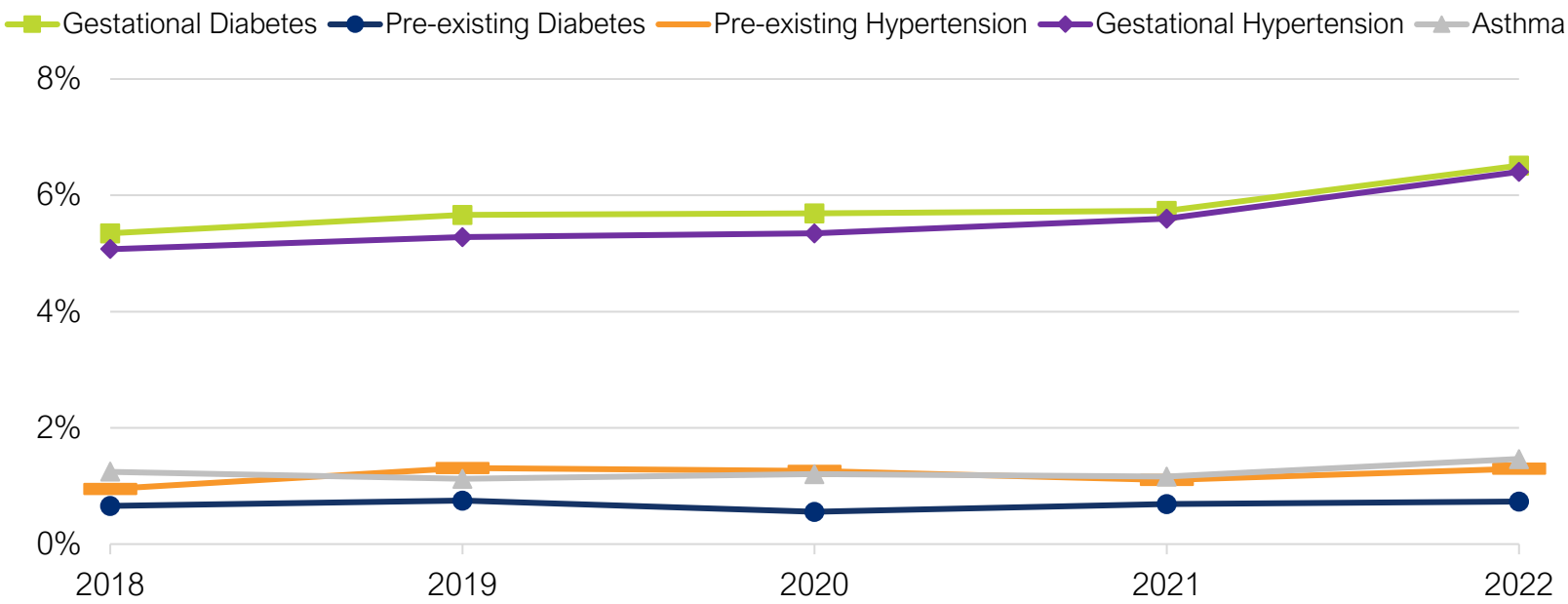
Figure 4. HPI Quartile of Cities with Maternal Deaths in Riverside County, 2018-2022*[9]



*The total reflects the 12 maternal deaths in the County from 2018-2022 and only includes pregnant at time of death or maternal deaths only up to 42 days postpartum.

