California American Indian / Alaska Native Maternal and Infant Health Status Report

June 2019

Source:istockphotos.com

CDPH California Department of PublicHealth

ACKNOWLEDGEMENTS

The *California American Indian/Alaska Native Maternal and Infant Health Status Report* was prepared by the California Department of Public Health (CDPH), Maternal, Child and Adolescent Health (MCAH) Division. Contents of this report, whole or in part, may be reproduced without modification using the following citation:

California American Indian/Alaska Native Maternal and Infant Health Status Report. Sacramento, CA: California Department of Public Health, Maternal, Child and Adolescent Health Division; 2018.

EDITORS

Christine Rinki, MPH, Jennifer Troyan, MPH, Nannie Song, MPH, and Michael Curtis, PhD; CDPH, Center for Family Health, MCAH Division.

Kristen Marchi, MPH; University of California, San Francisco, Center on Social Disparities in Health (UCSF).

Many other MCAH Division and UCSF staff also contributed to this report, including Miranda Brilliante, Melanie Dove, Dawnte Early, Chuncui Fan, Carrie Florez, Amina Foda, Katherine Heck, Carina Saraiva, Monisha Shah.

STAKEHOLDERS

We offer our sincerest thanks to the following stakeholders for the contribution of their time and expertise to support the development of this report:

Danielle Arellano, Centers for Disease Control and Prevention

Adrian Dominguez, Urban Indian Health Institute

Vanesscia Cresci, California Rural Indian Health Board, Inc.

Virginia Hedrick, California Consortium for Urban Indian Health

Stacey Kennedy, California Rural Indian Health Board, Inc.

Janet King, Native American Health Center, Inc.

Patricia Lavalas-Howe, Indian Health Program, California Department of Health Care Services

Jahmal Miller, Office of Health Equity, California Department of Public Health

Jess Montoya, Riverside-San Bernardino County Indian Health, Inc.

Jennifer Ruiz, Fresno American Indian Health Project

Shira Rutman, Urban Indian Health Institute

Jim Suennen, California Health and Human Services Agency

Sabine Talaugon, California Consortium for Urban Indian Health

Maureen Wimsatt, California Tribal Epidemiology Center of the California Rural Indian Health Board

Andrea Zubiate, Indian Health Program, California Department of Health Care Services

FUNDING

This project was supported by the California Department of Public Health using federal funds from the Title V Maternal and Child Health Block Grant.

CONTENTS

APPENDICES

TABLES

FIGURES

MAPS

Source: Jennifer Parsons. Used with permission.

ACRONYM LIST

ACA: Affordable Care Act

AIAN: American Indian or Alaska Native

AVSS: Automated Vital Statistics System

BSMF: Birth Statistical Master File

CBCF: California Birth Cohort File

CDPH: California Department of Public Health

CHSDA: Contract Health Service Delivery Area

FPG: Federal Poverty Guidelines

IHCIA: Indian Health Care Improvement Act

IHS: Indian Health Service

IPV: Intimate partner violence

LBW: Low birth weight

MCAH: Maternal Child and Adolescent Health

MIHA: Maternal and Infant Health Assessment

NAS: Neonatal abstinence syndrome

NCHS: National Center for Health Statistics

NICU: Neonatal Intensive Care Unit

OSHPD: Office of Statewide Health Planning and Development

PDD-VS: Patient Discharge Data linked to Vital Statistics Files

SIDS: Sudden infant death syndrome

SUID: Sudden unexpected infant death

Tdap: Tetanus, diphtheria and pertussis

UIHO: Urban Indian Health Organizations

US: United States

VLBW: Very low birth weight

WIC: Special Supplemental Nutrition Program for Women, Infants and Children

EXECUTIVE SUMMARY


Source:istockphotos.com

California is home to the largest population of American Indian and Alaska Native (AIAN) people of any state in the nation. This diverse population is made up of individuals who derive their ancestry from tribes originating in California, as well as many AIAN from other areas of the United States. While AIAN people live throughout California, most reside in urban areas. For some California AIAN, the urban areas are part of their ancestral homelands. Other AIAN people moved to cities as a result of both personal choice and federal policies of tribal termination, assimilation and relocation.

AIAN communities in California have experienced heavy burdens of disproportionately high mortality and poor health outcomes. This is largely a result of the legacy of policies leading to their economic and geographic marginalization and to the disruption of cultural and familial systems that form the foundation of healthy AIAN communities. The Maternal, Child and Adolescent Health (MCAH) Division of the California Department of Public Health has developed this report in an effort to advance our vision of health equity for all mothers and infants in California, and specifically to address the historic health inequities among California's AIAN families.

The body of this report includes a comprehensive range of indicators describing the health and well-being of AIAN mothers and babies statewide. The indicators are drawn from four California Department of Public Health data sources, including the Maternal and Infant Health Assessment survey, the Birth Statistical Master File, the Birth Cohort File, and the Patient Discharge Data linked to Vital Statistics File. The statewide information is complemented by detailed appendix tables showing the indicators by prenatal health insurance coverage (Medi-Cal and private) and by two geographic areas: the California counties included in the Indian Health Service Contract Health Service Delivery Area and the counties served by California Urban Indian Health Organizations.

Findings in this report are presented using an expanded definition of AIAN that more closely aligns with both legal and community-held conceptions of AIAN identity. Informed by stakeholder input, literature review, and data assessment, births in this report are identified as AIAN if American Indian or Alaska Native was recorded in any of three maternal or paternal race fields reported on the birth certificate, regardless of Hispanic ethnicity or maternal country of birth. According to this expanded definition, there were 12,773 AIAN births in California in 2014, or 2.5% of all resident live births, which is 7 times larger than the most restrictive definition.

KEY FINDINGS

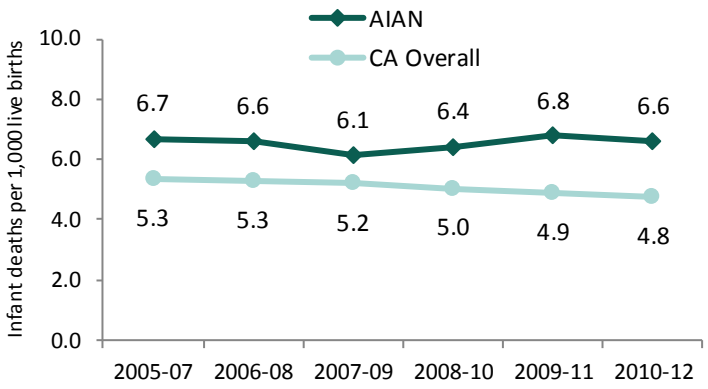
California AIAN infants and their mothers experience notable disparities in health and well-being, but also demonstrate areas of strength and resilience.

Infant mortality

The California AIAN infant mortality rate has remained high, while overall infant mortality in California has declined steadily since 2005, suggesting that AIAN infants are not equally benefiting from social and medical advances that have reduced infant mortality for other California populations.

Infant deaths due to sudden infant death syndrome (SIDS) and sudden unexpected infant death (SUID) were three times higher for AIAN infants compared to California infants overall.

Infant mortality rates, moving average, 2005-2012



Data Source: California Birth Cohort File (CBCF), 2005-2012.

Birth outcomes

Preterm birth and low birth weight are important predictors of infant mortality and overall infant well-being. Mothers of AIAN infants are more likely to experience preterm birth and bear infants of low birth weight compared to all California mothers.

Maternal nutrition and weight

Mothers of AIAN infants were more likely to experience food insecurity, enter pregnancy at an unhealthy weight, and gain excessive weight during pregnancy, increasing their risk for multiple pregnancy complications such as birth defects, hypertension and gestational diabetes.

Experience of hardship

Mothers of AIAN infants experienced very high rates of hardships during their own childhoods, such as parental divorce, difficulty affording basic needs or foster care placement. Childhood hardships can lead to toxic stress, which harms childhood development and has been associated with adult chronic conditions. Mothers of AIAN infants also experienced higher rates of hardships during pregnancy compared to California mothers overall. During pregnancy, hardships can also lead to increased stress, which in turn has been linked to poor outcomes. Intimate partner violence (IPV) during pregnancy was nearly twice as common among mothers of AIAN infants as California mothers overall. Higher exposures of AIAN women to historical, childhood and ongoing trauma make them more vulnerable to problems associated with IPV, such as post-traumatic stress disorder.

Substance use

Mothers of AIAN infants are more than two times as likely to use commercial tobacco before, during and after pregnancy compared to California mothers overall. Tobacco use during pregnancy increases the risks of poor outcomes experienced by AIAN infants such as preterm birth, infant mortality, and SIDS. During

the three months before pregnancy, mothers of AIAN infants were more likely to binge drink and drink heavily compared to California women overall, though there were no differences during pregnancy.

Breastfeeding

AIAN mothers were as likely as all California mothers to initiate breastfeeding and more likely to continue exclusively breastfeeding at two months postpartum. Breastfeeding is an important traditional practice with well-established health benefits for mother and infant.

Maternal health and health care utilization

Most mothers of AIAN infants report being in good to excellent health prior to pregnancy, and the majority had a usual source of prepregnancy care. Unfortunately, they were less likely than California mothers overall to initiate prenatal care in the first trimester or receive an adequate number of prenatal care visits.

CONCLUSION

Unique in its scope, this report fills an information gap on the health status of AIAN mothers and infants in California. As a result of stakeholder engagement, the findings portray a picture that is more representative of California's AIAN community. This report identifies striking disparities in birth outcomes as well as risk and protective factors. These findings can be used to elevate the importance of AIAN maternal and infant health among stakeholders and inform the development of policies and interventions that promote AIAN maternal and infant health. Such efforts should be undertaken in partnership with tribal or urban Indian communities and build upon their many strengths. We hope that this report will serve as the foundation for continued collaboration across stakeholder groups to advance health equity for AIAN mothers and infants in California.

Unique in its scope, this report fills an important information gap on the health status of American Indian and Alaska Native mothers and infants in California.

INTRODUCTION

California is home to the largest population of American Indian and Alaska Native (AIAN) people of any state in the nation.[1] This diverse population is made up of individuals who derive their ancestry from tribes originating in California, as well as a large number of AIAN from other areas of the United States (US). The AIAN population is dispersed across the state. There are currently 109 federally-recognized California Indian tribes; over 80 additional tribes are petitioning for federal recognition.[2] Despite its large AIAN population, relatively little California land is under tribal control.[3] Existing tribally-controlled lands include reservations and Rancherias throughout the state; ranging from the coast to the central valley to the mountains and deserts. Most AIAN in California live in urban environments. These areas are ancestral territory for some tribes. Other AIAN people have moved to cities as a result of both personal choice and federal policies of tribal termination, assimilation and relocation.[1,2]

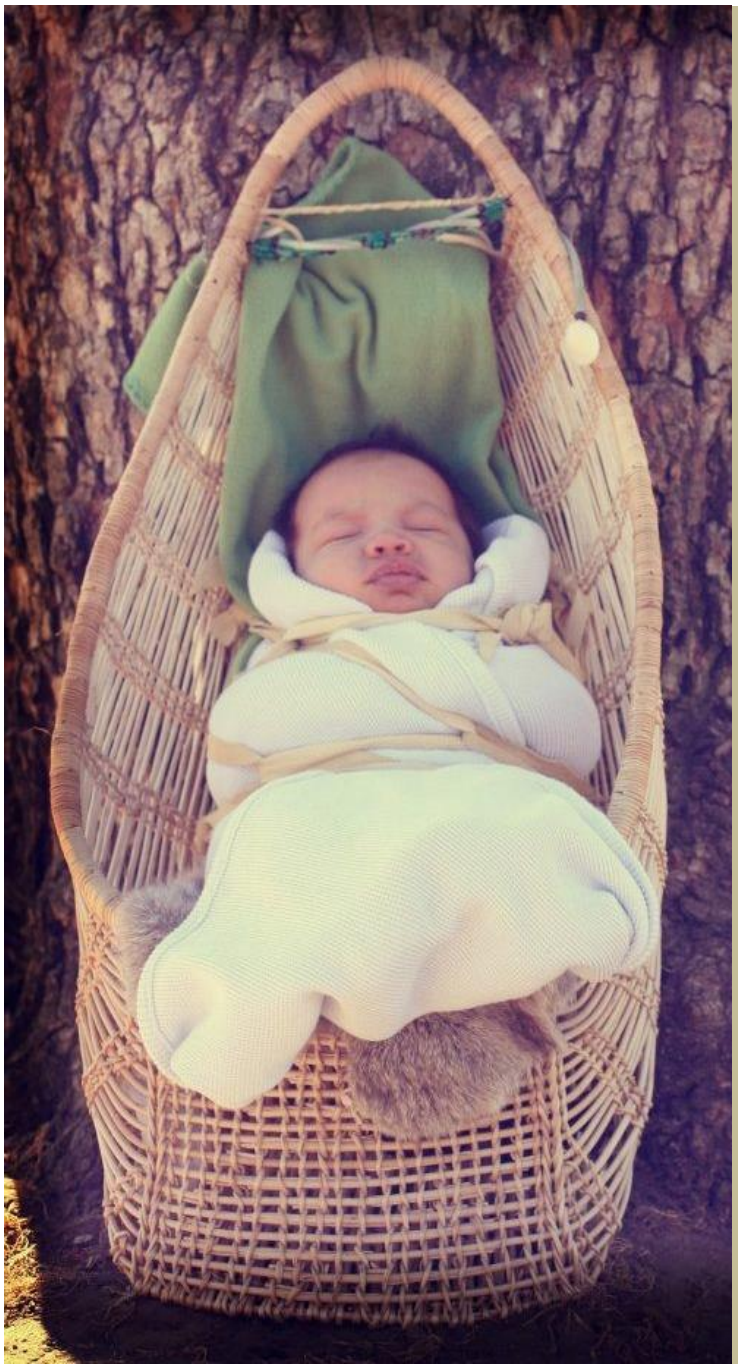
AIAN identification as it relates to health and health care is not only racially defined, but also holds specific political and legal purposes. The federal Indian Health Care Improvement Act (IHCIA) defines "Indian" in relation to eligibility for specific health care services and identified benefits within the Indian Health Service (IHS) and other federal policies and programs, as well as the Affordable Care Act (ACA). (See "Maternal and infant health insurance" on page 43 for more detail.) As defined by IHCIA, a "California Indian," (a) is a member of a federally-recognized Indian tribe; (b) is a descendant of an individual listed by federal agents in California as "Indian" in 1852; (c) holds trust land interests in California; or (d) is listed (or descendant of a listed individual) in specific plans for distribution of reservation/Rancheria assets within California in 1958.[4] These legally-defined AIAN individuals retain a range of legal rights, including the right to health care and other services.[4] A large number of AIAN individuals who retain legal rights self-report more than one race or ethnicity; few tribes require proof that an individual's entire lineage is comprised of enrolled tribal members in order to establish membership.[5]

In recognition that any effort to assess or address the health of AIAN people requires collaboration with Tribal Health Programs and Urban Indian Health Organizations, we engaged AIAN stakeholders throughout the creation of this report. The results presented in this report use an expanded definition of AIAN, which was informed by stakeholder input and an assessment of California maternal and infant health data, in order to address racial misclassification issues that typically limit AIAN surveillance data. AIAN stakeholders offered their time and insights to shape the scope and vision for the report, determine the appropriate definition to best describe the AIAN population, identify key health indicators of interest, and advise on a strategy for disseminating the results.

