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CALIFORNIA POLICY LAB

# CalFresh and Maternal and Infant Health in the Bay Area During the COVID Pandemic

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## Introduction

CalFresh — California's implementation of the federal Supplemental Nutrition Assistance Program (SNAP) — provides food assistance that supports basic nutritional needs, and is a central pillar of the social safety net for low-income families. About one-third of children born in California receive CalFresh benefits during their first year, when adequate nutrition is especially important for healthy development (Thorman, 2023). Many of these infants' mothers also received benefits that supported their nutritional needs during their pregnancies.

During the COVID pandemic, the federal government authorized emergency allotment supplements that increased CalFresh benefits by at least $95 per household per month, and these supplements remained in place through March 2023. These changes — among the largest expansions of food assistance in U.S. history — reached large numbers of the most economically vulnerable mothers and newborns in the state. The purpose of this report is to describe the population of CalFresh-receiving infants and mothers in the Bay Area during this period: who they are, when they enroll, what benefits they receive, and what health outcomes characterize their births.

We draw on a new linkage of two California administrative datasets: CalFresh case records from the California Department of Social Services (CDSS) and birth records from the California Department of Public Health (CDPH). Using this linked dataset, we address three descriptive questions. First, when, relative to the date of birth, do mothers and their infants first enroll in CalFresh? Second, how do benefit amounts evolve during the perinatal period, and how did the pandemic-era emergency allotments affect these amounts? Third, what are the patterns of maternal and infant health outcomes for CalFresh-involved births, and how do they vary across Bay Area counties, demographic groups, and urban areas? Our analyses are descriptive: we document patterns in the data, and do not attempt to identify the causal effects of CalFresh participation or benefit levels on health outcomes.

Section I describes the data sources and sample construction. Section II examines the timing of CalFresh enrollment relative to birth for both mothers and children. Section III describes the benefit allotment amounts received by CalFresh families during the perinatal period, with particular attention to the impact of the COVID-era emergency supplements. Section IV presents maternal and infant health outcomes for CalFresh-involved births, overall and broken out by county, race and ethnicity, maternal age, and urban area. Section V concludes with implications for outreach policy and directions for future research.

## Section I: Data and Study Sample

We draw on two administrative datasets. The first is CalFresh case records from CDSS, which cover all CalFresh cases in California and include information on case members, enrollment dates, and monthly benefit allotment amounts. The second is birth records from CDPH, which are drawn from California vital statistics and include information on birth outcomes (birthweight, gestational age, and related conditions), maternal outcomes (gestational weight gain, preeclampsia, and gestational diabetes), maternal demographics (age and race and ethnicity), adequacy of prenatal care, and county of residence. The two datasets are linked together using CPL's hashed linkage methodology (see Fu et al., 2022), based on exact or near matches of names, dates of birth, and Social Security Numbers. (By federal law, CalFresh is available only to citizens and legal permanent residents, so this report focuses on these populations.)

Our base child cohort consists of children who appear on CalFresh cases before age two, with birthdates between 2020 and 2023, where the CalFresh case began before the child's first birthday. Where possible, children in this cohort are matched to their mothers in the CalFresh case roster. Both mothers and newborns are then matched to birth records using name and birthdate matching. Table 1 reports cohort sizes and birth record match rates for each of the six Bay Area counties (Alameda, Contra Costa, Marin, San Francisco, San Mateo, and Santa Clara), and for the remainder of the state. We identify approximately 50,000 children in the Bay Area in this cohort, and identify mothers for approximately 29,000 of them.[1] The Table also shows the share of these children and mothers who are successfully matched to birth records. This is 86–90% for mothers, and somewhat lower (74–85%) for children.

We supplement the base child cohort with another method of identifying covered births. Here, we begin with birth records, and identify all mothers on birth records who appear on a CalFresh case within one year of the birthdate. The great majority of these mothers appear in our base cohort, but this method also captures families where the newborn child is not added to the mother's CalFresh case within the first two years after the child's birth. We match mothers and children from this maternal cohort to the CalFresh records and use it to supplement our base cohort. This adds an additional 4,360 births in the Bay Area and 48,740 statewide.