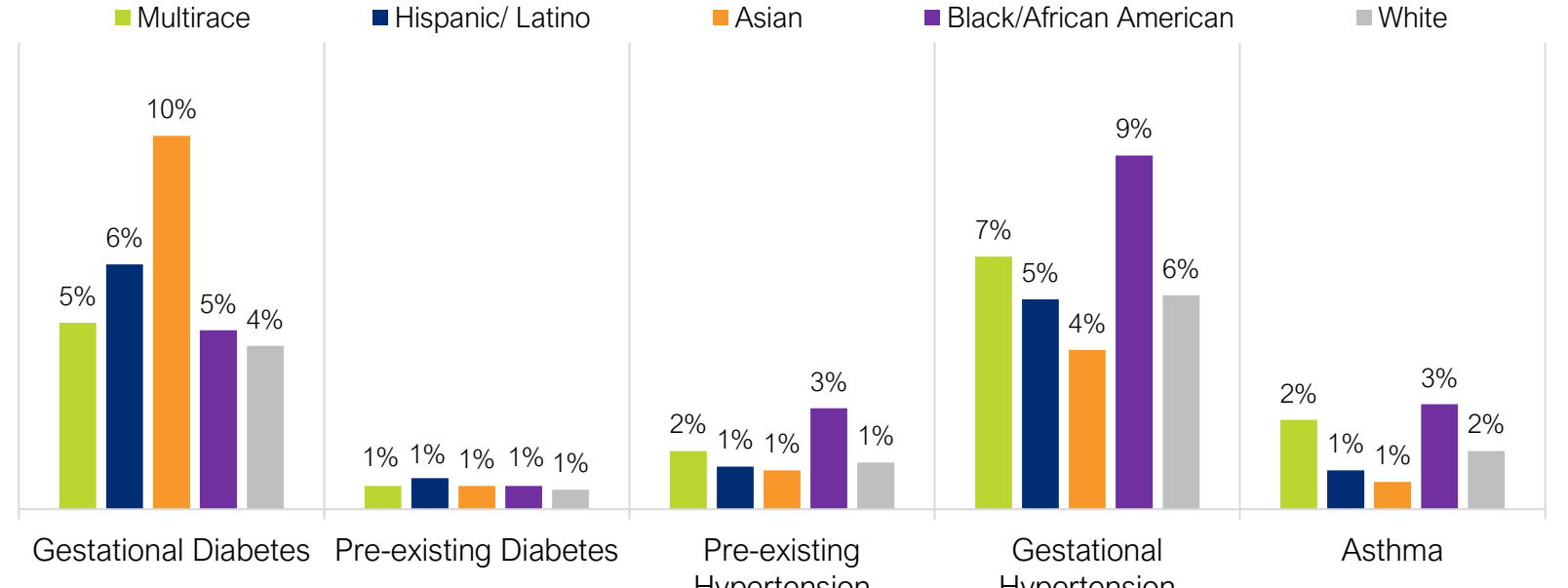
MATERNAL COMORBIDITIES

Figure 5. Percent of Maternal Comorbidities by Year, 2018-2022[3,4]



From 2018-2022, approximately 0.7% of birthing parents had pre-existing diabetes, which was lower than the 3% of women of reproductive age with diabetes in Riverside County (CHIS, 2024). Similarly, between 2018-2022, only 1.2% of birthing parents had pre-existing hypertension, which was lower than the 13% of women of reproductive age with hypertension in Riverside County (CHIS, 2024). All listed maternal comorbidities had a percent increase of at least **6%** in prevalence (Figure 5) from 2018-2022. Among these, gestational diabetes and gestational hypertension remained the most prevalent maternal comorbidities across different years and race/ethnicity groups. Notably, Black/African American birthing parents had the highest percentage of gestational hypertension, followed by Multirace and White birthing parents. Moreover, Asian birthing parents had the highest percentage of gestational diabetes, followed by Hispanic/Latino and Multirace birthing parents (Figure 6).

Figure 6. Percent of Maternal Comorbidities by Race/Ethnicity, 2018-2022[3,4,5]



MATERNAL MENTAL HEALTH

In Riverside County, Hispanic/Latino birthing parents reported more depressive symptoms during the prenatal period compared to other race/ethnicity groups and notably higher than in California. During the postpartum period, Black/African American birthing parents reported more depressive symptoms compared to other race/ethnicity groups (Figure 7). Additionally, birthing parents with "some college" or a "college degree" reported increased depression symptoms in prenatal and postpartum periods (Figure 8). However, this trend seems to be reversed at the State level, with highest percentage of prenatal and postpartum depression observed in parents with less education.