California is home to the largest population of American Indian and Alaska Native people of any state in the nation.

AIAN populations in California experience heavy burdens of mortality and poor health outcomes resulting from a legacy of policies that have led to economic marginalization and the disruption of cultural and familial systems that form the foundation of healthy AIAN communities. The MCAH Division of the California Department of Public Health developed this report in an effort to advance our vision of health equity for all mothers and infants in California, and specifically to address the historic health inequities among California's AIAN families.

The *California American Indian/Alaska Native Maternal and Infant Health Status Report* is the first of its kind to provide a comprehensive range of measures to describe the health and well-being of AIAN mothers and babies. The report includes key information on health outcomes, health behaviors, health care utilization, and risk and protective factors known to impact health across the life course. It is our hope that these comprehensive data can be used to help identify priorities and inform the development of policies and interventions to improve the health of AIAN mothers and infants in California.



"Women are the first environment. We are privileged to be the doorway to life. At the breast of women, the generations are nourished and sustained. From the bodies of women flow the relationship of those generations both to society and to the natural world. In this way is the earth our mother, the old people said. In this way, we as women are earth."[6]

--Katsi Cook,
Traditional Midwife

Source: Jennifer Parsons. Used with permission.

METHODS

This report uses data from four data sources to describe the maternal and infant health status for California AIAN. Percentages and rates of health outcomes, behaviors and risk factors are presented for California AIAN infants and their mothers with comparison to California infants and mothers overall (including AIAN). Detailed tables are included in the appendix for California AIAN subgroups by prenatal health insurance coverage (Medi-Cal and private) and for two aggregate geographic areas: the 38 California counties included in the IHS Contract Health Service Delivery Area and the 16 California counties served by Urban Indian Health Organizations.

DATA SOURCES

The following data sources are used in this report and are described in detail below: 1) the California Birth Statistical Master File, which provides both demographic and health information about births; 2) the California Birth Cohort File, which provides information on infant deaths; 3) the California Patient Discharge Data linked to Vital Statistics File, which provides information on the health conditions of the mother or infant related to the delivery hospitalization; and 4) the California Maternal and Infant Health Assessment survey, which provides information on maternal attitudes, behaviors and experiences before, during and shortly after pregnancy.

California Birth Statistical Master File (BSMF)

The Birth Statistical Master File is compiled from information on birth certificates, including detailed demographic information related to the child, mother, and father, as well as medical data related to the birth. Birth data are obtained through an electronic registration process wherein birth certificates are generated from data entered into the Automated Vital Statistics System (AVSS) at the birth hospital or office of the local registrar. The electronic data are transmitted from the local registry to the state registry where they are checked, further edited, and modified.

All data sources have been linked to the BSMF for demographic information, including race and ethnicity. Therefore, the BSMF is the primary data source defining the AIAN population for all analyses.

California Birth Cohort File (CBCF)

The Birth Cohort File is compiled from both birth and infant death certificates. Each cohort consists of data for all live births that occurred in a calendar year, and death information for those infants who were born in that year but subsequently died within 12 months of birth.

The preparation of birth cohort files also includes resolution of registration anomalies, for example, when an infant death was registered but no birth certificate was filed. This results in counts and rates that differ slightly from those based on the birth and death statistical master files.

Studies have shown that the designation of race/ethnicity on the birth certificate is more accurate than on the death certificate where the race/ethnicity of the deceased infant are reported by the funeral director based on information provided by an informant or by observation. The Birth Cohort File enables more accurate race-specific infant death rates, since both the numerator and the denominator utilize the race/ethnicity of the mother from the birth certificate. The Birth Cohort File may be used to compute infant mortality rates for a number of characteristics of the mother and child that are only available on the birth certificates.

California Patient Discharge Data linked to Vital Statistics files (PDD-VS)

This file is created for the purpose of studying delivery and birth outcomes. The linkage uses information from vital statistics files and hospitalizations related to labor and delivery from the California Office of Statewide Health Planning and Development (OSHPD). OSHPD collects data from licensed hospitals in California (there are no IHS hospitals in California). Licensed hospitals include general acute care, acute psychiatric, chemical dependency recovery, and psychiatric health facilities. The linked records include information associated with a mother/baby pair from the baby's hospitalization record, the mother's hospitalization record, and the vital statistics data.

California Maternal and Infant Health Assessment survey (MIHA)

MIHA is an annual statewide-representative survey of California women with a live birth, conducted jointly by the California Department of Public Health and the University of California, San Francisco. MIHA participants are English- or Spanish-speaking women ages 15 years and older. Each year, close to 7,000 women participate in MIHA, and the response rate is approximately 70%. MIHA data are weighted to represent all women in California with a live birth during each survey year, excluding women who are non-residents, have a multiple birth of greater than three infants, or have a missing address on the birth certificate. Women are sent a questionnaire in English or Spanish by mail, and non-respondents receive a reminder letter and a second questionnaire. Those who do not respond by mail are followed up by phone. The MIHA survey asks mothers about their experiences before, during, and shortly after pregnancy. Survey responses are linked to information in the BSMF, which provides additional demographic and health information, including race and ethnicity variables.

Source: depositphotos.com

DEFINITION OF AMERICAN INDIAN/ALASKA NATIVE

The availability of high quality surveillance data for AIAN people in population statistics and underlying databases has been limited by a number of factors, including misclassification of AIAN individuals as other races or ethnicities. Racial misclassification is the discrepancy in racial classification of an individual within a data source and that individual's self-identity or classification in a more valid source, such as a tribal enrollment list. Misclassification can result from many factors, including misattribution of race by professionals responsible for completing demographic information in data sources, inadequate collection of race data, or narrow definitions of race that limit ascertainment of the AIAN population within a database.[1-3] Eligibility requirements for IHS and most tribes' enrollment legislation allow for multiple races and ethnicities, and linkage studies have shown that substantial proportions of AIAN individuals listed on official tribal rolls or in IHS patient registration records are identified as other races or ethnicities in vital registry files or other health databases.[4-8] One implication of racial misclassification is an undercount of the number of important health events, such as infant births or deaths, or other health outcomes, which can have a significant impact on health planning and resource allocation. In addition, smaller numbers of AIAN in health databases can result in less availability of surveillance data for AIAN.

The definition of AIAN used in this report was developed based on a literature review of AIAN racial misclassification, expert consultation, a comprehensive data assessment, and stakeholder input. The data assessment involved the comparison of multiple characteristics and outcomes across several proposed AIAN definitions, including the size of the birth population, demographic composition, and rates of selected outcomes or risk factors. Stakeholders from eight organizations reviewed key insights from the literature review and expert consultation, as well as the data assessment results. Following multiple discussions, a final definition was selected by the stakeholder group.

The AIAN definitions under consideration were based on race and ethnicity variables from the BSMF. All of the data sources described above were linked to the BSMF for demographic information, including race and ethnicity variables. The BSMF includes three race variables and one ethnicity variable for the mother and for the father, as well as country of birth for the mother. For the majority of birth records in California, this information is collected by birth certificate clerks at the delivery hospital, either through observation or self-report by the mother.

As a result of the process described above, the AIAN definition selected for use in this report is AIAN reported in any of the three maternal or paternal race fields, regardless of Hispanic ethnicity or maternal country of birth. This definition is the most expansive of the definitions considered, and includes the largest number of AIAN births. Many California stakeholders and tribal epidemiology experts suggested that this was the most appropriate definition in a report focusing mainly on infant births and deaths because it aligns with both legal and community-held conceptions of AIAN identity, both of which allow for multiple race/ethnicity. Further, this definition addresses concerns of undercounting that can result from excluding infants born to AIAN fathers.

The availability of data for American Indian and Alaska Native people has been limited by a number of factors, including racial misclassification.

The majority of women in this expanded group, defined by *maternal or paternal* AIAN race, were both AIAN and another race or ethnicity. A smaller number of women in this group were White alone, Hispanic alone, or AIAN alone. Approximately 70% of women lived in an urban area. The estimates for health outcomes and risks produced using this definition were largely similar to other definitions that were considered, particularly those that expanded upon the commonly used definition of non-Hispanic AIAN alone. Because the selected definition is based on maternal and paternal information, and AIAN fathers are included, some of the mothers included in this group were not AIAN. Therefore, the phrase "mothers of AIAN infants" is used in the report when referring to maternal characteristics, behaviors, or health conditions.

DATA ANALYSIS

Percentages and rates presented in this report describe births and infant deaths, as well as a comprehensive set of maternal characteristics, health behaviors, risk and protective factors, and outcomes. The 95% confidence interval presented in tables indicates that there is a 95% chance that the range contains the true prevalence or rate in the population. The annual population estimates presented in this report from the BSMF and MIHA are averages calculated by dividing the total number of events (e.g., births or deaths) by the number of years pooled to create that total, which for most measures was three years. The annual number of deaths from the CBCF is based on a five-year average. The average number of deliveries or newborns from the PDD-VS is a three-year average.

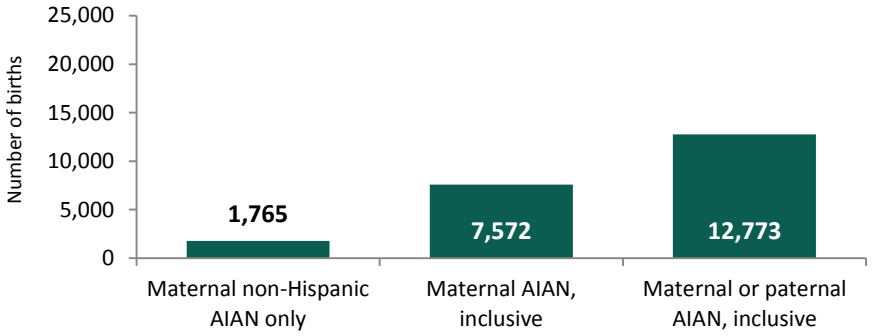
Comparisons between the AIAN and California overall (including AIAN) populations were made by examining the 95% confidence intervals of the two estimates. Differences between rates were noted when the confidence intervals did not overlap.

Data from each of the data sources were analyzed using SAS software. Definitions for each indicator and a description of the annotation and suppression criteria for reporting results are in the Appendix. The MIHA survey sampling and weighting procedures are described in detail in the MIHA technical notes available on the MIHA website (www.cdph.ca.gov/MIHA).

BIRTHS

California has the largest population of AIAN people of any state.[1] Despite making up more than 10% of the US AIAN population, California AIAN are a small proportion of the overall California population.[2] Many California AIAN identify themselves as multiple races and ethnicities. Because of this, and the unique political and legal implications of AIAN identification mentioned earlier, an accurate count of the number of births must consider an expanded definition of racial identification that includes multiple races and ethnicities. When addressing the infant population, paternal race must also be considered. The number of AIAN births in California varies widely depending on the definition of AIAN used (Figures 1 and 2).

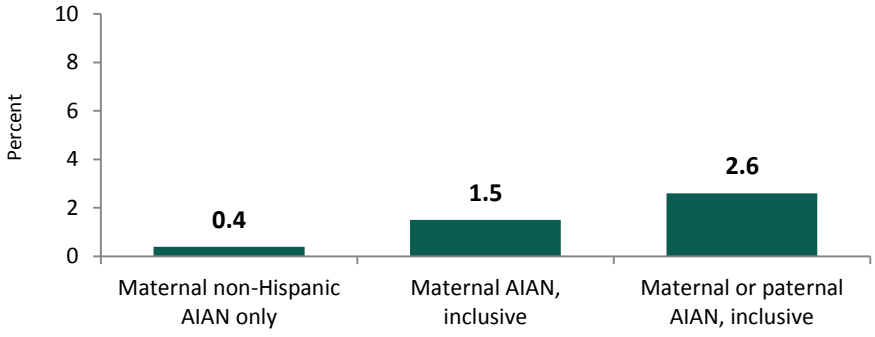
Figure 1. Number of births by AIAN definition



Data Source: California Birth Statistical Master File (BSMF), 2014.

In California, there were 502,973 resident births in 2014. Of these, 1,765 infants were born to non-Hispanic mothers who identified as AIAN alone. The number increased to 7,572 for infants born to mothers who identified themselves as AIAN and one or more races or ethnicities. Finally, the number increased to 12,773 for infants born to mothers or fathers who identified themselves on the birth certificate as AIAN, either alone or with one or more races or ethnicities. Using this latter expanded definition, the number of AIAN births was 7 times larger than the most restrictive definition of infants born to non-Hispanic women who are AIAN only.

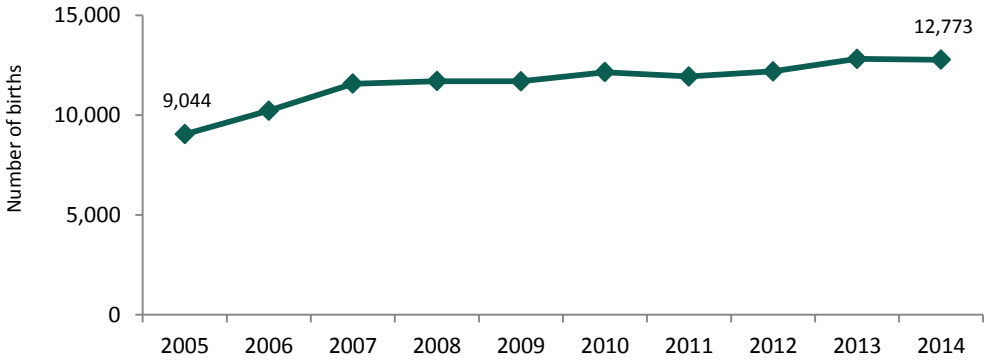
Figure 2. Percent of births by AIAN definition



Data Source: California Birth Statistical Master File (BSMF), 2014.

According to the most expansive definition, the number of AIAN infants born in California has increased from 9,044 in 2005 to 12,773 in 2014 (Figure 3). In contrast, overall births in California decreased substantially during this period from 532,619 to 478,845, with most of the decline occurring during the years 2008 to 2010 (data not shown).