TABLE 1. CalFresh cohort sizes and birth record match rates by county

| | CHILD | | MOTHER | |
|---|---|---|---|---|
| COUNTY | COHORT COUNT | MATCHING BIRTH RECORDS (%) | COHORT COUNT | MATCHING BIRTH RECORDS (%) |
| Alameda | 14,339 | 85 | 9,072 | 88 |
| Contra Costa | 10,985 | 80 | 7,111 | 90 |
| Marin | 1,654 | 75 | 694 | 86 |
| San Francisco | 6,420 | 74 | 3,359 | 88 |
| San Mateo | 3,967 | 75 | 1,889 | 88 |
| Santa Clara | 12,605 | 76 | 6,776 | 87 |
| **Bay Area Total** | **49,970** | **77** | **28,902** | **90** |
| **Rest of State** | **501,822** | **82** | **316,123** | **90** |
| California Total | 551,792 | 82 | 354,024 | 89 |

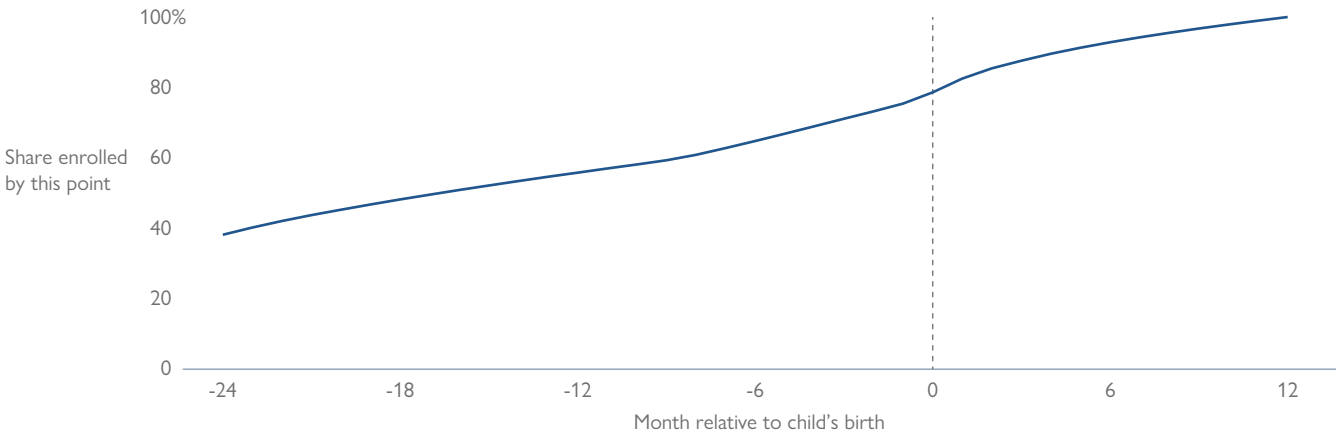
Note: Table 1 reports counts and match rates for the base child cohort. The maternal cohort adds another 48,740 births, of which 4,360 are in the Bay Area.

## Section II: CalFresh Enrollment Around Childbirth

Our first question is when children and their mothers first appear on a CalFresh case. Do we see that many new mothers enroll in CalFresh following the births of their children, or are mothers typically enrolled in the program well before the birth? And how quickly are children added to the cases?

Figure 1 shows the date of the mother's first appearance on a CalFresh case relative to the birth of the child, beginning two years before the birth and continuing to a year after the birth. (Recall that our method for identifying births covered by CalFresh limits to those where the CalFresh case begins before the child's first birthday.) A large share — a bit less than 40% — of mothers are already on CalFresh two years before the birth. This share rises to 60% by nine months prior to the birth (approximately the date of conception) and to nearly 80% by the month of the birth itself. This implies that only 20% of the mothers in our cohort first enroll after the birth; others were covered by the program well before.

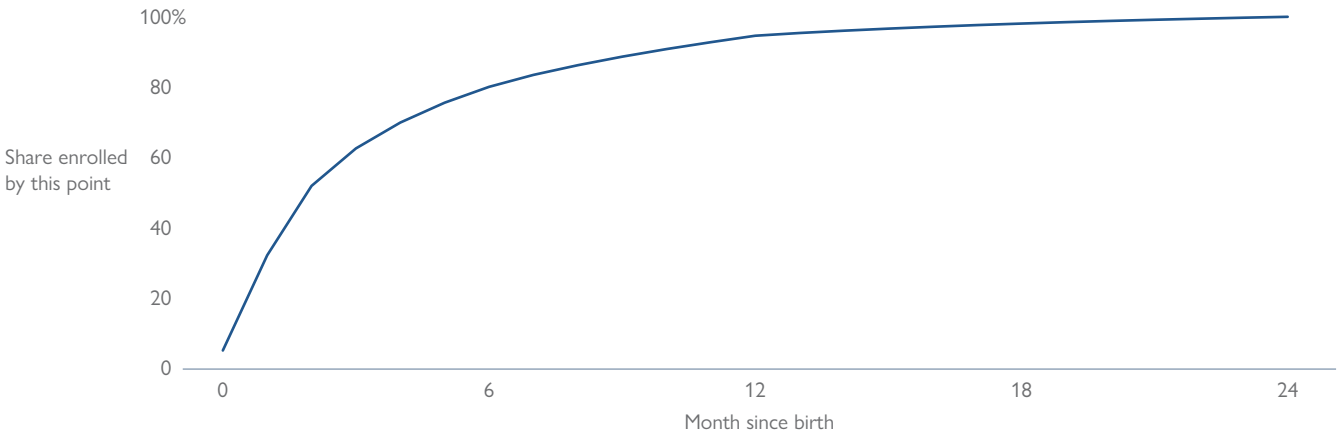
FIGURE 1. Timing of mother's CalFresh enrollment relative to the birth, Jan 2020 - Dec 2023