Figure 7. Percentage of Self-Reported Prenatal and Postpartum Depression Symptoms by Race/Ethnicity in Riverside County and California, 2019-2021[5,6,7]

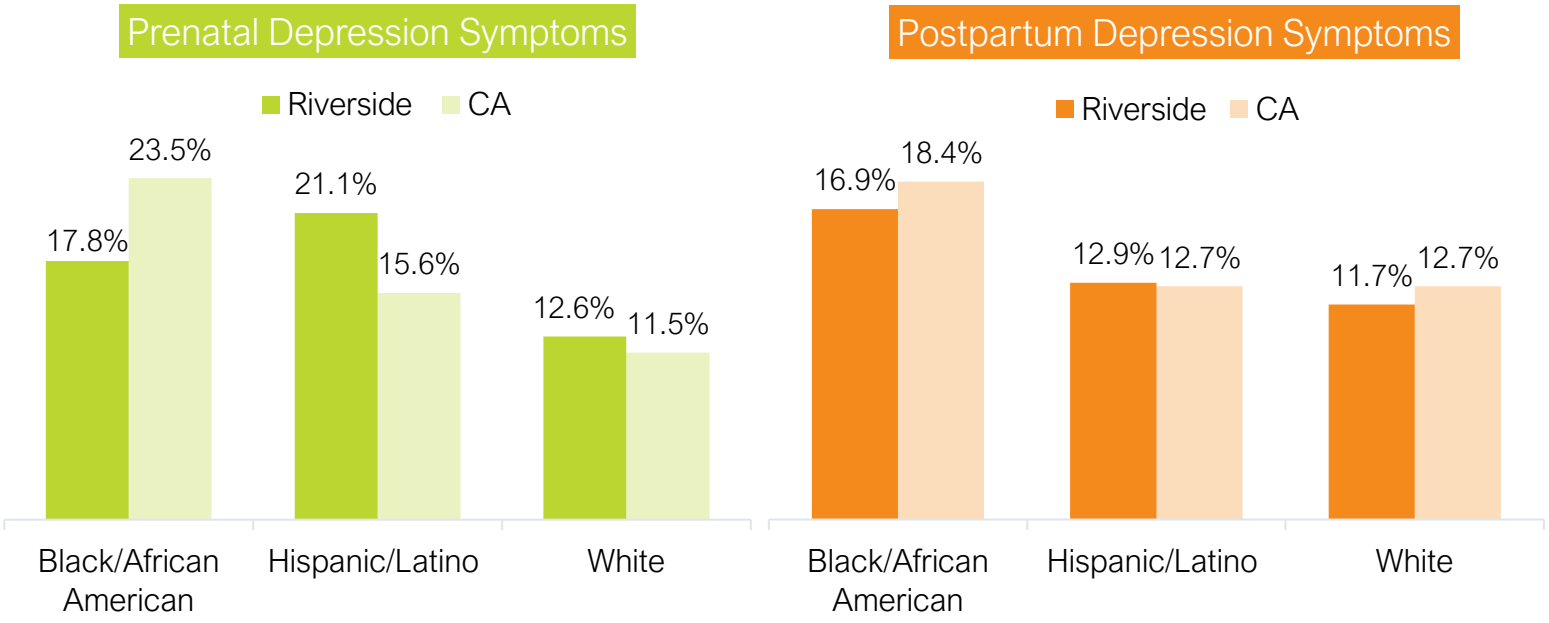
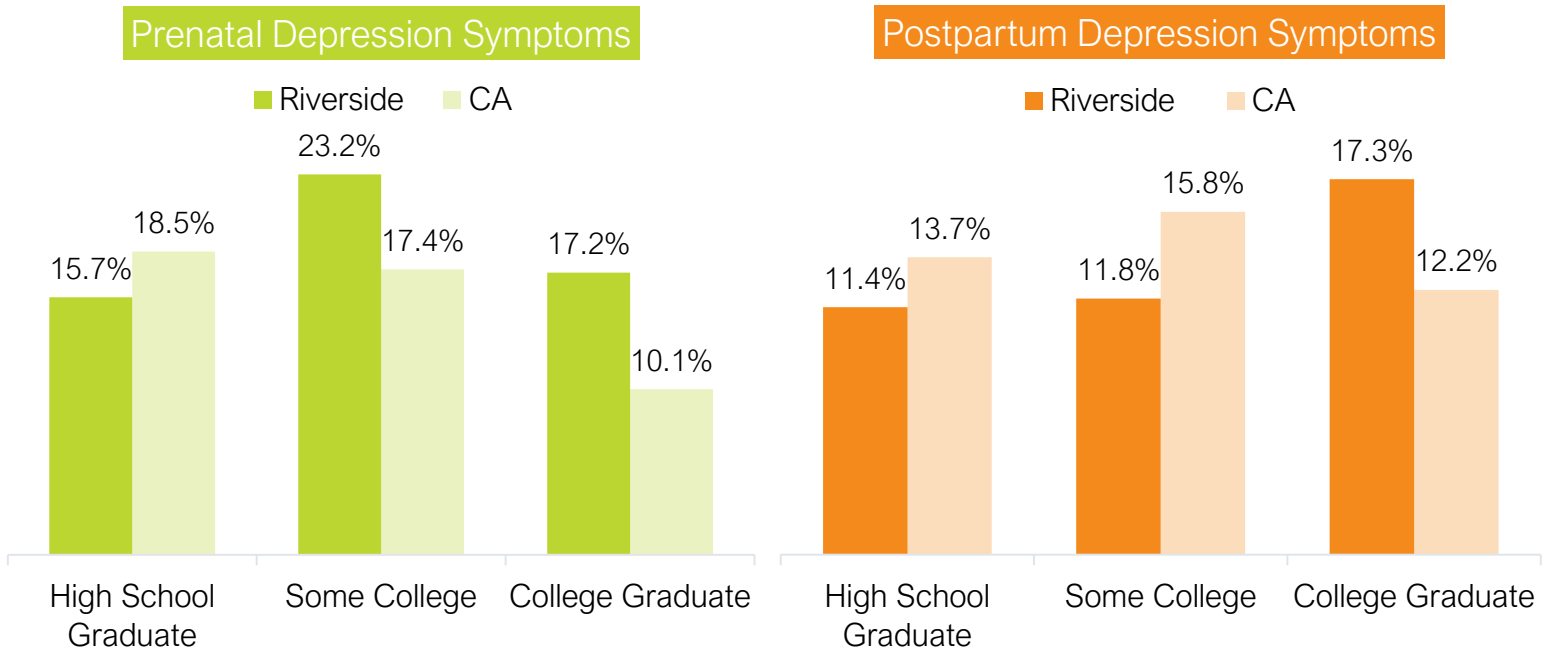