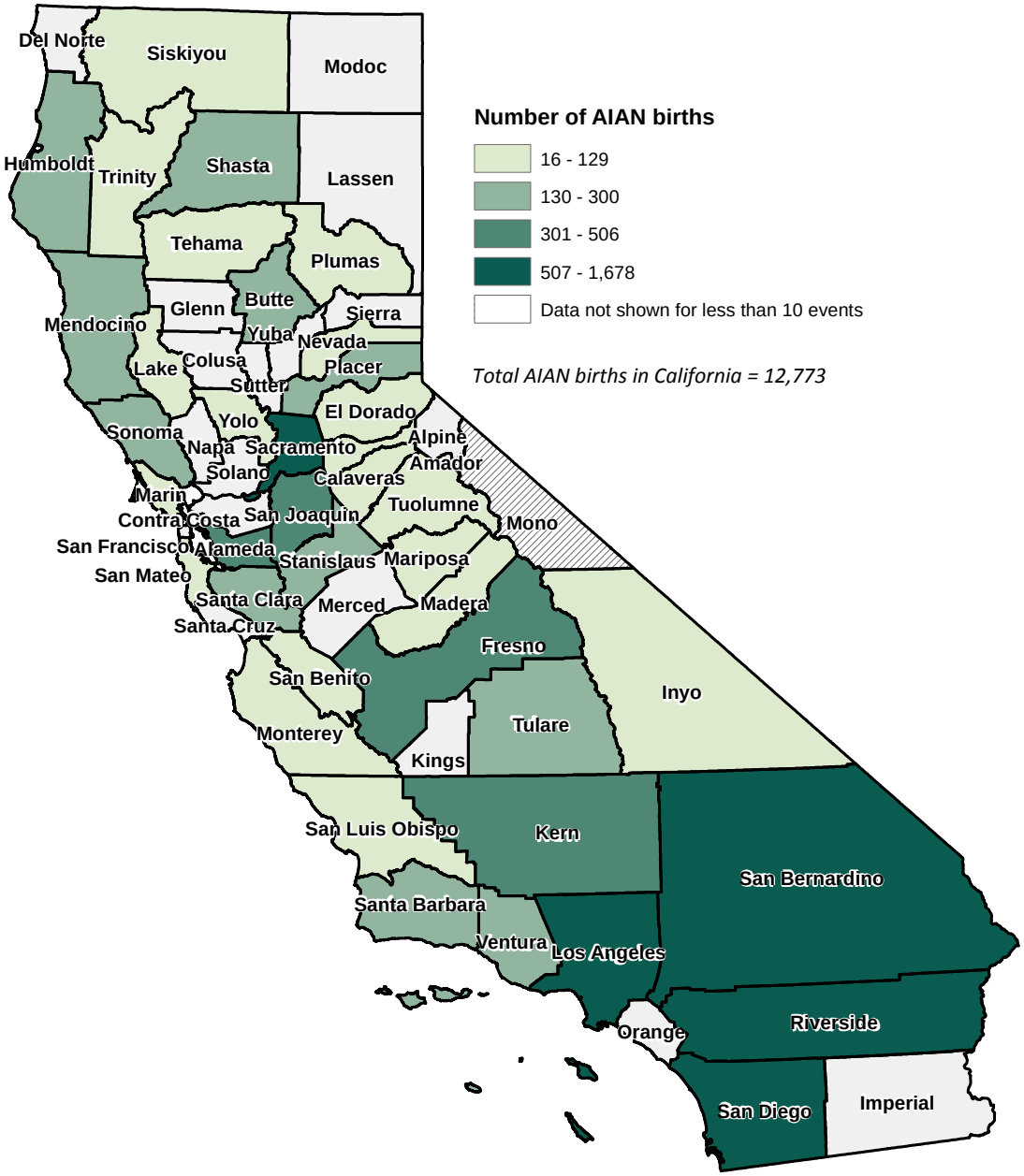
Figure 3. AIAN births, 2005-2014



Data Source: California Birth Statistical Master File (BSMF), 2005-2014.

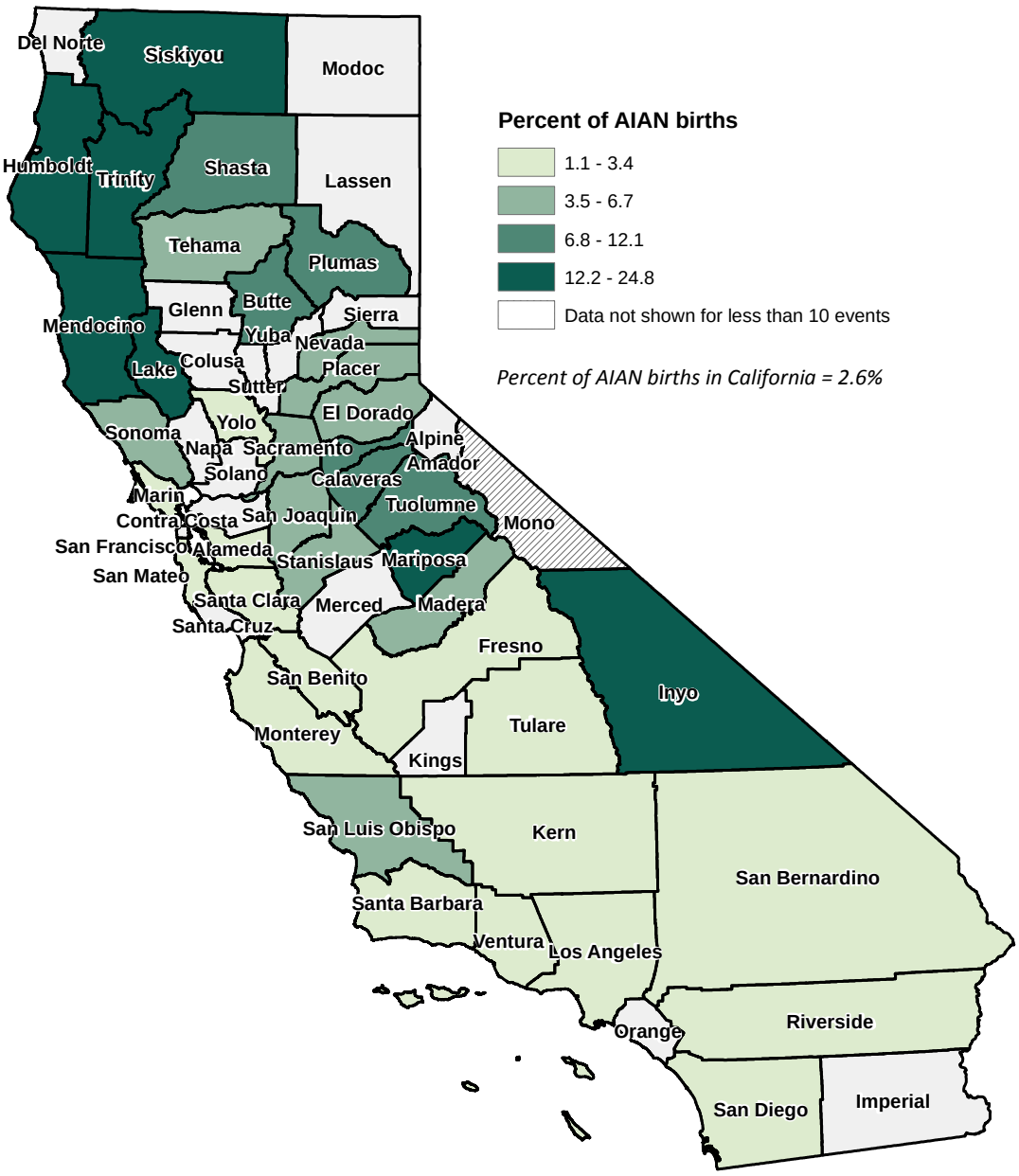
AIAN births were distributed across California, with the majority of births occurring in Southern California (Map 1). In 2014, the counties with the greatest numbers of AIAN births were the large, populous counties of Los Angeles (1,678 AIAN births, 1.3% of total births in Los Angeles County), Sacramento (1,095, 5.6%), Riverside (1,009, 3.4%), and San Diego (967, 2.4%). AIAN births made up a relatively small proportion of the very large and diverse overall populations of these counties (Map 2). While the absolute numbers were lower, the counties with the largest concentration of AIAN births were Del Norte (80, 24.8% of total births in Del Norte County), Inyo (54, 24.3%), Modoc (16, 18.4%), and Humboldt (264, 18.2%).

Map 1. Number of American Indian/Alaska Native births in each California county, 2014



Data Source: California Birth Statistical Master File (BSMF), 2014

Map 2. Percent of American Indian/Alaska Native births in each California county, 2014

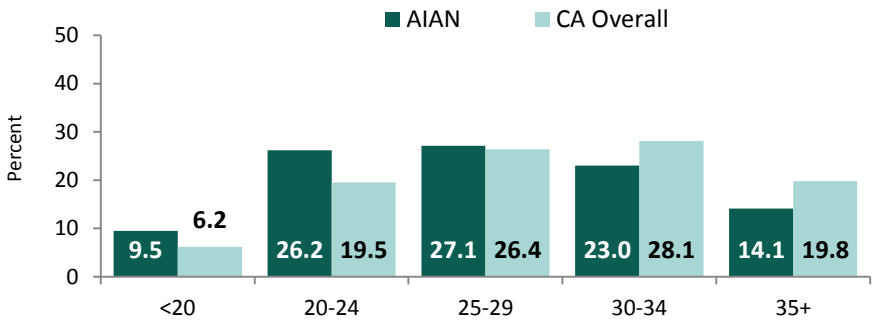


Data Source: California Birth Statistical Master File (BSMF), 2014

MATERNAL CHARACTERISTICS

Traditional teachings of many tribes emphasize the roles that social, environmental, and spiritual factors play in shaping health and well-being of individuals and communities across generations. In recent years, an increasing body of scientific research has shown that a woman's health before, during and after pregnancy has a strong influence on the health of her infant and her own future health outcomes. In turn, maternal health is influenced by social, demographic and economic factors such as age, education, income, parity, and marital status. Table 1 presents information on the characteristics of mothers of California AIAN infants and for California mothers overall (which includes AIAN).

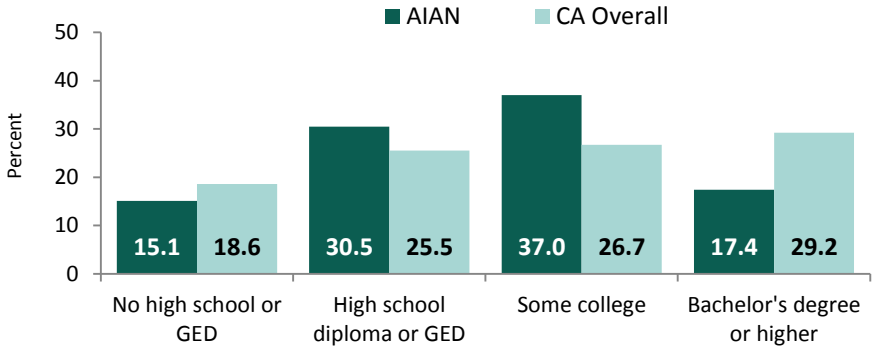
Figure 4. Maternal age



Data Source: California Birth Statistical Master File (BSMF), 2012-2014.

Compared to California women giving birth overall, the population of women giving birth to AIAN infants was younger (Figure 4), more likely to have high school diploma and some college, less likely to have received a college degree (Figure 5), and more likely to have spoken English at home. There was no difference in parity or marital status between the AIAN maternity population and women delivering in California overall.

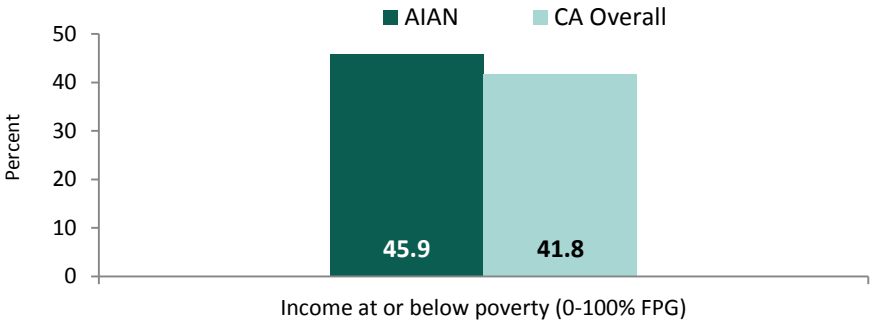
Figure 5. Maternal education



Data Source: California Birth Statistical Master File (BSMF), 2012-2014.

Income is strongly related to health as it affects housing, diet, education, transportation and insurance coverage or the ability to pay for health care services.[1] Women and infants with lower incomes have higher rates of hardships during pregnancy, low birth weight births and infant mortality.[2-4] Though not different than for California mothers overall, poverty was very high among mothers of AIAN infants. As shown in Figure 6, nearly one in two AIAN women had incomes at or below 100% of Federal Poverty Guidelines (FPG) during their pregnancies.

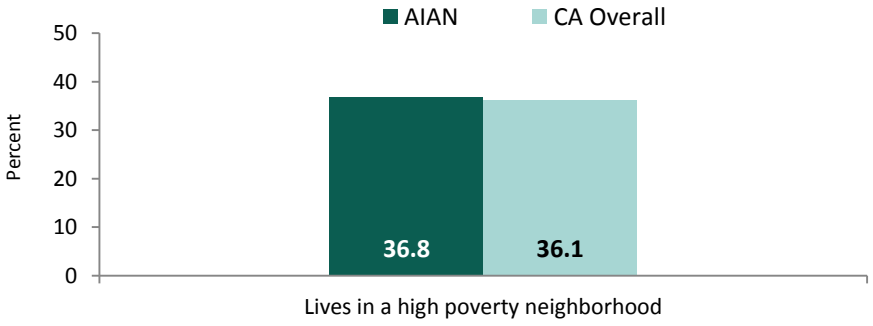
Figure 6. Income as a percent of poverty



Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014.

In neighborhoods where many households have incomes below poverty, resources, such as high quality food, education, recreational resources, and financial institutions are scarcer, while prevalence of negative conditions, such as crime and pollution, are higher. These neighborhood conditions have a direct impact on health, while also influencing individual health behaviors and the levels of stress and anxiety among residents. Thus, a variety of pathways link neighborhood poverty to the poor health outcomes of community members.[5] AIAN women (36.8%) were about as likely as all California women (36.1%) to live in a high poverty neighborhood (Figure 7).

Figure 7. Neighborhood poverty



Data Source: California Birth Statistical Master File (BSMF), 2012-2014.