Note: Figure shows the cumulative share of mothers from our CalFresh birth cohorts who first appear on a CalFresh case by the indicated month relative to the birth. Figure covers all of California.

Figure 2 shows the date of the *child's* first appearance on the CalFresh case. Of course, no children appear before they are born. Most — 63% — appear within the first three months after the birth, and 95% appear within the first year.

FIGURE 2. Timing of newborn's first CalFresh enrollment, Jan 2020 - Dec 2023

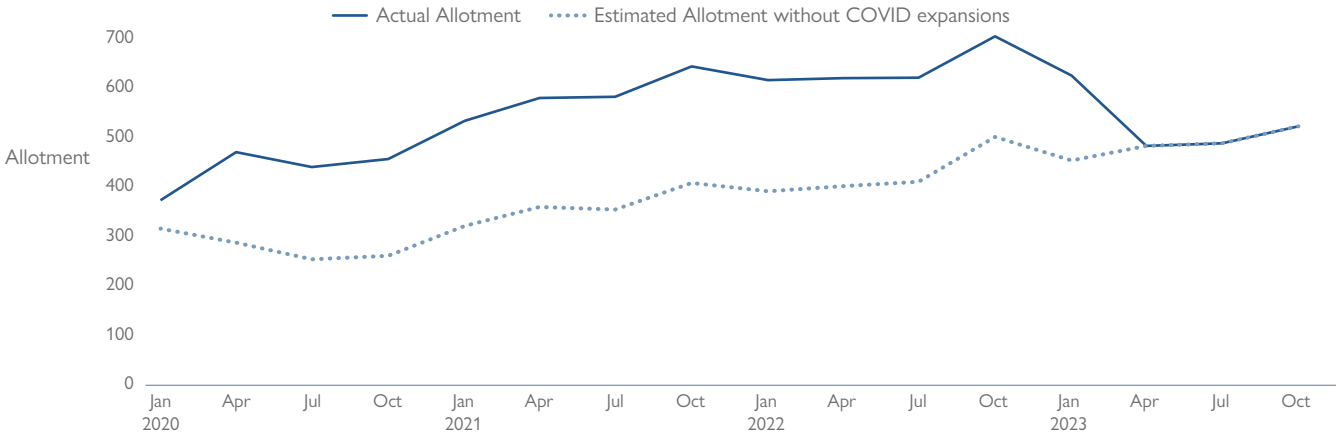



Note: Figure shows the cumulative share of children from our CalFresh child cohort who first appear on a CalFresh case by the indicated month relative to the birth. Figure covers all of California. This figure excludes the additional births identified in the supplemental maternal cohort.

## Section III: Benefit Allotments and the Pandemic-Era Expansions

Figure 3 shows average quarterly CalFresh allotments by calendar quarter from 2020 through 2023. We show averages across all mothers and children in our cohort, limiting to those enrolled in CalFresh each quarter.[2] We present two series — the actual allotment, and an estimate of what the household's allotment would have been under pre-COVID rules.[3] The average individual in our sample received about $450 in CalFresh benefits each quarter in 2020, rising to $700 by the end of 2022. (These figures are not adjusted for inflation.) Allotments would have been about $200 lower in the absence of the COVID-era emergency allotments. Thus, when the emergency allotments ended in 2023, average benefits fell sharply, to about $500 on average.