Figure 8. Percentage of Self-Reported Prenatal and Postpartum Depression Symptoms by Education Level in Riverside County and California, 2019-2021[6,7]



SUBSTANCE USE DURING PREGNANCY

Figure 9. Percentage of Self-Reported Substance Use During Pregnancy by Race/Ethnicity in Riverside County and California, 2019-2021[5,6,7]

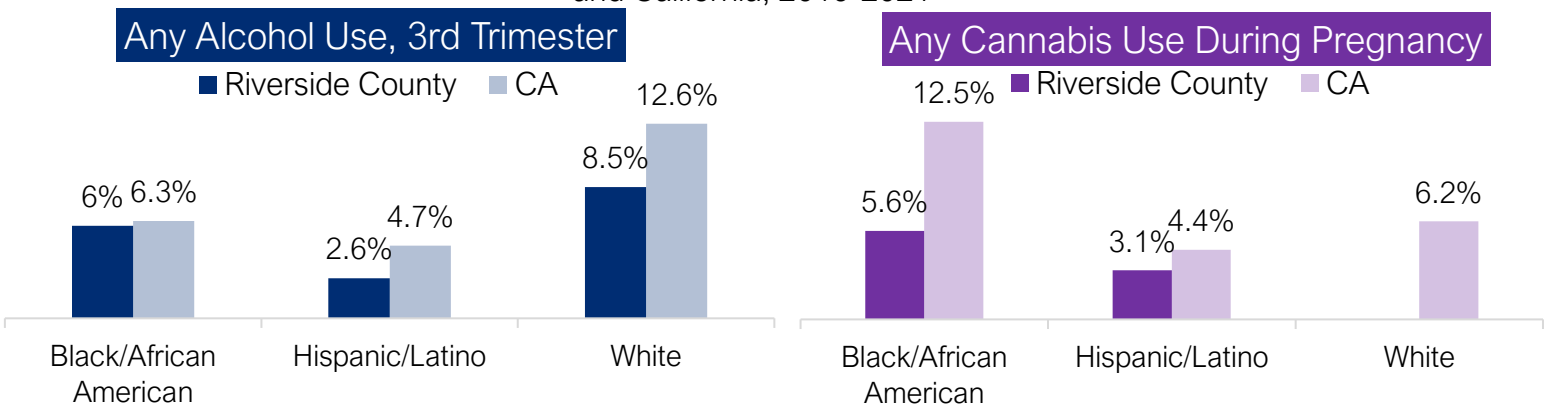
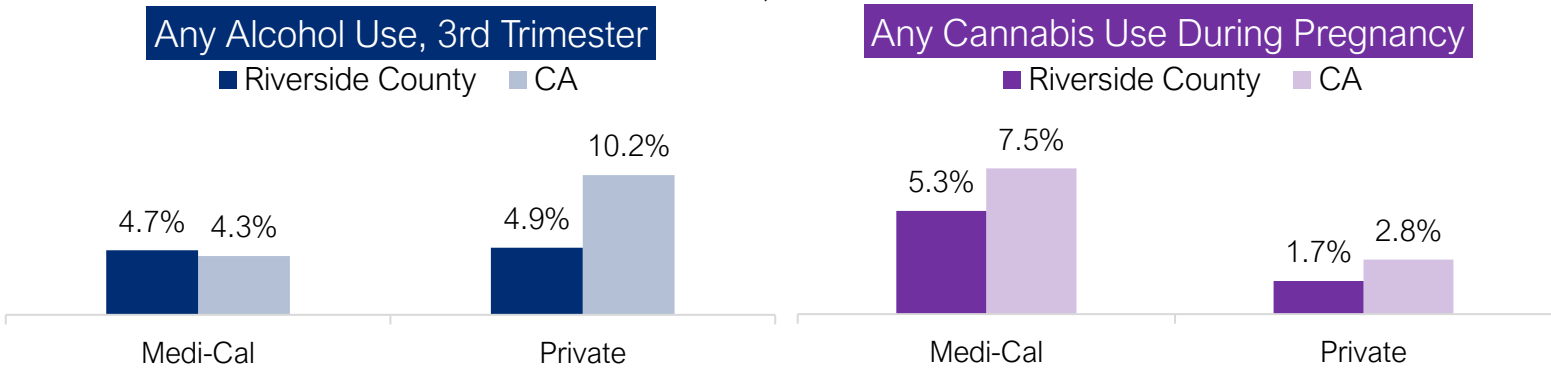


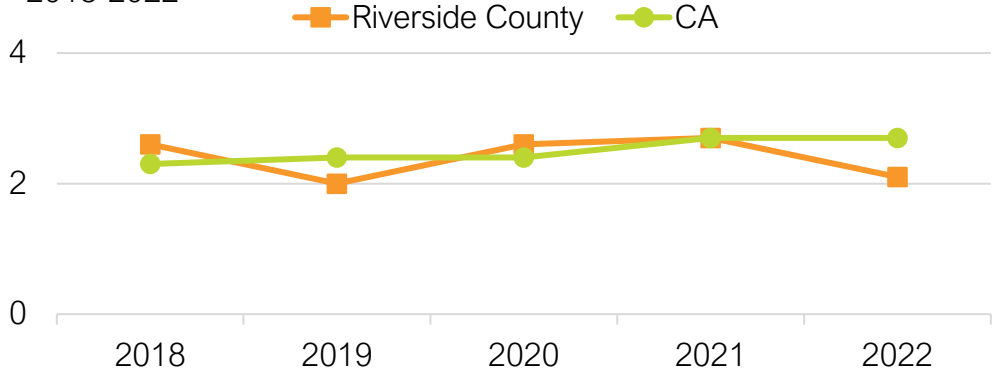
Figure 10. Percentage of Self-Reported Substance Use by Prenatal Care Payment Source in Riverside County and California, 2019-2021[6,7,10]