Table 1. Maternal characteristics

	American Indian/Alaska Native			California Overall		
	%	95% CI	Annual Population Estimate	%	95% CI	Annual Population Estimate
Age†						
Younger than 20	**9.5**	9.2 - 9.8	1,195	**6.2**	6.2 - 6.3	31,116
20-24	**26.2**	25.8 - 26.7	3,301	**19.5**	19.4 - 19.5	97,417
25-29	**27.1**	26.7 - 27.6	3,416	**26.4**	26.3 - 26.5	132,135
30-34	**23.0**	22.6 - 23.5	2,900	**28.1**	28.0 - 28.2	140,696
35 or older	**14.1**	13.8 - 14.5	1,780	**19.8**	19.7 - 19.8	98,945
Total live births†						
0 prior live births	**41.8**	41.3 - 42.3	5,259	**39.1**	39.1 - 39.2	195,675
1-2 prior live births	**44.2**	43.7 - 44.7	5,558	**48.9**	48.8 - 48.9	244,274
3 or more prior live births	**14.0**	13.7 - 14.4	1,768	**12.0**	12.0 - 12.1	60,052
Education†						
No high school or GED	**15.1**	14.7 - 15.4	1,862	**18.6**	18.6 - 18.7	89,387
High school diploma or GED	**30.5**	30.1 - 31.0	3,774	**25.5**	25.5 - 25.6	122,395
Some college	**37.0**	36.5 - 37.5	4,569	**26.7**	26.6 - 26.7	127,842
Bachelor's degree or higher	**17.4**	17.0 - 17.8	2,151	**29.2**	29.1 - 29.2	139,845
Marital status‡						
Married or living as married	**81.9**	78.4 - 85.4	11,000	**83.7**	82.7 - 84.6	409,000
Single, separated, divorced or widowed	**18.1**	14.6 - 21.6	2,400	**16.3**	15.4 - 17.3	79,800
Income as a percent of poverty‡						
0-100%	**45.9**	40.1 - 51.7	5,900	**41.8**	40.6 - 42.9	192,300
101-200%	**20.9**	16.3 - 25.4	2,700	**20.2**	19.1 - 21.3	92,800
>200%	**33.2**	27.1 - 39.4	4,300	**38.0**	37.0 - 39.1	175,100
Neighborhood poverty†						
Lives in a high poverty neighborhood	**36.8**	36.3 - 37.3	4,347	**36.1**	36.1 - 36.2	172,571
Language usually spoken at home‡						
English	**91.9**	88.5 - 95.3	12,300	**56.8**	55.5 - 58.0	274,300
Another language	**8.1**	4.7 - 11.5	1,100	**43.2**	42.0 - 44.5	208,900

Data Sources: † California Birth Statistical Master File (BSMF), 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates are presented for births to all resident women in California. Population estimates are a three-year average, rounded down to the whole number. Definitions of indicators and additional BSMF information are in the appendix.
‡ Maternal and Infant Health Assessment (MIHA) survey, 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates (rounded to the nearest hundred) are weighted to represent all women in California. Population estimates are a three-year average. Definitions of indicators and additional MIHA information are in the Appendix.

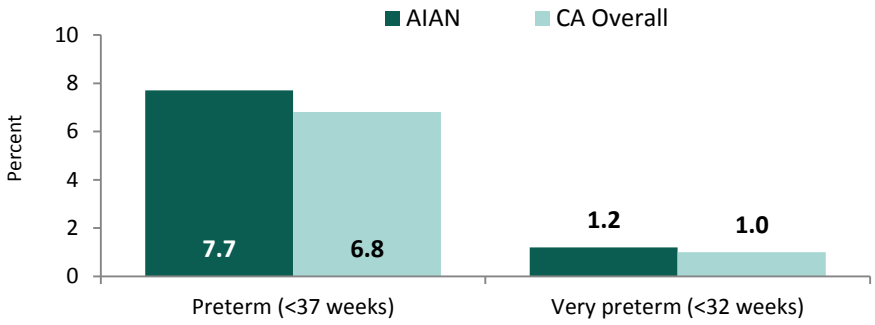
BIRTH OUTCOMES AND DELIVERY

In this section, Table 2 shows detailed information on gestational age, birth weight, type of hospital and mode of delivery for AIAN births compared to California overall. Gestational age and birth weight are particularly important indicators of infant well-being at birth, with implications for health in later life.

Preterm birth, or birth before 37 weeks gestation, is a major factor driving high rates of infant mortality in the US.[1] Surviving infants have increased risks for lifelong health and developmental problems. In addition to the substantial emotional and financial impact on individuals and families, preterm birth exacts a heavy toll on communities, with respect to cost of health care, education, and social support services.[2] The causes of preterm birth are complex and often overlapping, including maternal behavioral and psychosocial factors, environmental exposures, maternal health conditions, and neighborhood characteristics.[2] In the US, AIAN infants have higher rates of preterm birth than overall rates, and AIAN women have higher rates of many of the risks described above.[3]

In California, the percentage of preterm births is higher among AIAN infants compared to California overall (7.7% and 6.8%, respectively). The percentage of very preterm births that occur before 32 weeks is also higher among AIAN infants compared to California infants overall (1.2% and 1.0%, respectively, Figure 8).

Figure 8. Preterm birth among singletons

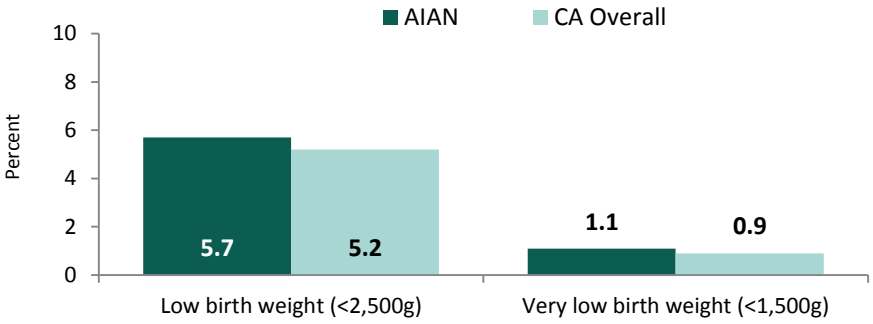


Data Source: California Birth Statistical Master File (BSMF), 2012-2014.

Like gestational age, birth weight is critical to infant health. Infants born with abnormal birth weight are likely to experience short and long term health consequences. Low birth weight (LBW) births weighing less than 2,500 grams, and very low birth weight (VLBW) births weighing less than 1,500 grams, can result from either preterm birth or from fetal growth restriction among full term infants. These infants are more likely than normal weight infants to have health problems such as respiratory ailments, heart conditions and feeding difficulties. They are also more likely to develop chronic health conditions later in life, such as heart disease, diabetes and high blood pressure.[4] In the US, AIAN have similar rates of LBW compared to the general population.[5]

Among AIAN infants in California, LBW and VLBW are higher than for infants overall. Specifically, as shown in Figure 9, 5.7% of AIAN births were LBW and 1.1% were VLBW, compared to 5.2% LBW and 0.9% VLBW among California births overall.

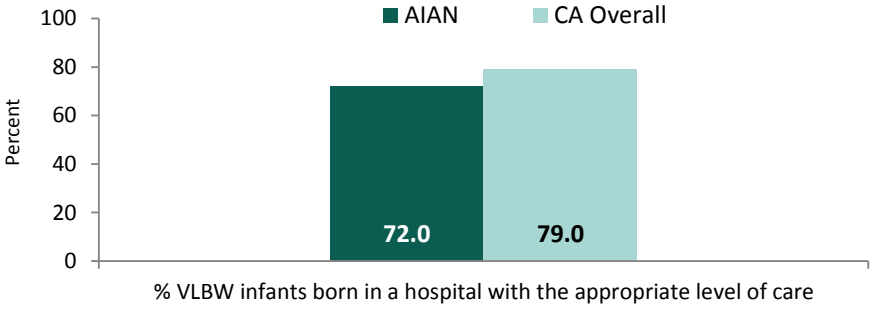
Figure 9. Low birth weight among singletons



Data Source: California Birth Statistical Master File (BSMF), 2012-2014.

Because VLBW births are at higher risk for complications or even death, it is crucial they are born in a specialized facility that is appropriately staffed and equipped to handle the unique needs of these newborns. California Children's Services within the California Department of Health Care Services, oversees a certification process for hospitals seeking approval for a specific level of care at either Intermediate, Community, or Regional Neonatal Intensive Care Unit (NICU) level. Ideally, all high-risk births should be born at either a Community or Regional level NICU facility; however, only 72% of AIAN VLBW births are delivered at an approved site, lower than the 79% of VLBW infants among California births overall (Figure 10).

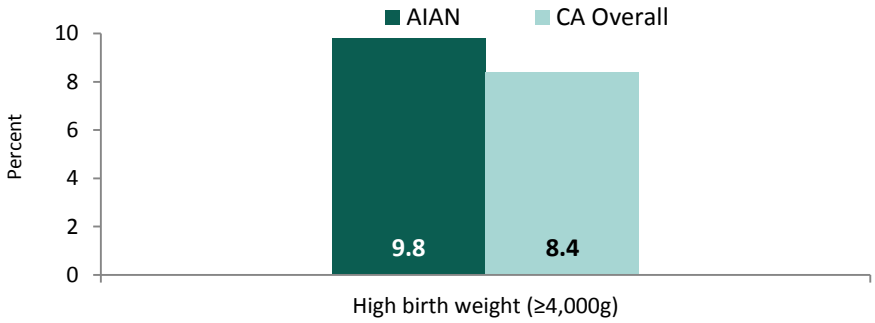
Figure 10. Percent of VLBW infants born in a hospital with the appropriate level of care



Data Source: California Birth Statistical Master File (BSMF), 2012-2014.

High birth weight of 4,000 grams or more can cause complications during labor and delivery, including injury to the infant, and an increased likelihood of cesarean section. These infants are more likely to develop diabetes, obesity, asthma, and cancer later in life.[6] Studies in other US AIAN populations have found a greater likelihood of high birth weight among AIAN infants and identified risk factors including prepregnancy overweight and obesity and excessive weight gain during pregnancy.[7] Nearly one in ten AIAN births is at a high birth weight, compared to one in twelve births in California overall (Figure 11).

Figure 11. High birth weight among singletons



Data Source: California Birth Statistical Master File (BSMF), 2012-2014.

Table 2. Birth outcomes and delivery

	American Indian/Alaska Native			California Overall		
	%	95% CI	Annual Population Estimate	%	95% CI	Annual Population Estimate
Gestational age among singletons						
Preterm (<37 weeks)	**7.7**	7.4 - 8.0	937	**6.8**	6.8 - 6.9	32,952
Very preterm (<32 weeks)	**1.2**	1.1 - 1.3	147	**1.0**	1.0 - 1.0	4,941
Moderately and late preterm (33-36 weeks)	**6.5**	6.2 - 6.8	790	**5.8**	5.8 - 5.8	28,010
Early term (37-38 weeks)	**23.0**	22.5 - 23.4	2,794	**24.1**	24.0 - 24.1	116,276
Term (39 weeks or more)	**69.3**	68.9 - 69.8	8,434	**69.1**	69.1 - 69.2	334,207
Birth weight among singletons						
Low birth weight (<2,500g)	**5.7**	5.4 - 5.9	690	**5.2**	5.2 - 5.2	25,125
Very low birth weight (<1,500g)	**1.1**	1.0 - 1.2	132	**0.9**	0.9 - 0.9	4,231
Moderately LBW (1,500-2,499g)	**4.6**	4.4 - 4.8	558	**4.3**	4.3 - 4.3	20,894
Normal birth weight (2,500g-3,999g)	**84.5**	84.2 - 84.9	10,310	**86.4**	86.3 - 86.4	418,322
High birth weight (≥4,000g)	**9.8**	9.5 - 10.1	1,196	**8.4**	8.4 - 8.5	40,849
Delivery						
% very low birth weight infants born in a hospital with the appropriate level of care	**72.0**	67.8 - 75.7	118	**79.0**	78.4 - 79.6	4,483
Cesarean section, among all women	**32.9**	32.4 - 33.3	4,133	**33.1**	33.0 - 33.1	165,771
Cesarean section, among low risk women with a first birth	**26.3**	25.6 - 27.1	1,159	**26.2**	26.1 - 26.3	43,045

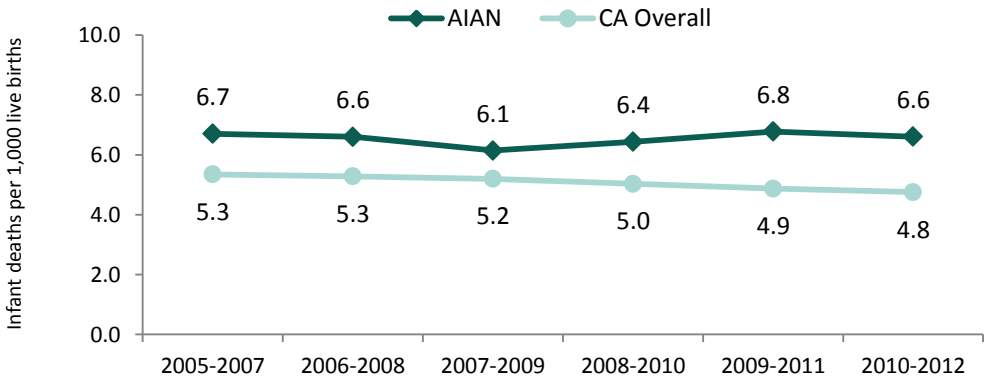
Data Source: California Birth Statistical Master File (BSMF), 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates are presented for births to all resident women in California. Population estimates are a three-year average, rounded down to the whole number. Definitions of indicators and additional BSMF information are in the Appendix.

INFANT MORTALITY

Infant death is a critical indicator of community well-being; it reflects overall health and socioeconomic status, as well as the quality and accessibility of health care. Overall in the US, the infant mortality rate for AIAN is higher than the rate among non-Hispanic Whites, Asian or Pacific Islanders and Hispanics.[1] These disparities suggest that AIAN infants are not equally benefiting from social and medical advances that have reduced infant mortality to lower levels in other populations.[2] Table 3 presents information on infant mortality by time period, leading cause and special cause-of-death categories.

California AIAN infants also experience disproportionately high mortality compared to other infants. While the infant mortality rate in California has declined slowly but steadily during the 2005 to 2012 period, California AIAN infants have not experienced a similar decrease in mortality rates (Figure 12). As shown in Figure 13, during the 2008-2012 period, the California AIAN infant mortality rate was 6.4 infant deaths per 1,000 live births, which was higher than the rate for California infants overall (4.9).