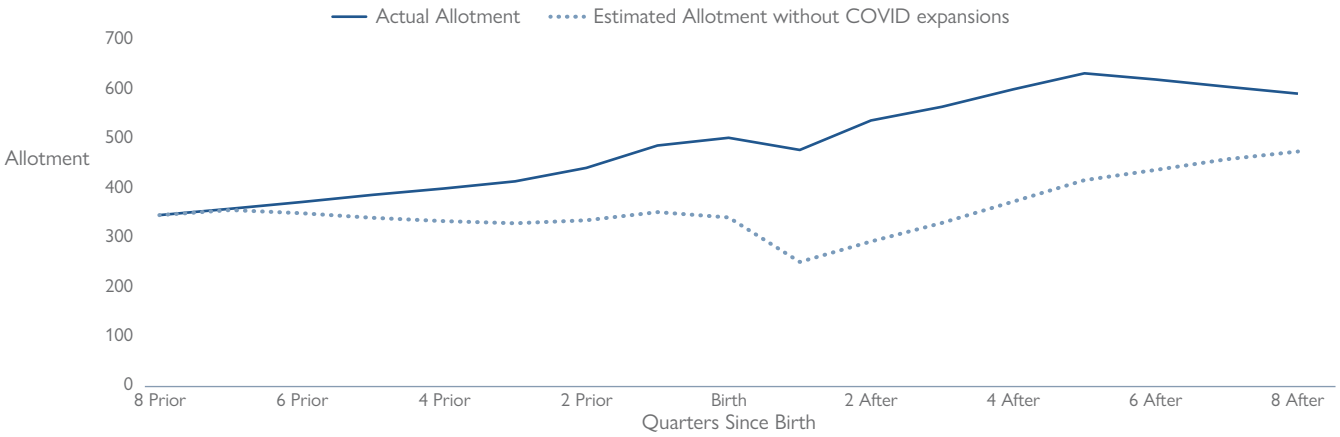
FIGURE 3. Average allotments by quarter, and effect of COVID emergency allotments, Jan 2020 - Dec 2023




Note: Figure graphs average quarterly allotments for mothers and children in our statewide samples, averaged over those who are receiving CalFresh each quarter. Case allotments are converted to per-capita amounts by dividing by the number of household members on the case. Estimated allotments without COVID expansions subtract from each allotment the estimated impact of the COVID expansions, estimating the latter as the difference in the individual's average allotments in the COVID and non-COVID periods.

Figure 4 shows average quarterly allotments by quarter relative to the child's birth — from eight quarters before birth to eight quarters after. Again, the solid line shows COVID-era allotments and the dashed line shows the estimated pre-COVID counterfactual. For this graph, we limit to births in 2021 and 2022, so nearly all would have received EAs for the full two years after the birth. However, in many cases eight quarters prior to the birth was prior to the beginning of EAs; the onset of EAs explains the increase in average allotments in the months leading up to the birth.

FIGURE 4. Average allotments by quarter, and effect of COVID emergency allotments, Jan 2021 - Dec 2022




Note: Figure graphs average quarterly allotments for mothers and children in our statewide samples, limiting to births in 2021 and 2022 and averaged over those who are receiving CalFresh each quarter. Case allotments are converted to per-capita amounts by dividing by the number of household members on the case. Estimated allotments without COVID expansions subtract from each allotment the estimated impact of the COVID expansions, estimating the latter as the difference in the individual's average allotments in the COVID and non-COVID periods.

Taken together, these figures describe a substantial, temporary increase in food assistance for CalFresh families during the perinatal period. The COVID-era supplements raised quarterly allotments by close to $200 per person above the pre-COVID counterfactual during much of 2020–2022. These benefits reached families during a critical window for maternal and infant nutrition. Their expiration in March 2023 constituted an abrupt reduction in food assistance for families with young children.

## Section IV: Maternal and Infant Health Outcomes

Our third question concerns the health of mothers and infants in the CalFresh population. Table 2 reports rates of twelve maternal and infant health outcomes for CalFresh-involved births in the Bay Area (n≈26,000) compared to all Bay Area births in our data (n≈342,000).

TABLE 2. Birth outcomes for CalFresh births and all births

| BIRTH OUTCOMES (PERCENT OF TOTAL BIRTHS) | ALL BIRTHS (%) | CALFRESH BIRTHS (%) |
|---|---|---|
| High Weight Gain | 38.0 | 46.1 |
| Low Weight Gain | 23.5 | 21.2 |
| Preeclampsia | 9.0 | 11.1 |
| Gestational Diabetes | 10.8 | 10.2 |
| Low Birthweight | 6.1 | 7.4 |
| Very Low Birthweight | 0.9 | 1.1 |
| Macrosomia | 5.6 | 6.4 |
| Preterm | 6.1 | 11.3 |
| Very Preterm | 1.3 | 1.7 |
| Inadequate Prenatal Care | 5.4 | 12.6 |
| Small for Gestational Age | 8.0 | 8.5 |
| Large for Gestational Age | 7.2 | 8.7 |
| Number of Births | 341,633 | 25,725 |

CalFresh births have higher rates of most adverse outcomes than births overall. It is important to remember that this is a descriptive comparison, not a causal effect. CalFresh families differ from the broader population in many dimensions, and differences in outcomes reflect the characteristics of the population served. CalFresh families are lower income and tend to have poorer health than the population as a whole, and this translates to worse birth outcomes.