Substance use during pregnancy has been linked with negative birth outcomes, including maternal mortality, stillbirth, neonatal abstinence syndrome, and pre-term birth (CDC, 2024a). The percentage of any self-reported alcohol use during the 3rd trimester or self-reported cannabis use during pregnancy was generally higher for pregnant individuals in California compared to those in Riverside County. Consumption of any alcohol during the 3rd trimester was highest among White pregnant individuals, whereas use of cannabis during pregnancy was highest among Black/African Americans (Figures 9,10). From 2019-2021, any cannabis use during pregnancy was 3x higher for Medi-Cal prenatal care users in contrast to those whose payment source was private insurance. Self-reported substance use data was collected through the Maternal and Infant Health Assessment (MIHA)[6].

NEONATAL ABSTINENCE SYNDROME

Figure 11. Neonatal Abstinence Syndrome Rate in Riverside County, 2018-2022[8]



Neonatal Abstinence Syndrome (NAS) in newborns results from opioid withdrawal due to opiate use anytime during pregnancy (CDPH, 2023a). On average, 62 infants were born with NAS from 2018-2022 in Riverside County[8]. Riverside County reported higher rates of NAS than the state in 2018 and 2020. However, as of 2022, the County's rate of 2.1 per 1,000 hospitalized births became lower than California's rate of 2.7 (Figure 11).

NEONATAL ABSTINENCE SYNDROME

Figure 12. Percentage of Neonatal Abstinence Syndrome by Payment Source in Riverside County, 2018-2022[8,10]