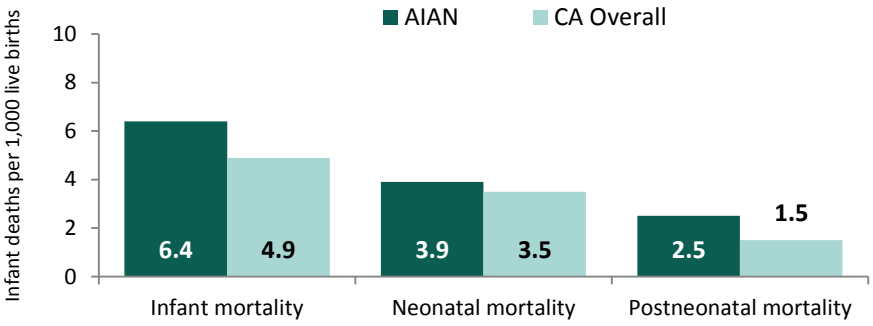
Figure 12. Infant mortality rates, moving average, 2005-2012



Data Source: California Birth Cohort File (CBCF), 2005-2012.

Infant mortality is commonly categorized as neonatal (within the first 27 days after birth) and postneonatal (from 28 days to 1 year) mortality. Neonatal mortality is generally related to short gestation and low birth weight, congenital malformations, maternal complications related to pregnancy or complications experienced by the newborn resulting from birth.[3] As shown in Figure 13, the neonatal mortality rate for AIAN infants was 3.9 per 1,000 live births, similar to California infants overall (3.5).

Figure 13. Infant, neonatal and postneonatal mortality rates

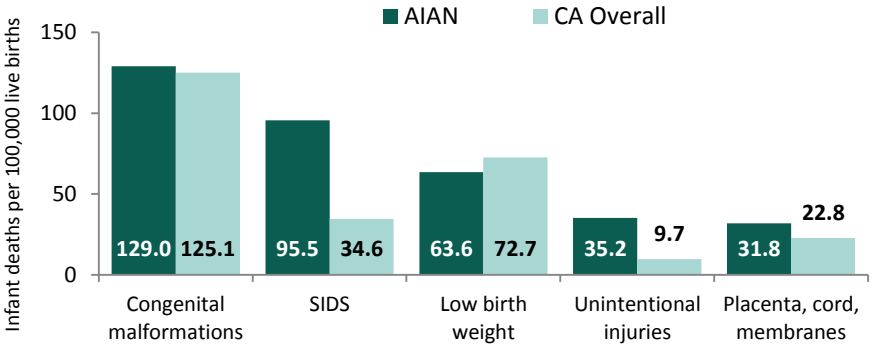


Data Source: California Birth Cohort File (CBCF), 2008-2012.

In contrast, postneonatal mortality is often related to environmental and social conditions, infant care, and access to primary health services.[4] Therefore, postneonatal deaths are considered to be more amenable to prevention.[4,5] As shown in Figure 13, the postneonatal mortality rate for AIAN infants was 2.5 per 1,000 live births, substantially higher than the California overall rate (1.5). Though both the neonatal and postneonatal mortality rates for AIAN infants were higher than in California overall, the particularly high AIAN postneonatal mortality rate accounted for most of the AIAN infant mortality disparity.

Infant mortality rates for the five leading causes of death among California AIAN infants are presented in Figure 14. The leading cause of AIAN infant death was (1) congenital malformations, deformations and chromosomal abnormalities; followed by (2) sudden infant death syndrome (SIDS); (3) disorders relating to short gestation and low birthweight, not elsewhere classified; (4) unintentional injuries; and (5) newborn affected by complications of placenta, cord and membranes. AIAN infants experienced large disparities for selected causes of death, including SIDS (95.5 deaths per 100,000 live births compared to 34.6 deaths for California overall) and unintentional injuries (35.2 for AIAN infants compared to 9.7 deaths for California overall). Unintentional injuries include deaths due to accidental suffocation and strangulation in bed. AIAN mortality rates for the remaining causes of death were similar for both AIAN infants and for infants in California overall.

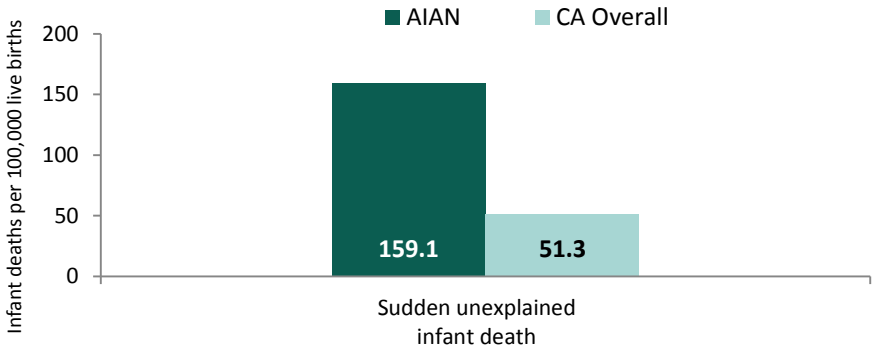
Figure 14. Leading causes of infant death



Data Source: California Birth Cohort File (CBCF), 2008-2012.

Sudden unexpected infant deaths (SUID) are infant deaths before one year of age that occur suddenly and unexpectedly, the cause of which are not immediately known before investigation.[6] Most SUID are reported as one of three causes: SIDS, unknown/undetermined, or accidental suffocation and strangulation in bed. SIDS is the sudden death of an infant younger than one year of age that cannot be explained even after a full investigation that includes a complete autopsy, examination of the death scene, and review of the clinical history.[7] SUID reported here are limited to these three causes, which allows for a more comprehensive assessment of related deaths that share common risk factors.[8] As with SIDS, AIAN infants experienced a substantial disparity in SUID mortality rates (159.1) compared to infants in California overall (51.3, Figure 15). The AIAN SUID rate is higher than the AIAN congenital malformation mortality rate, the leading cause of death described above, (159.1 and 129.0, respectively).

Figure 15. Sudden unexplained infant death



Data Source: California Birth Cohort File (CBCF), 2008-2012.

Table 3. Infant mortality

	American Indian/Alaska Native			California Overall		
	Rate	95% CI	Annual Number of Deaths	Rate	95% CI	Annual Number of Deaths
Infant mortality (deaths per 1,000 live births)						
Infant mortality	**6.4**	5.8 - 7.1	76	**4.9**	4.8 - 5.0	2,545
Neonatal mortality	**3.9**	3.4 - 4.4	46	**3.5**	3.4 - 3.5	1,790
Postneonatal mortality	**2.5**	2.2 - 3.0	30	**1.5**	1.4 - 1.5	754
Leading causes of infant death (deaths per 100,000 live births)						
Congenital malformations, deformations and chromosomal abnormalities	**129.0**	103.2 - 161.1	15	**125.1**	120.9 - 129.5	649
Sudden infant death syndrome	**95.5**	73.7 - 123.7	11	**34.6**	32.4 - 36.9	179
Disorders related to short gestation and low birth weight, not elsewhere classified	**63.6**	46.4 - 87.3	<10	**72.7**	69.5 - 76.0	377
Accidents (unintentional injuries)	**35.2**	23.0 - 53.8	<10	**9.7**	8.6 - 11.0	50
Newborn affected by complications of placenta, cord and membranes	**31.8**	20.4 - 49.7	<10	**22.8**	21.0 - 24.7	118
Special cause of infant death (deaths per 100,000 live births)						
Sudden unexplained infant death	**159.1**	130.2 - 194.5	19	**51.3**	48.6 - 54.1	266

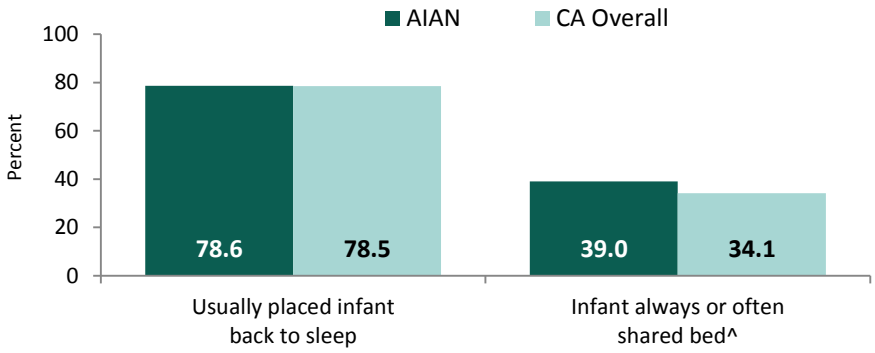
Data Source: California Birth Cohort File (CBCF), 2008-2012. Rate, 95% confidence interval (95% CI) and annual number of deaths are presented for all resident deaths to infants under one year of age. Number of deaths are a five-year average, rounded down to the whole number. Definitions of indicators and additional CBCF information are in the Appendix.

SIDS AND SUID RISK FACTORS, INFANT SAFE SLEEP RECOMMENDATIONS

In an effort to reduce the risk of infant sleep-related deaths, external stressors in the infant sleep environment have been identified and addressed by the American Academy of Pediatrics in the updated *2016 Recommendations for a Safe Infant Sleeping Environment*. [9] Recommendations include placing infants on their backs for every sleep; using a firm sleep surface with no soft bedding, pillows, blankets or toys; avoiding overheating (only 1 layer of clothing more than adults); and placing infants to sleep in the same room, but not on the same sleep surface as the caregiver. Additional strategies to reduce the risk include promotion of breastfeeding, routine immunization, pacifier use, and abstinence from smoking and alcohol use during pregnancy and after delivery (for all infant caregivers).[9]

Table 4 and Figure 16 present information on infant sleep practices. Placing infants on their backs for every sleep has been recommended to reduce the risk of SIDS since 1992, but in 2012-2014 nearly 1 in 4 California AIAN infants were not placed to sleep on their backs (Figure 16). In addition, nearly 40% of mothers of AIAN infants reported that their infant always or often shared a bed. The prevalence of these infant sleep practices among AIAN were similar to California infants overall. Bed sharing may increase the risk of an infant dying suddenly and unexpectedly by increasing the risks of suffocation or strangulation from soft bedding, an adult lying over the infant, or entrapment between two objects. Despite these risks, recent infant safe sleep environment recommendations have acknowledged that bed sharing is common, and many breastfeeding mothers fall asleep with their infants during nighttime feedings. Further, some AIAN families practice bed sharing as a traditional aspect of childrearing. If parents do choose to bring their infants into bed for breastfeeding, soothing or bonding, they are advised to return their infants to a separate sleep surface prior to the parent returning to sleep or as soon as the parent wakes up.[9] For additional information on the prevalence of risk and protective factors related to infant sleep-related deaths, refer to sections in this report describing substance use and breastfeeding.

Figure 16. Infant sleep practices



Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014.
^This indicator is only available for 2013-2014.

California Assembly Bill 757 (Health & Safety code 1254.6 and 1596.847) requires that hospitals provide advice about recommended infant sleep environment practices before discharge from the hospital.[10] Table 4 shows that nearly all mothers of AIAN infants reported receiving this education (96.5%).

Table 4. Infant sleep environment

	American Indian/Alaska Native			California Overall		
	%	95% CI	Annual Population Estimate	%	95% CI	Annual Population Estimate
Usually placed infant back to sleep	**78.6**	74.1 - 83.2	10,400	**78.5**	77.4 - 79.7	377,700
Infant always or often shared bed±	**39.0**	32.5 - 45.5	5,000	**34.1**	32.5 - 35.7	163,700
Was told in the hospital to place infant on back to sleep^	**96.5**	94.7 - 98.3	11,700	**90.5**	89.0 - 92.0	421,800

Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates (rounded to the nearest hundred) are weighted to represent all women in California. Population estimates are a three-year average. Definitions of indicators and additional MIHA information are in the Appendix.

± This indicator is only available for 2013-2014.

^ This indicator is only available for 2013.

Source: istockphoto.com

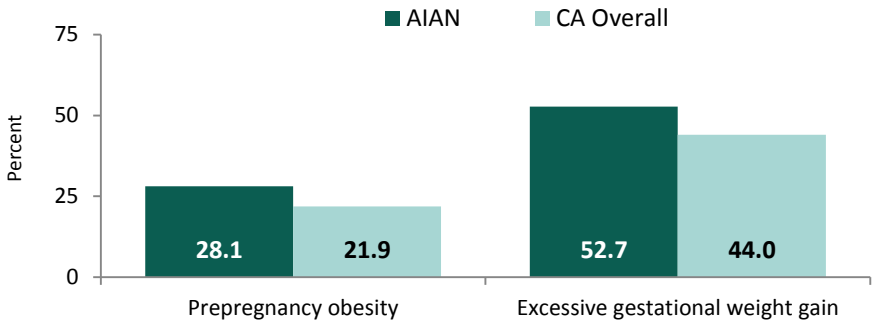
MATERNAL NUTRITION AND WEIGHT

Adequate nutrition and the maintenance of a healthy weight before and during pregnancy play key roles in the well-being of mothers and babies. Due to limited access to high quality foods, particularly in rural and reservation or Rancheria communities, AIAN have long struggled to achieve adequate nutrition. Table 5 provides information on a variety of indicators related to nutrition and weight, including folic acid use before pregnancy, prepregnancy weight, gestational weight gain, food security, and participation in food and nutrition assistance programs during pregnancy.

In the US, obesity is higher among AIAN at all ages compared to other race groups, from preschoolers to adults, and obesity has been increasing for AIAN over the last 30 years.[1] Women who are obese before conception have an increased likelihood of multiple pregnancy complications, including gestational diabetes, pregnancy-induced hypertension, high birth weight, cesarean delivery, and delivery of a low birth weight infant.[2] Additionally, women who enter pregnancy above a healthy weight are more likely to gain too much weight during pregnancy. Excessive gestational weight gain is associated with pregnancy-associated hypertension, gestational diabetes, postpartum weight retention, cesarean delivery, delivery of a large-for-gestational-age infant (a marker of neonatal morbidity), and childhood obesity.[2]

As shown in Figure 17, California mothers of AIAN infants have a higher rate of prepregnancy obesity compared to mothers overall (28.1% and 21.9%, respectively). In addition, more than half of women (52.7%) with a recent AIAN birth gained more than the recommended amount of weight during pregnancy, compared to 44% of all California women.

Figure 17. Prepregnancy weight and gestational weight gain

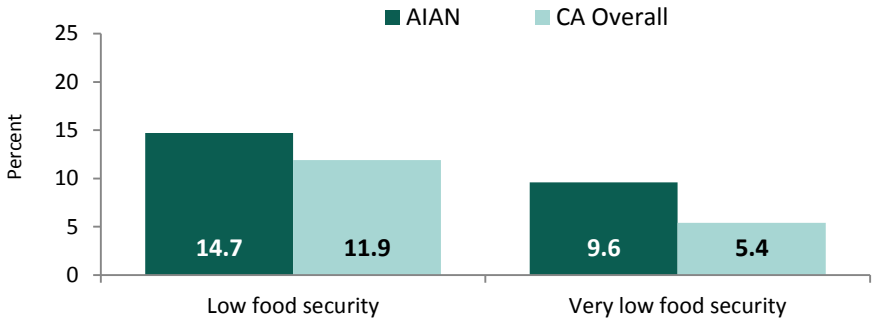


Data Source: California Birth Statistical Master File (BSMF), 2012-2014.