The largest gap is in inadequate prenatal care — 12.6% among CalFresh births compared to 5.4% among all births. This likely reflects differential access to health care, as well as transportation and work schedule barriers that disproportionately face low-income families. CalFresh births also show higher rates of preterm birth (11.3% vs. 6.1%), low birthweight (7.4% vs. 6.1%), very low birthweight (1.1% vs. 0.9%), preeclampsia (11.1% vs. 9.0%), and high gestational weight gain (46.1% vs. 38.0%). Gestational diabetes is the one outcome where CalFresh births fare comparatively better (10.2% vs. 10.8%), likely reflecting the younger average age and different racial and ethnic composition of the CalFresh population.

Figure 5 shows these outcome rates over time for CalFresh births, from January 2019 through the end of 2022. Rates are broadly stable across the period. We find no dramatic shifts at the onset of the pandemic or at the start of the emergency allotments, with the exception of gestational diabetes that did seem to increase around this time.

FIGURE 5. Birth outcomes over time for CalFresh births, Jan 2019 - Dec 2022

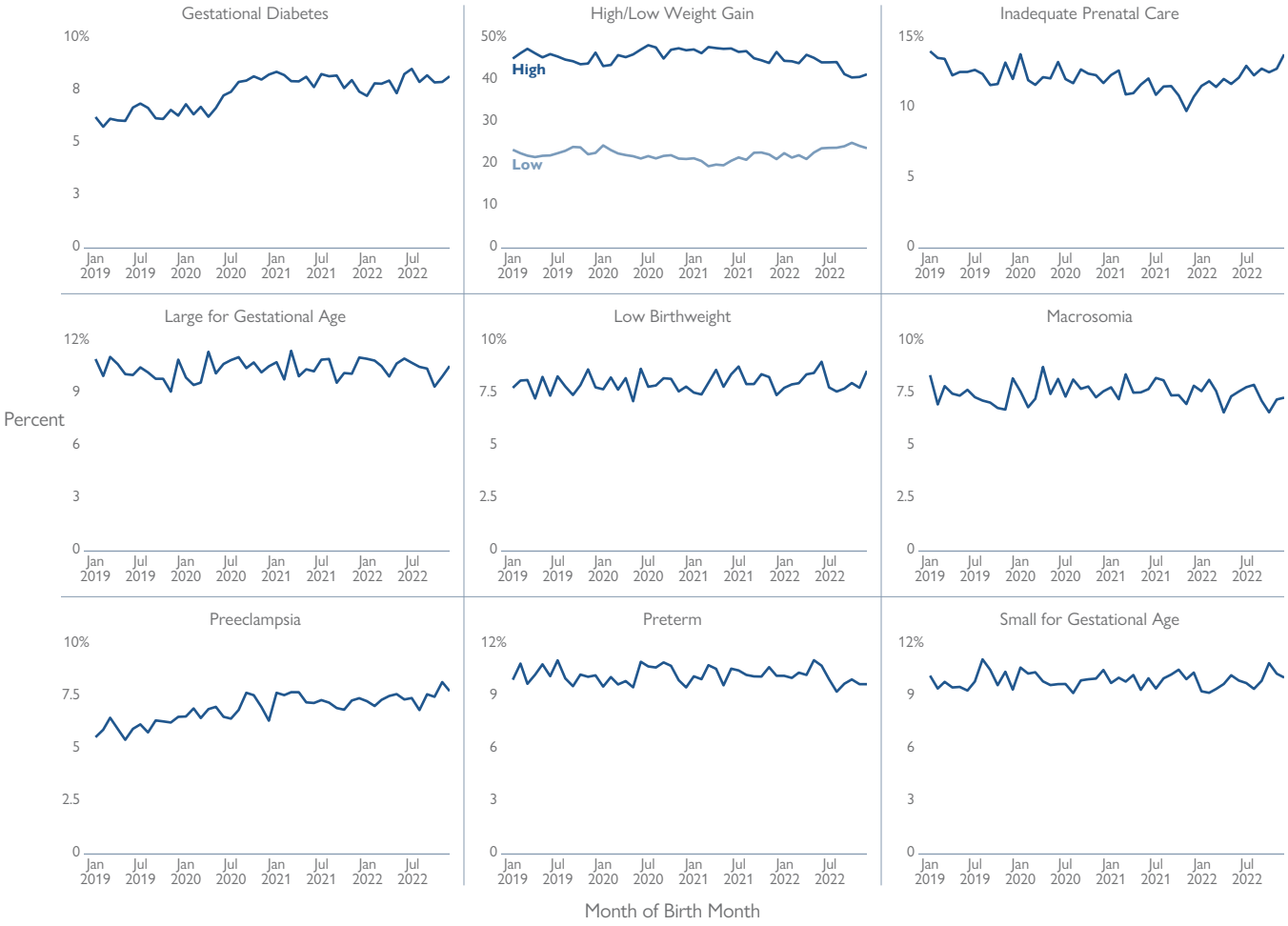


Table 3 reports outcomes by Bay Area county for CalFresh-involved births (total n=25,725). Rates vary meaningfully across counties: preeclampsia ranges from 6.5% in Alameda to 15.4% in San Francisco; preterm birth from 7.6% in Marin (where the sample is small, n=594) to 13.1% in San Francisco; and gestational diabetes from 6.5% in Alameda to 13.3% in Santa Clara.

TABLE 3. Birth outcomes by Bay Area county

| BIRTH OUTCOMES (PERCENT OF TOTAL BIRTHS) | BAY AREA (%) | ALAMEDA (%) | CONTRA COSTA (%) | MARIN (%) | SAN FRANCISCO (%) | SAN MATEO (%) | SANTA CLARA (%) |