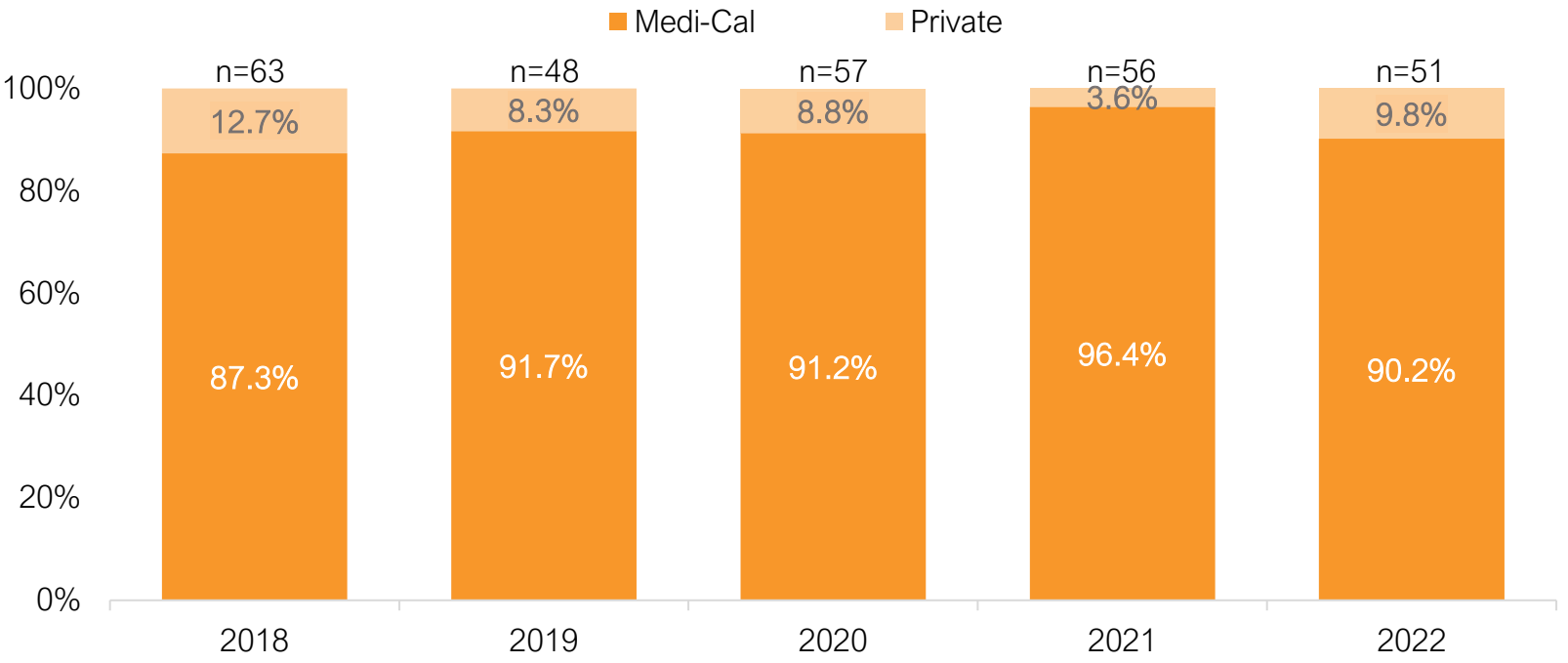
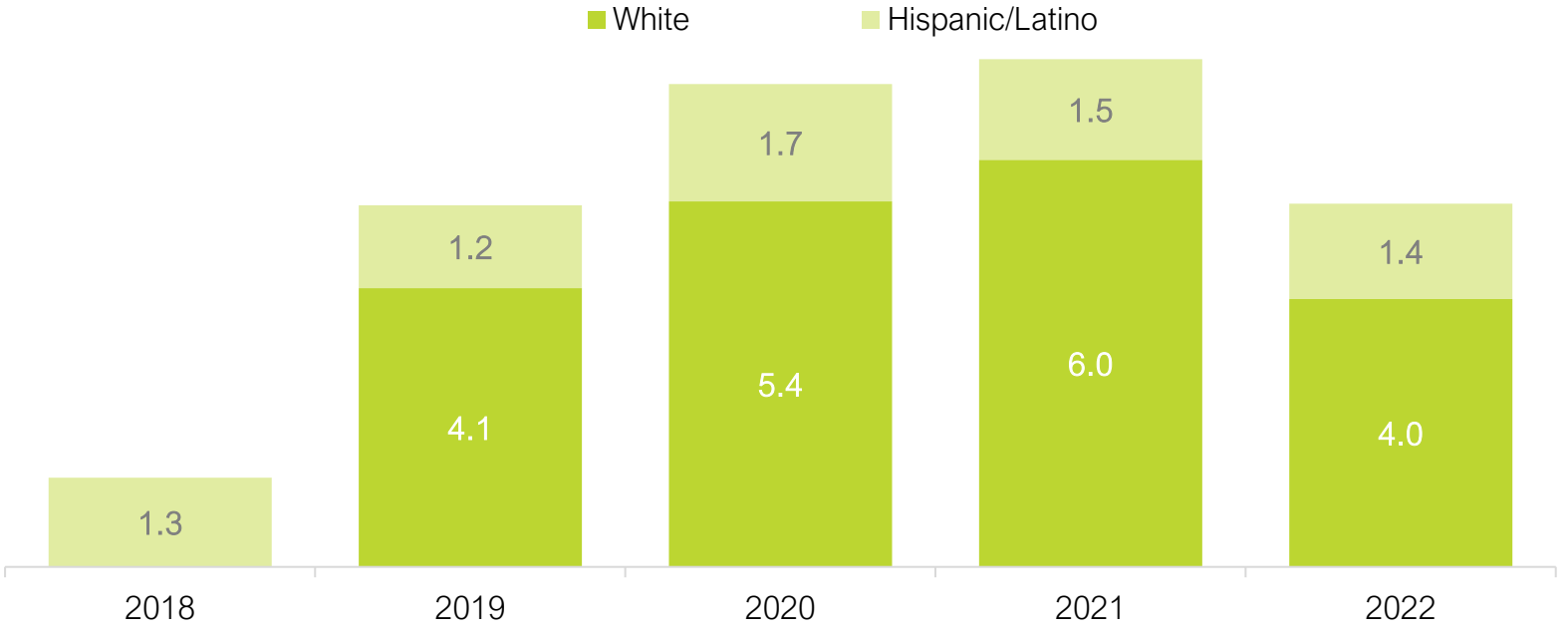