Food insecurity is an umbrella term that describes limited access to adequate nutritious food including reduced quality, variety or desirability of diet; or reduced food intake and disrupted eating patterns.[3,4] Across the US, AIAN households are much more likely to be food insecure compared to non-AIAN households. The disparity is even larger for households with children.[5] Food insecurity during pregnancy is particularly concerning due to the increased nutritional requirements during this period, and the association between food insecurity and stress, anxiety, birth defects and low birth weight.[6,7]

In California, more than one in four mothers of AIAN infants experienced either low or very low food security during pregnancy. Troublingly, nearly 10% of mothers of AIAN infants experienced very low food security, that is, reduced food intake or disrupted eating patterns (Figure 18), a rate almost two times that of pregnant women in California overall.

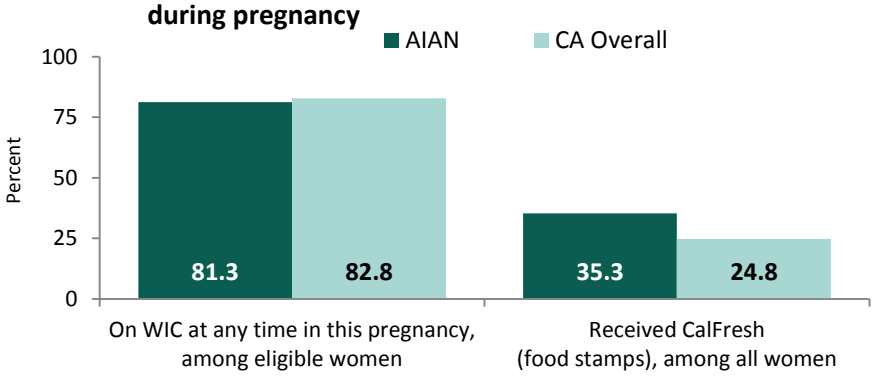
Figure 18. Food security



Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014.

Food aid and nutrition assistance programs such as the California Special Supplemental Nutrition Program for Women, Infants and Children (WIC) and CalFresh (food stamps) play an important role in relieving food insecurity for low-income pregnant women and supporting adequate nutrition during this important developmental period. Despite higher rates of food insecurity, mothers of AIAN infants who were eligible for WIC during pregnancy reported being on WIC at any time in this pregnancy at similarly high levels compared to eligible pregnant women in California overall (81.3% and 82.8%, respectively, Figure 19). Leading reasons reported by eligible mothers of AIAN infants for not participating in WIC during pregnancy were thinking they would not qualify (38%), thinking they did not need WIC (33%), and having a negative view of WIC (16%).[8] In contrast, participation in CalFresh during pregnancy was higher among mothers of AIAN infants compared to California mothers overall (35.3% and 24.8%, respectively). Information about reasons for nonparticipation among eligible pregnant women was not available for CalFresh.

Figure 19. Participated in food and nutrition assistance programs during pregnancy



Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014.

Table 5. Nutrition and weight

	American Indian/Alaska Native			California Overall		
	%	95% CI	Annual Population Estimate	%	95% CI	Annual Population Estimate
Daily folic acid use, month before pregnancy‡	**32.1**	25.9 - 38.3	4,300	**33.2**	31.9 - 34.4	162,900
Prepregnancy weight†						
Underweight	**3.8**	3.6 - 4.0	449	**4.0**	4.0 - 4.0	18,681
Healthy weight	**42.9**	42.4 - 43.4	5,083	**48.2**	48.1 - 48.2	225,656
Overweight	**25.3**	24.8 - 25.7	2,997	**25.9**	25.8 - 26.0	121,398
Obese	**28.1**	27.6 - 28.5	3,329	**21.9**	21.9 - 22.0	102,773
Gestational weight gain†						
Inadequate	**17.7**	17.3 - 18.1	1,879	**21.6**	21.5 - 21.6	91,567
Appropriate	**29.6**	29.1 - 30.1	3,148	**34.5**	34.4 - 34.5	146,381
Excessive	**52.7**	52.1 - 53.2	5,593	**44.0**	43.9 - 44.1	186,817
Food security‡						
Low food security	**14.7**	10.5 - 18.8	2,000	**11.9**	11.0 - 12.7	57,700
Very low food security	**9.6**	7.5 - 11.6	1,300	**5.4**	4.7 - 6.0	26,100
Participated in food and nutrition assistance programs during pregnancy‡						
On WIC at any time in this pregnancy, among eligible women	**81.3**	76.9 - 85.7	7,600	**82.8**	81.7 - 83.9	262,500
Received CalFresh (food stamps), among all women	**35.3**	30.5 - 40.1	4,700	**24.8**	23.8 - 25.9	121,200

Data Sources: † California Birth Statistical Master File (BSMF), 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates are presented for births to all resident women in California. Population estimates are a three-year average, rounded down to the whole number. Definitions of indicators and additional BSMF information are in the Appendix.
‡ Maternal and Infant Health Assessment (MIHA) survey, 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates (rounded to the nearest hundred) are weighted to represent all women in California. Population estimates are a three-year average. Definitions of indicators and additional MIHA information are in the Appendix.

MATERNAL HEALTH CONDITIONS

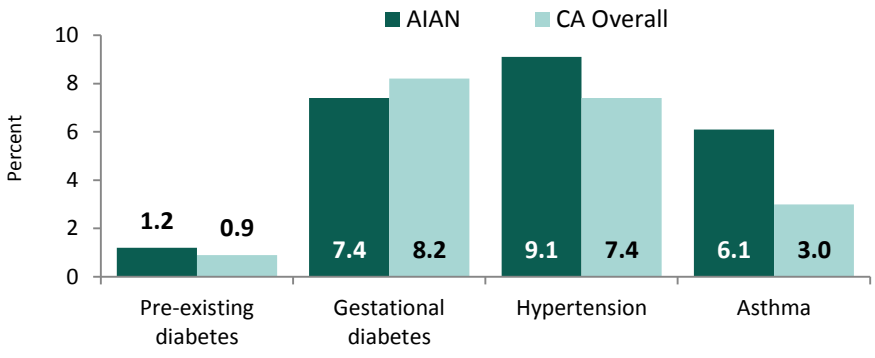
AIAN women play a key role in maintaining tribal culture, protecting families and upholding the community. Their health is integral to overall community well-being. While most AIAN women self-report being in good health prior to pregnancy, Table 6 shows that they have higher rates of several health conditions before, during and after pregnancy. Maternal health conditions such as diabetes, hypertension, and asthma are major contributors to poor maternal and infant health outcomes, described below.

In the US, AIAN have higher rates of diabetes compared to other race groups, and those with diabetes experience higher rates of complications and mortality resulting from the disease.[1,2] Pre-existing diabetes diagnosed before a woman becomes pregnant and gestational diabetes that develops during pregnancy can lead to congenital abnormalities, fetal malformation and intrauterine death.[3] In some cases, pre-existing diabetes is mistaken for gestational diabetes when it is first diagnosed during pregnancy. As shown in Figure 20, more mothers of AIAN infants have pre-existing diabetes during pregnancy (1.2%) compared to California overall (0.9%). Gestational diabetes, however, is less common among mothers of AIAN infants (7.4%) compared to California mothers overall (8.2%).

Women with poorly-controlled hypertension or high blood pressure during pregnancy are at increased risk for maternal complications, such as pre-eclampsia, and poor birth outcomes, including preterm delivery and infant death.[4] Hypertension is more common in mothers of AIAN infants compared to California mothers overall (9.1% and 7.4%, respectively).

Women with asthma may experience worsening control of their symptoms during pregnancy. Uncontrolled asthma can cause hypertension and toxemia in the mother. Risks to the infant include stillbirth, preterm birth, low birth weight, and fetal growth restriction. When well-controlled with medical management and avoidance of known triggers or allergens, women with asthma are likely to have a healthy pregnancy and birth outcome.[5,6] Among mothers of AIAN infants, 6.1% had an asthma diagnosis, which was twice as high as California overall (3.0%).

Figure 20. Maternal health conditions at delivery



Data Source: California Patient Discharge Data linked to Vital Statistics files (PDD-VS), 2010-2012.

Table 6. Maternal health conditions

	American Indian/Alaska Native			California Overall		
	%	95% CI	Annual Population Estimate	%	95% CI	Annual Population Estimate
Maternal health status before pregnancy‡						
In good to excellent health before pregnancy	**91.9**	89.9 - 93.8	12,400	**92.4**	91.6 - 93.1	453,800
Maternal health conditions at delivery†						
Pre-existing diabetes	**1.2**	1.1 - 1.4	142	**0.9**	0.9 - 1.0	4,536
Gestational diabetes	**7.4**	7.1 - 7.7	843	**8.2**	8.1 - 8.2	39,409
Hypertension (chronic or gestational)	**9.1**	8.8 - 9.4	1,035	**7.4**	7.4 - 7.5	35,759
Asthma	**6.1**	5.8 - 6.3	692	**3.0**	3.0 - 3.0	14,542

Data Sources: † California Patient Discharge Data linked to Vital Statistics files (PDD-VS), 2010-2012. Percent (%) and 95% confidence interval (95% CI) are presented for all resident women in California. Annual population estimate is a three-year average of the number of deliveries, rounded down to the whole number. Indicator definitions are in the Appendix.
‡ Maternal and Infant Health Assessment (MIHA) survey, 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates (rounded to the nearest hundred) are weighted to represent all women in California. Population estimates are a three-year average. Definitions of indicators and additional MIHA information are in the Appendix.

Source: Depositphotos.com

HARDSHIPS AND PROTECTIVE FACTORS ACROSS THE MATERNAL LIFE COURSE

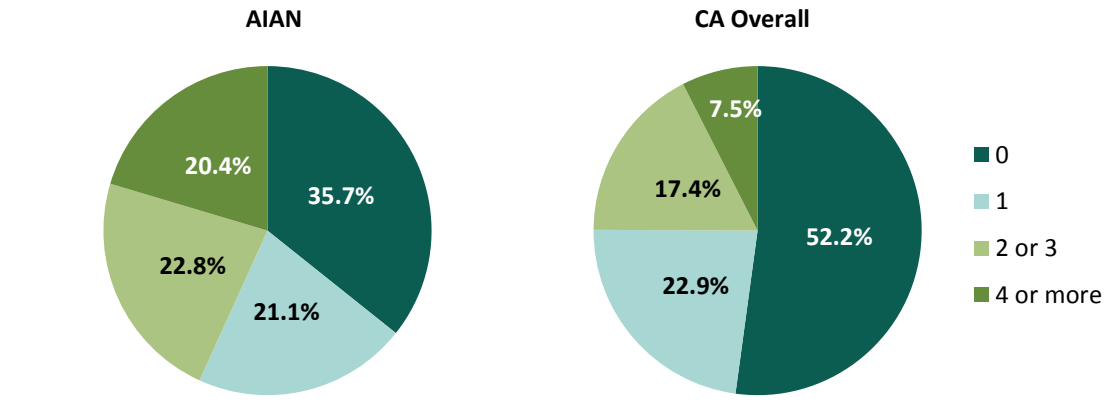
An increasing body of literature has demonstrated the negative impact of stress on health across the life course.[1] Table 7 shows a wide range of stressful financial, relational and race-related hardships, as well as positive social support, experienced by women with a recent live birth at various points in their lives.

HARDSHIPS AND PROTECTIVE FACTORS ACROSS THE LIFE COURSE

Childhood hardships are events or conditions that can harm social, cognitive and emotional functioning and upset the nurturing family environments that children need to thrive. Hardships during childhood may cause individual trauma or toxic stress (the prolonged activation of the body's stress response system that can disrupt brain architecture and other organ systems), which in turn may lead to lifelong problems in learning, behavior and health. Resilience, or the ability to positively adapt to adversity or trauma, can mitigate the effects of these hardships. Importantly, resilience can be strengthened by having safe, stable and nurturing relationships within and outside the family.

In AIAN communities, childhood hardships may extend from and be compounded by collective experiences of historical oppression. Such oppression encompasses intergenerational trauma resulting from historical land dispossession, forced removal, assimilative boarding schools or relocation policies, prohibition of spiritual practices, and environmental degradation. Other examples of chronic contemporary oppression include disrupted cultural patterns, marginalization and racism.[2] Accumulation of trauma at the individual level has been shown to have a dose response relationship with a number of health problems.[2] That is, the more trauma experienced, whatever the source, the greater the negative impact on health. AIAN communities have survived these struggles as a result of their many strengths, which are drawn from "places, cultural ways of living, kinship and other relationships, ceremony, humor and collective successes."[2]

Figure 21. Total number of childhood hardships experienced by the mother

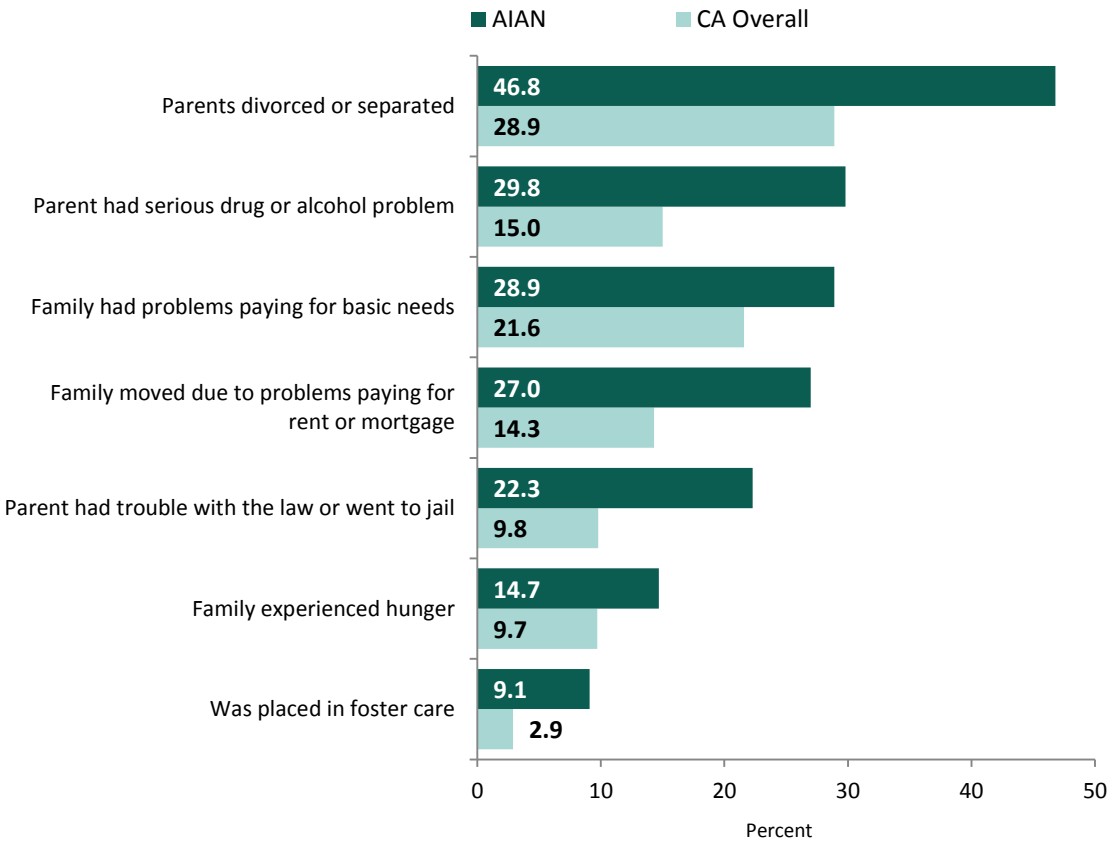


Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014.