|---|---|---|---|---|---|---|---|
| High Weight Gain | 46.1 | 45.7 | 47.% | 46.3 | 46.4 | 47.8 | 44.9 |
| Low Weight Gain | 21.2 | 18.8 | 23.6 | 24.6 | 20.0 | 16.3 | 23.1 |
| Preeclampsia | 11.1 | 6.5 | 14.7 | 11.6 | 15.4 | 8.7 | 11.7 |
| Gestational Diabetes | 10.2 | 6.5 | 11.6 | 9.1 | 11.1 | 9.3 | 13.3 |
| Low Birthweight | 7.4 | 7.8 | 7.6 | 5.2 | 9.2 | 6.3 | 6.5 |
| Very Low Birthweight | 1.1 | 1.1 | 1.2 | NR | 1.7 | 1.0 | 0.7 |
| Macrosomia | 6.4 | 6.7 | 6.8 | 8.1 | 5.1 | 6.5 | 6.2 |
| Preterm | 11.3 | 10.7 | 11.5 | 7.6 | 13.1 | 10.3 | 11.4 |
| Very Preterm | 1.7 | 1.7 | 1.7 | NR | 2.4 | 1.7 | 1.5 |
| Inadequate Prenatal Care | 12.6 | 12.8 | 11.3 | 17.7 | 14.5 | 6.6 | 13.9 |
| Small for Gestational Age | 8.5 | 9.9 | 8.2 | 7.7 | 10.0 | 6.5 | 6.9 |
| Large for Gestational Age | 8.7 | 8.7 | 8.5 | 8.2 | 7.7 | 9.2 | 9.1 |
| Total Births | 25,725 | 7,864 | 6,367 | 594 | 2,941 | 1,574 | 6,385 |

Note: NR = not reported due to sample size below reporting threshold.

Table 4 reports outcomes for Bay Area CalFresh-involved births by race and ethnicity.[4] We find that racial disparities in birth outcomes that are well-documented in the broader literature are clearly visible within the CalFresh population. Black mothers have the highest rates of low birthweight (12.0%), preterm birth (13.9%), and small for gestational age (13.3%). Asian mothers have the lowest rate of high weight gain (33.4%) but the highest rate of gestational diabetes (16.9%), consistent with elevated gestational diabetes risk at lower body weight. Hawaiian and Pacific Islander mothers have the highest rate of high weight gain (60.3%) and macrosomia (13.9%).