Figure 13. Rate of Neonatal Abstinence Syndrome per 1,000 Birth Hospitalizations by Race/Ethnicity in Riverside County, 2018-2022[5,8]



Between 2018-2022, the percentage of infants with Neonatal Abstinence Syndrome (NAS) was higher among birthing parents with Medi-Cal compared to birthing parents with private insurance (Figure 12)[8]. Medi-Cal often serves low-income, disadvantaged populations who may have less access to preventive care, mental health services, and substance use treatment (Stephen, 2019). Additionally, from 2019 to 2022, birthing parents that identified as White were on average **3.4x more likely** to give birth to a baby with NAS compared to any other race/ethnicity group (Figure 13)[8].

NOTES

1. Pre-existing medical conditions refers to any chronic health condition, COVD-19 or viral diseases the person had prior or during pregnancy. Pregnancy related conditions refers to any medical condition that may affect the birthing parent or fetus because of pregnancy or childbirth. Mental health conditions refers to self-harm, substance use, and mental disorders such as depression, anxiety disorders, obsessive-compulsive disorder, post-traumatic stress disorder, bipolar illness, and psychosis. Other refers to injuries caused by vehicle collision or assault.
2. HPI Quartiles are based on the residential zip code of the parent giving birth. Maternal deaths with missing residential zip codes or HPI Quartiles were omitted from the analysis.
3. Co-morbidities include gestational diabetes, pre-existing diabetes, pre-existing hypertension, gestational hypertension, and asthma.
4. Gestational hypertension rates in the report include gestational hypertension and eclampsia hypertension. Pre-diabetes consists of a diabetes diagnosis three months prior to pregnancy. Pre-existing hypertension is chronic hypertension prior to pregnancy.
5. Data for Native Hawaiian/Pacific Islander, American Indian/Alaska Native, or Black/African American people are not presented due to the small number of cases observed for these populations, which can lead to distorted comparisons with other groups.
6. The Maternal and Infant Health Assessment (MIHA) collects self-reported information about maternal experiences before, during, and after pregnancy. Data used from the MIHA are weighted to be representative of all individuals with a live birth in Riverside County. Data excludes nonresidents, birthing parents younger than 15 years old at delivery, those with multiple births greater than triplets, or birthing parents with a missing address on the birth certificate (CDPH, 2024).
7. The weighted percentages are based on responses that were self reported from the MIHA survey. Race/ethnicity groups for which estimates were not presented due to small sample size were excluded to avoid distorted comparisons with other groups.
8. The rate of neonatal abstinence syndrome is the number of births with ICD-10 code of P961 per 1,000 birth hospitalizations in Riverside County. Records with indication of transfer were excluded to avoid duplication. The dataset contains inpatient data from California licensed hospitals that report to the California Department of Health Care Access & Information (HCAI). We only included ICD-10 code P961 (neonatal abstinence syndrome withdrawals due to maternal use of drugs of addiction) in the analysis to exclude any possible iatrogenic cases or cases of therapeutic drug use.
9. There were a total of 12 maternal deaths in Riverside County from 2018-2022.
10. Payment source includes only Medi-Cal and Private insurance users and excludes other forms of payment.
11. Due to unstable maternal mortality rates at the County level, a direct comparison cannot be made with the state and national rates.

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