Compared to California postpartum women overall, more mothers of AIAN infants experienced at least one childhood hardship, and were more likely to experience a high number of childhood hardships (Figure 21). Nearly two-thirds of AIAN women with a recent live birth experienced at least one childhood hardship and 20.4% experienced four or more childhood hardships. Among women with a live birth in California overall, fewer than half experienced any childhood hardships, and only 7.5% experienced four or more.

In addition, mothers of AIAN infants more commonly experienced each of the individual measures of childhood hardships, compared to California mothers overall (Figure 22). The most common childhood hardships for mothers of AIAN infants were parental separation or divorce (46.8%), parental drinking or drug problem (29.8%), family problems paying for basic needs (28.9%), and having to move because of problems paying for housing (27%). Though it was the least common hardship, nearly one in ten mothers of AIAN infants had been in foster care or removed from their home by the court as children, which was more than three times higher than for California mothers overall.

Figure 22. Hardships experienced by the mother during her childhood



Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014.

Despite the very high rates of childhood hardships, a large majority of mothers of AIAN infants reported having an adult they could count on during childhood (89.1%, Table 7). This protective factor has been shown to play an important role in buffering the impact of childhood hardships and building resilience.

Women's experience of racial discrimination has been shown to negatively impact maternal and infant health outcomes.[3] For AIAN peoples, racism has played a key role in both historical and contemporary oppression. Among mothers of AIAN infants, 20% reported worrying about racism somewhat or very often across their lifetime, compared to only 14.3% of California mothers overall (Table 7).

Table 7. Support and hardships experienced by the mother across her life course

	American Indian/Alaska Native			California Overall		
	%	95% CI	Annual Population Estimate	%	95% CI	Annual Population Estimate
Adult support during childhood						
Had adult support	**89.1**	87.0 - 91.1	12,000	**88.9**	88.0 - 89.7	432,800
Childhood hardships experienced						
Parents divorced or separated	**46.8**	41.1 - 52.4	6,300	**28.9**	27.7 - 30.1	140,800
Parent had serious drug or alcohol problem	**29.8**	24.8 - 34.9	4,000	**15.0**	14.1 - 16.0	73,300
Family had problems paying for basic needs	**28.9**	23.7 - 34.1	3,900	**21.6**	20.5 - 22.7	105,600
Family moved due to problems paying for rent or mortgage	**27.0**	21.7 - 32.2	3,600	**14.3**	13.3 - 15.2	69,200
Parent had trouble with the law or went to jail	**22.3**	18.6 - 26.1	3,000	**9.8**	9.0 - 10.6	47,700
Family experienced hunger	**14.7**	11.8 - 17.5	2,000	**9.7**	8.9 - 10.4	47,200
Was placed in foster care	**9.1**	7.1 - 11.2	1,200	**2.9**	2.5 - 3.3	14,300
Total number of hardships experienced by the mother during her childhood						
0	**35.7**	29.7 - 41.7	4,700	**52.1**	50.7 - 53.5	250,600
1	**21.1**	17.2 - 25.1	2,800	**22.9**	21.8 - 24.1	110,200
2 or 3	**22.8**	18.6 - 27.0	3,000	**17.4**	16.4 - 18.5	83,900
4 or more	**20.4**	15.7 - 25.1	2,700	**7.5**	6.9 - 8.2	36,300
Worried about racism						
Somewhat or very often worried about racism throughout lifetime	**20.0**	15.0 - 25.1	2,700	**14.3**	13.4 - 15.2	69,200

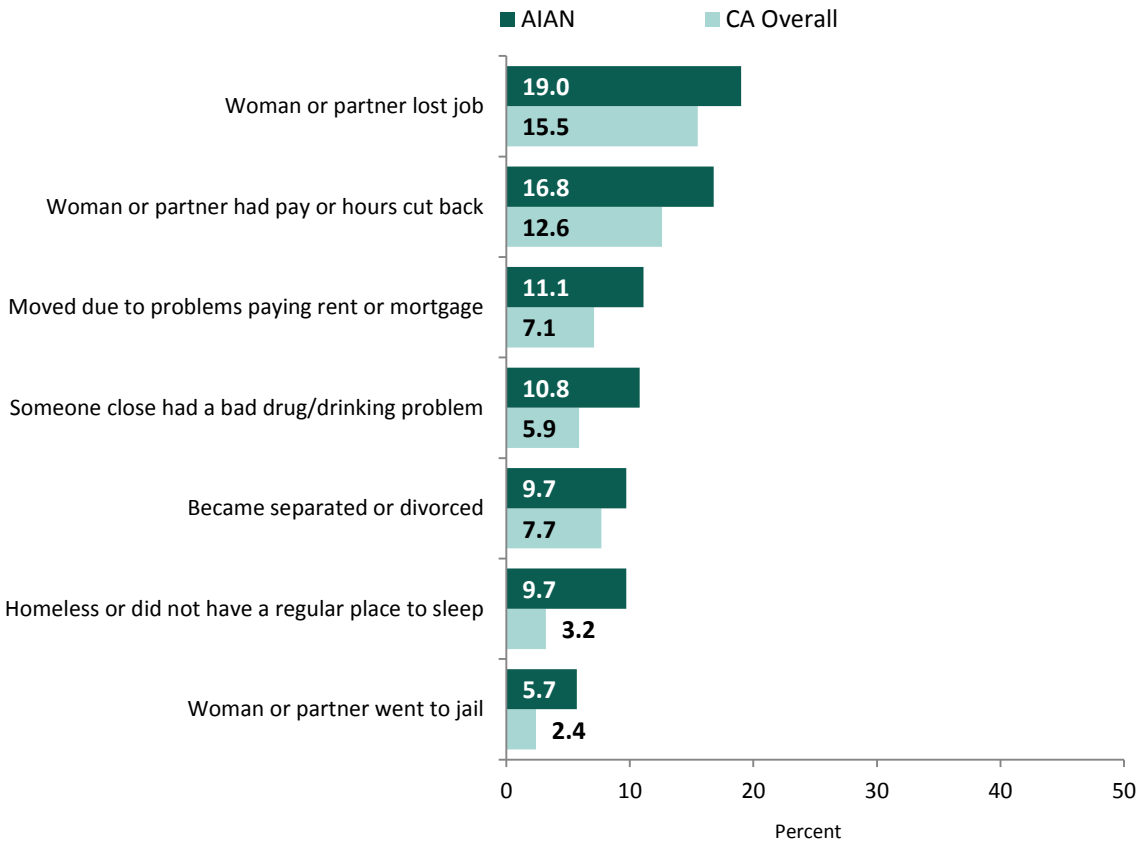
Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates (rounded to the nearest hundred) are weighted to represent all women in California. Population estimates are a three-year average. Definitions of indicators and additional MIHA information are in the Appendix.

HARDSHIPS AND PROTECTIVE FACTORS DURING PREGNANCY

Stress during pregnancy has been associated with a number of poor outcomes, such as hypertension, preterm birth, low birth weight, and developmental delays in infants.[4,5] The experience of hardships during pregnancy may result in increased psychological or biological stress experienced by the mother. Further, the hardships described below may have additional direct impact on the health and well-being of women and their families. Table 8 shows a wide range of stressful financial and relational hardships, as well as emotional support, experienced by women during pregnancy.

Nearly one in five mothers of AIAN infants reported that either they or their partner experienced job loss or a reduction in hours or pay while they were pregnant (Figure 23). Job loss and reduction in pay causes economic hardships that may increase stress and result in difficulty meeting basic needs during pregnancy, such as housing, food and the cost of preparations to bring a new child into the home.

Figure 23. Hardships experienced during pregnancy



Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014.

Homelessness and lack of stable housing can have a severe impact on health and well-being during pregnancy. Furthermore, housing may be even more difficult to secure following the birth of a child, when family and friends may be less able to provide shelter for an infant. Families who experience difficulty affording housing may have to resort to overcrowded, substandard housing. This poses concerns for pregnant women themselves, and if not resolved prior to the birth of their baby, could pose challenges to providing safe sleep locations for their infants. This is a particular concern for AIAN infants who are at higher risk of SIDS and SUID.

Homelessness and unstable housing is a serious problem for AIAN families in both urban and rural areas of California. During their pregnancy, approximately one in ten mothers of AIAN infants was homeless or did not have a regular place to sleep at night, nearly three times the rate for California overall. More than one in ten (10%) reported having to move due to problems paying the rent or mortgage, compared to 7.1% of mothers in California overall.

Just as in childhood, social support during pregnancy is important for all women, and can help to buffer against the impact of stressors for pregnant women. Though support was very common for both groups, more mothers of AIAN infants reported having practical or emotional support than did California mothers overall (97.1% and 95.2%, respectively, Table 8).

Table 8. Support and hardships experienced during pregnancy

	American Indian/Alaska Native			California Overall		
	%	95% CI	Annual Population Estimate	%	95% CI	Annual Population Estimate
Support during pregnancy						
Had practical or emotional support	**97.1**	96.1 - 98.1	13,100	**95.2**	94.7 - 95.8	467,800
Hardships experienced during pregnancy						
Woman or partner lost job	**19.0**	15.1 - 23.0	2,600	**15.5**	14.6 - 16.5	75,500
Woman or partner had pay or hours cut back	**16.8**	13.1 - 20.4	2,300	**12.6**	11.8 - 13.5	61,300
Homeless or did not have a regular place to sleep	**9.7**	6.7 - 12.7	1,300	**3.2**	2.7 - 3.6	15,400
Moved due to problems paying rent or mortgage	**11.1**	8.8 - 13.4	1,500	**7.1**	6.4 - 7.8	34,600
Became separated or divorced	**9.7**	6.9 - 12.6	1,300	**7.7**	7.0 - 8.4	37,600
Someone close had a bad drug/drinking problem	**10.8**	8.6 - 13.0	1,500	**5.9**	5.3 - 6.5	28,800
Woman or partner went to jail	**5.7**	3.8 - 7.7	800	**2.4**	2.0 - 2.8	11,700

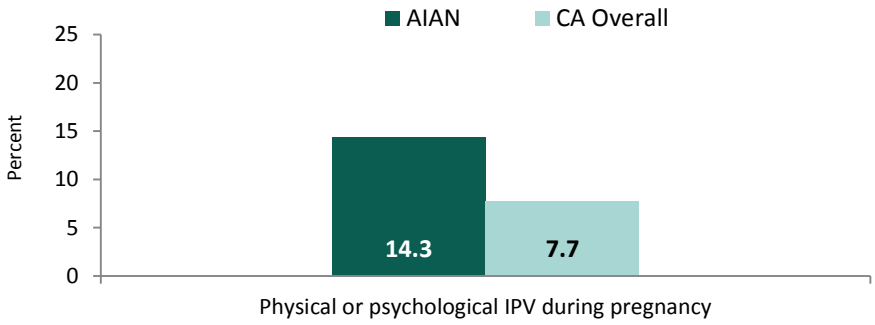
Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates (rounded to the nearest hundred) are weighted to represent all women in California. Population estimates are a three-year average. Definitions of indicators and additional MIHA information are in the Appendix.

INTIMATE PARTNER VIOLENCE DURING PREGNANCY

AIAN women report intimate partner violence (IPV) at a rate higher than any other group in the US, and are more likely to be injured and require hospital care than other groups.[1,2] In addition, higher exposures to historical, childhood and chronic trauma among AIAN women make them more vulnerable to problems associated with IPV, such as post-traumatic stress disorder.[3] On tribally-governed land, the problem of IPV is compounded by significant barriers to prosecution of both AIAN and non-AIAN perpetrators because tribal jurisdictions have limited authority to prosecute violent crimes within their jurisdictions.[4] A majority of perpetrators of violence against AIAN women are not AIAN.[5] Table 9 provides the percentage of physical or psychological IPV during pregnancy.

Women of all ages can experience IPV, however, it is most prevalent among women of reproductive age and contributes to adverse outcomes including perinatal depression, unintended pregnancy, and lower likelihood of contraception use and breastfeeding.[6,7] IPV during pregnancy is associated with delayed entry into prenatal care, miscarriage, preterm delivery and neonatal mortality.[7] If IPV persists into the postpartum period, there are additional risks to the young child from witnessing threats, uncontrolled anger, or physical violence, as well as the risk of experiencing abuse themselves.[8-10] Children who witness IPV can experience emotional, psychological, and physical problems as a result of the trauma they experience.[7]

Figure 24. Physical or psychological IPV during pregnancy



Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014.

Among mothers of AIAN infants in California, psychological and physical IPV during pregnancy was nearly twice as common as it was for California mothers overall (14.3% and 7.7%, respectively, Figure 24).

Table 9. Intimate partner violence during pregnancy

	American Indian/Alaska Native			California Overall		
	%	95% CI	Annual Population Estimate	%	95% CI	Annual Population Estimate
Physical or psychological IPV during pregnancy	**14.3**	9.5 - 19.1	1,900	**7.7**	7.0 - 8.4	37,600

Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates (rounded to the nearest hundred) are weighted to represent all women in California. Population estimates are a three-year average. Definitions of indicators and additional MIHA information are in the Appendix.