TABLE 4. Birth outcomes by race and ethnicity

| BIRTH OUTCOMES (PERCENT OF TOTAL BIRTHS) | ASIAN (%) | BLACK (%) | HAWAIIAN / PACIFIC ISLANDER (%) | HISPANIC (%) | WHITE (%) | TWO OR MORE CATEGORIES (%) | TOTAL (%) |
|---|---|---|---|---|---|---|---|
| High Weight Gain | 33.4 | 49.2 | 60.3 | 45.8 | 46.1 | 50.7 | 46.1 |
| Low Weight Gain | 26.6 | 20.6 | 12.7 | 21.1 | 21.0 | 21.6 | 21.2 |
| Preeclampsia | 8.5 | 12.0 | 11.9 | 11.4 | 10.3 | 12.1 | 11.1 |
| Gestational Diabetes | 16.9 | 6.9 | 10.5 | 11.2 | 10.2 | 9.5 | 10.2 |
| Low Birthweight | 5.9 | 12.0 | 4.2 | 5.5 | 5.3 | 9.0 | 7.4 |
| Very Low Birthweight | 1.3 | 1.7 | NR | 0.8 | 0.8 | 0.7 | 1.1 |
| Macrosomia | 4.6 | 4.3 | 13.9 | 6.9 | 8.2 | 7.7 | 6.4 |
| Preterm | 9.8 | 13.9 | 9.7 | 9.9 | 9.5 | 11.7 | 11.3 |
| Very Preterm | 1.8 | 2.1 | NR | 1.4 | 1.8 | 1.2 | 1.7 |
| Inadequate Prenatal Care | 10.1 | 12.8 | 22.4 | 11.8 | 14.8 | 13.1 | 12.6 |
| Small for Gestational Age | 7.8 | 13.3 | 5.4 | 6.2 | 7.3 | 9.4 | 8.5 |
| Large for Gestational Age | 7.0 | 5.7 | 16.7 | 9.6 | 10.1 | 9.8 | 8.7 |
| Total Births | 2,059 | 5,907 | 504 | 10,032 | 3,702 | 2,009 | 25,725 |

Note: NR = not reported due to sample size below reporting threshold.

Table 5 reports outcomes by maternal age. Gestational diabetes rises sharply with age — from 5.6% among mothers age 25 and under to 17.2% among mothers over 35 — as does preterm birth (9.9% to 14.5%). High weight gain and small for gestational age follow the opposite pattern, both declining with age.

TABLE 5. Birth outcomes by maternal age

| BIRTH OUTCOMES (PERCENT OF TOTAL BIRTHS) | 25 AND UNDER (%) | 26–30 (%) | 31–35 (%) | OVER 35 (%) | TOTAL (%) |
|---|---|---|---|---|---|
| High Weight Gain | 48.1 | 47.0 | 44.2 | 43.7 | 46.1 |
| Low Weight Gain | 19.9 | 20.8 | 21.9 | 22.1 | 21.2 |
| Preeclampsia | 11.6 | 9.4 | 10.3 | 12.7 | 11.1 |
| Gestational Diabetes | 5.6 | 9.0 | 11.7 | 17.2 | 10.2 |
| Low Birthweight | 9.0 | 8.2 | 9.2 | 10.1 | 7.4 |
| Very Low Birthweight | 1.4 | 0.9 | 1.3 | 2.0 | 1.1 |
| Macrosomia | 5.9 | 8.4 | 8.5 | 8.7 | 6.4 |
| Preterm | 9.9 | 10.0 | 12.2 | 14.5 | 11.3 |
| Very Preterm | 1.6 | 1.2 | 1.9 | 2.7 | 1.7 |
| Inadequate Prenatal Care | 13.5 | 12.6 | 12.6 | 11.6 | 12.6 |
| Small for Gestational Age | 12.0 | 10.1 | 9.6 | 8.8 | 8.5 |
| Large for Gestational Age | 7.4 | 11.0 | 11.7 | 12.6 | 8.7 |
| Total Births | 5,611 | 6,480 | 5,805 | 3,373 | 25,725 |

Table 6 reports outcomes for the largest cities in the Bay Area: San Jose, Oakland, San Francisco, and Richmond. Low birthweight is notably higher in Oakland (9.2%) and Richmond (9.3%) than in San Jose (7.0%). Preeclampsia is elevated in San Francisco (14.9%) and Richmond (12.5%), and inadequate prenatal care is highest in Oakland (13.7%) and San Francisco (14.1%), consistent with known health disparities in historically disinvested communities.

TABLE 6. Birth outcomes for largest cities

| BIRTH OUTCOMES (PERCENT OF TOTAL BIRTHS) | OAKLAND (%) | RICHMOND (%) | SAN FRANCISCO (%) | SAN JOSE (%) | REST OF BAY AREA (%) | TOTAL (%) |
|---|---|---|---|---|---|---|
| High Weight Gain | 46.7 | 47.6 | 46.1 | 44.8 | 46.3 | 46.1 |
| Low Weight Gain | 18.8 | 20.3 | 19.8 | 22.9 | 21.6 | 21.2 |
| Preeclampsia | 6.4 | 12.5 | 14.9 | 11.4 | 11.4 | 11.1 |
| Gestational Diabetes | 4.8 | 10.8 | 11.4 | 13.0 | 10.4 | 10.2 |
| Low Birthweight | 9.2 | 9.3 | 9.0 | 7.0 | 6.7 | 7.4 |
| Very Low Birthweight | 1.3 | 2.4 | 1.7 | 0.9 | 0.9 | 1.1 |
| Macrosomia | 5.7 | 7.2 | 4.7 | 6.3 | 7.0 | 6.4 |
| Preterm | 11.4 | 13.5 | 12.9 | 12.0 | 10.5 | 11.3 |
| Very Preterm | 1.8 | 2.2 | 2.3 | 1.7 | 1.6 | 1.7 |
| Inadequate Prenatal Care | 13.7 | 10.8 | 14.1 | 14.2 | 11.7 | 12.6 |
| Small for Gestational Age | 11.5 | 9.4 | 10.1 | 7.0 | 7.8 | 8.5 |
| Large for Gestational Age | 7.8 | 8.6 | 7.3 | 9.0 | 9.1 | 8.7 |
| Total Births | 3,614 | 965 | 2,699 | 4,279 | 14,165 | 25,725 |

## Section V: Conclusion

This report provides a descriptive portrait of CalFresh-enrolled mothers and infants in the Bay Area during 2020–2023. We find that most CalFresh-involved births occur to mothers who were already enrolled in the program before birth; only 20% first enroll around or after delivery. Children typically appear on CalFresh cases at or just after birth. Average benefit allotments were substantially elevated during the COVID-era emergency supplement period — reaching roughly $700 per person per quarter at their peak in early 2023 — before falling sharply when the supplements expired in March 2023.

CalFresh-involved births have higher rates of adverse maternal and infant outcomes than births in the broader population, including higher rates of preterm birth (11.6% vs. 9.1%) and inadequate prenatal care (12.3% vs. 5.7%), with meaningful variation across counties, racial and ethnic groups, maternal age groups, and urban areas.

There are several important limitations to keep in mind. First, our analyses are entirely descriptive: we document characteristics of the CalFresh population rather than estimate the causal effects of CalFresh participation or benefit levels on outcomes. Differences between CalFresh and all births reflect the characteristics of the families CalFresh serves, not the impact of the program. Second, the linked sample may underrepresent some families. While match rates are high, between 74 and 90%, the missing families may differ in unknown ways from those that are successfully matched. Third, the COVID period complicates interpretation of trends: the pandemic simultaneously changed enrollment patterns, benefit levels, economic conditions, and health risks, making it difficult to isolate any single factor from the descriptive data alone.

The enrollment pattern documented in Section II suggests that most CalFresh births occur to mothers who are already in the program — the group of families who join the program during the perinatal or postnatal period is relatively small. The benefit level analysis in Section III indicates that the COVID-era supplements provided meaningful additional food assistance to families during a critical nutritional window. If adequate food assistance supports maternal and infant health, their expiration in March 2023 represents a potentially consequential policy reversal. The large gap in inadequate prenatal care between CalFresh births and births overall (12.3% vs. 5.7%) may represent an important leverage point independent of benefit levels.

The data infrastructure developed for this report — linking CalFresh records to birth records for a large, statewide population — creates opportunities for future research that go beyond these descriptive findings. The sharp, policy-driven changes in benefit levels during the COVID period provide quasi-experimental variation that can support causal estimates of how CalFresh benefit generosity affects maternal and infant health, an important question that observational comparisons cannot answer. We plan to study this in future work.

## Acknowledgments

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### Endnotes

1 CalFresh case records do not record the relationships among members of the case. When the CalFresh case includes exactly one female between 18 and 40 years of age at the time of the child's birth, we identify her as the child's mother. When the case has zero or more than one such women, we do not identify a mother of the child.

2 A similar plot that limits attention to cases with mothers who are continuously enrolled throughout the period is nearly identical.

3 Our estimates of these counterfactual allotments are relatively crude: We compare each CalFresh participant's average quarterly allotment (the total allotment for the case divided by the number of household members on the case) during the period of the COVID benefit expansion and during the period before and after the expansion, and treat the difference as the impact of the expansions. We subtract this from the participant's observed allotment during the COVID period to estimate the allotment as it would have been under pre-COVID rules.

4 We do not report estimates for the American Indian and Alaska Native group because the number of births in our sample was too small to meet reporting standards.