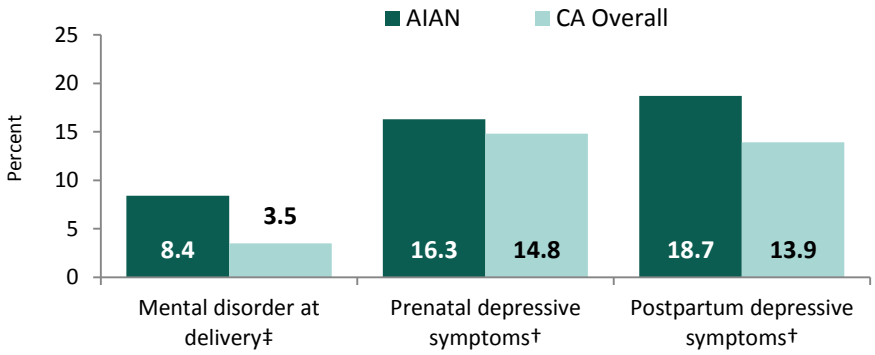
MATERNAL MENTAL HEALTH

AIAN peoples' experience of historical trauma, racism and other forms of material deprivation have contributed to disproportionately high rates of mental health conditions compared to other populations in the US.[1] Table 10 provides information on mental disorders at delivery and depressive symptoms during and after pregnancy.

Many women of all races and ethnicities experience mental illness during their pregnancies, including disorders related to anxiety, depression, psychosis, eating, and substance use or abuse. Mental illness not only affects the mother's well-being, but some research has shown a link between maternal mental health and pregnancy outcomes, such as preterm birth and low birth weight.[2] In California, documented mental disorder diagnoses in the hospital delivery record are more than twice as common in mothers of AIAN infants (8.4%) compared to California mothers overall (3.5%, Figure 25).

Depression at any time in a woman's life is mentally and physically challenging.[3-5] Women with a history of depression are more likely to experience depression during and after pregnancy.[6] Prenatal depression is not only associated with a higher risk of postpartum depression, but also adverse birth outcomes including low birth weight and preterm birth.[7] Postpartum depression can impact many aspects of maternal and child health. For example, it can impair parenting behavior or social functioning, leading to maladaptive social, emotional, and cognitive development in children.[8-11] Women who experience postpartum depression are also less likely to breastfeed.[12] During pregnancy, mothers of AIAN infants experienced depressive symptoms at levels similar to California mothers overall (16.3% and 14.8%, respectively), but following pregnancy, depressive symptoms were more common for mothers of AIAN infants (18.7% and 13.9%, respectively). Women's self-report of depressive symptoms during pregnancy was more common than documented mental disorder diagnosis for any condition at the time of delivery. This may reflect the many barriers that women experience in accessing mental health care.

Figure 25. Maternal mental health



Data Sources: †Maternal and Infant Health Assessment (MIHA) survey, 2012-2014.
‡California Patient Discharge Data linked to Vital Statistics files (PDD-VS), 2010-2012.

Table 10. Maternal mental health

	American Indian/Alaska Native			California Overall		
	%	95% CI	Annual Population Estimate	%	95% CI	Annual Population Estimate
Prenatal depressive symptoms†	**16.3**	13.0 - 19.7	2,200	**14.8**	13.9 - 15.8	72,800
Postpartum depressive symptoms†	**18.7**	14.2 - 23.2	2,500	**13.9**	13.0 - 14.8	68,100
Mental disorder at delivery‡	**8.4**	8.1 - 8.7	961	**3.5**	3.4 - 3.5	16,730

Data Sources: † Maternal and Infant Health Assessment (MIHA) survey, 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates (rounded to the nearest hundred) are weighted to represent all women in California. Population estimates are a three-year average. Definitions of indicators and additional MIHA information are in the Appendix.
‡ California Patient Discharge Data linked to Vital Statistics Files (PDD-VS), 2010-2012. Percent (%) and 95% confidence interval (95% CI) are presented for all resident women in California. Annual population estimate is a three-year average of the number of deliveries, rounded down to the whole number. Indicator definitions are in the Appendix.

Source: Depositphotos.com

MATERNAL SUBSTANCE USE

Maternal substance use around the time of pregnancy can negatively impact fetal development, and when characterized by misuse can be disruptive to infant caretaking and maternal well-being. In recent decades, substance use in general, and among pregnant women in particular, has become an issue of serious concern among many tribal and urban Indian communities. Patterns of tobacco, alcohol and illicit substance use show variation across various demographic and cultural groups of AIAN in the US.[1] Table 11 provides information on maternal use of commercial tobacco and alcohol before, during and after pregnancy in California. Table 12 describes the rate of neonatal abstinence syndrome.

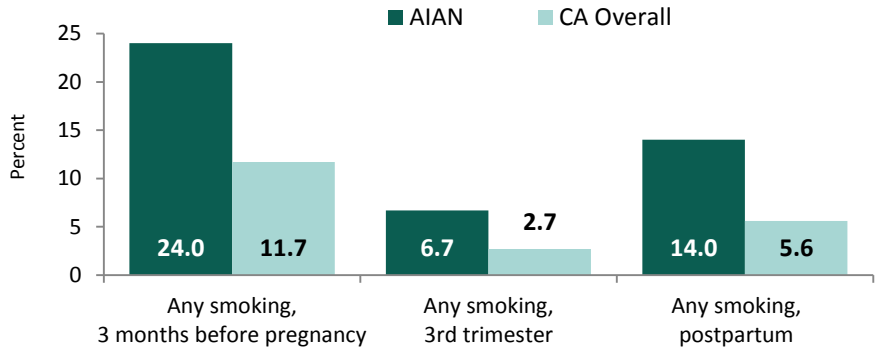
TOBACCO USE

Traditional tobacco is grown and used by AIAN people for ceremonial and medicinal purposes.[2] In contrast, commercial tobacco is manufactured for recreational use in cigarettes, smokeless tobacco, and other products, and contains thousands of disease causing chemical compounds.[3] While the importance of an ongoing role of traditional tobacco has been recognized in AIAN communities, substantial efforts have been implemented to address the negative effects of commercial tobacco use on the health and well-being of AIAN people. This section focuses on commercial tobacco use.

Overall in the US, AIAN adults have the highest prevalence of using commercial tobacco products among all racial groups, as do AIAN women before, during and after pregnancy.[4-7] Though California generally has a lower smoking prevalence compared to other states, AIAN adults in California have been found to have a high prevalence of commercial tobacco use.[8-10] Because of this high prevalence, AIAN adults have a higher risk of tobacco-related diseases, such as respiratory illnesses, cardiovascular disease, lung cancer and diabetes.[8,11]

Women who use commercial tobacco during pregnancy have an increased risk of poor birth outcomes, including low birth weight, preterm birth, and fetal and infant mortality.[6] Both prenatal and postpartum maternal smoking has been associated with SIDS, which is a leading cause of infant mortality for AIAN infants in California.[12] Pregnancy can be an optimal time to intervene to reduce tobacco use for mothers of AIAN infants, and support during the postpartum period may help women who quit during pregnancy maintain non-smoking status.[13]

Figure 26. Any smoking before, during and after pregnancy



Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014.

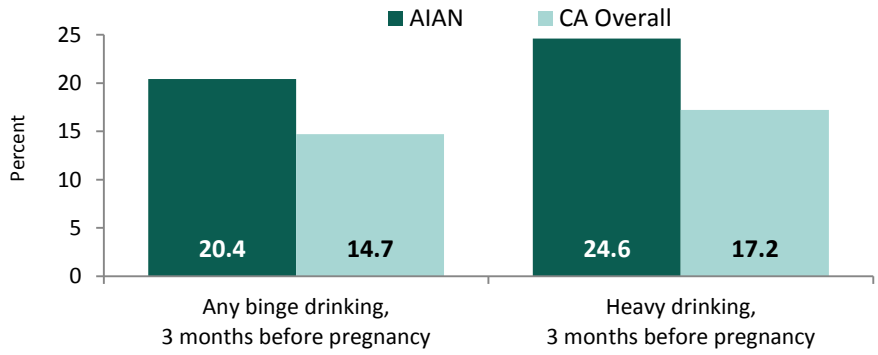
Among California mothers of AIAN infants, 24% smoked in the 3 months before pregnancy, 6.7% smoked during their third trimester and 14% smoked after pregnancy (Figure 26). Though the majority of prepregnancy smokers quit smoking during pregnancy (73.4%), many started smoking again after their pregnancies were over (41.7%). At each time point, mothers of AIAN infants were over two times as likely to smoke as California mothers overall, but there was no difference in the prevalence of quitting during pregnancy or postpartum relapse between the groups.

ALCOHOL USE

Alcohol use during pregnancy is the leading preventable cause of birth defects and is associated with poor growth, delayed development, heart defects, physical/structural problems and mental retardation, and SIDS.[14] The negative impact of alcohol on fetal development can occur at any stage of pregnancy, even before a women knows she is pregnant. Though no level of alcohol use during pregnancy has been determined to be safe, evidence suggests that heavier alcohol use and binge drinking pose more substantial risks.[14]

Alcohol use during pregnancy did not differ between mothers of AIAN infants and California mothers overall. However, during the three months before their pregnancies, mothers of AIAN infants were more likely to binge drink or drink heavily. During this period, 20.4% of mothers of AIAN infants binge drank and 24.6% drank heavily (Figure 27). Binge and heavy drinking during the period immediately preceding pregnancy is particularly concerning because many women, especially those whose pregnancies were unintended, do not realize they are pregnant until several critical weeks of fetal development have passed.

Figure 27. Prepregnancy binge drinking and heavy drinking



Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014.

Table 11. Maternal substance use

	American Indian/Alaska Native			California Overall		
	%	95% CI	Annual Population Estimate	%	95% CI	Annual Population Estimate
Maternal tobacco use before, during and after pregnancy						
Any smoking, 3 months before pregnancy	**24.0**	19.8 - 28.2	3,200	**11.7**	10.8 - 12.5	57,100
Any smoking, 3rd trimester	**6.7**	4.8 - 8.5	900	**2.7**	2.3 - 3.1	13,300
Any smoking, postpartum	**14.0**	11.3 - 16.8	1,900	**5.6**	5.0 - 6.2	27,300
Quit smoking during pregnancy	**73.4**	66.1 - 80.6	2,300	**77.5**	74.5 - 80.6	43,800
Postpartum relapse among women who smoked before and quit during pregnancy	**41.7**	31.1 - 52.4	1,000	**33.4**	29.3 - 37.5	14,600
Maternal alcohol use before and during pregnancy						
Any binge drinking, 3 months before pregnancy	**20.4**	16.4 - 24.4	2,700	**14.7**	13.7 - 15.6	71,300
Heavy drinking, 3 months before pregnancy	**24.6**	20.4 - 28.8	3,300	**17.2**	16.2 - 18.2	83,700
Any alcohol use, 3rd trimester	**6.9**	4.6 - 9.3	900	**7.1**	6.4 - 7.9	34,800
Any binge drinking during pregnancy	**8.0**	5.8 - 10.2	1,100	**6.3**	5.6 - 7.0	30,600

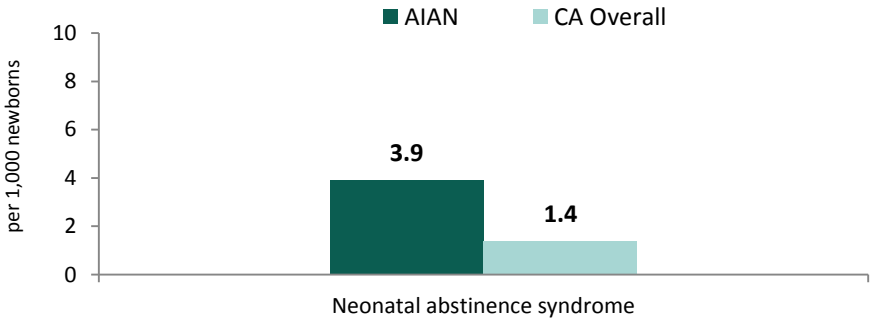
Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates (rounded to the nearest hundred) are weighted to represent all women in California. Population estimates are a three-year average. Definitions of indicators and additional MIHA information are in the Appendix.

Source: alamy.com

NEONATAL ABSTINENCE SYNDROME

In recent years, opioid overuse and addiction has become a major concern for all populations in the US, including tribal and urban Indian communities. Neonatal abstinence syndrome (NAS) is comprised of a constellation of symptoms including central nervous system irritability, gastrointestinal dysfunction, and temperature instability that occur among newborns that have been exposed primarily to opioids during pregnancy from medical, nonmedical, or medication-assisted therapeutic uses.[16] As shown in Figure 28, AIAN infants in California are more than twice as likely to experience NAS than infants in California overall (3.9 and 1.4 per 1,000 newborns, respectively).

Figure 28. Neonatal abstinence syndrome



Data Source: California Patient Discharge Data linked to Vital Statistics files (PDD-VS), 2010-2012.

Though NAS is an important health concern, exposure to other substances known to harm fetal development, including tobacco and alcohol, was far more common among AIAN infants in California. Specifically, less than 0.4% of California AIAN infants experienced NAS, compared to nearly 7% who were exposed to tobacco and 7% who were exposed to alcohol during the third trimester of pregnancy.

Table 12. Neonatal abstinence syndrome

	American Indian/Alaska Native			California Overall		
	Rate	95% CI	Annual Number of Newborns	Rate	95% CI	Annual Number of Newborns
Neonatal abstinence syndrome (per 1,000 newborns)	**3.9**	3.3 - 4.6	44	**1.4**	1.3 - 1.5	679

Data Source: California Patient Discharge Data linked to Vital Statistics Files (PDD-VS), 2010-2012. Rate (per 1,000 newborns) and 95% confidence interval (95% CI) are presented for all resident women in California. Annual number of newborns is a three-year average of the number of deliveries, rounded down to the whole number. Indicator definitions are in the Appendix.

PREGNANCY INTENTION AND FAMILY PLANNING

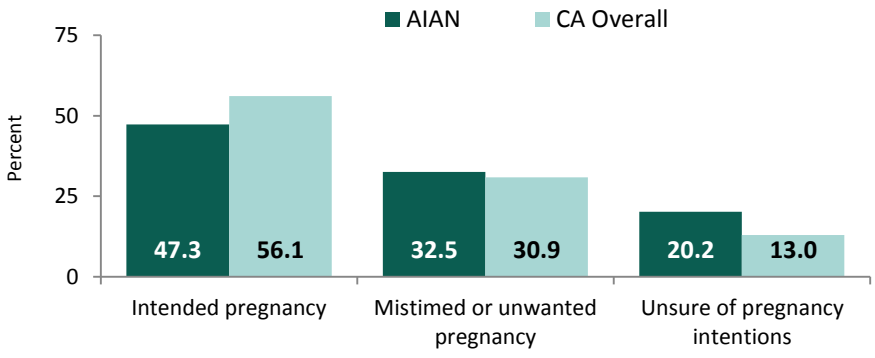
The best health outcomes for mothers and babies occur when mothers are healthy and prepared for the demands of motherhood and parenting. In order to achieve this goal, AIAN women in California need the economic, social and political resources to self-determine if, when, and under what circumstances they become pregnant. In addition, women must have access to health care services including reproductive health care and the full range of contraception options. Table 13 provides information on several reproductive health indicators for mothers of AIAN infants and California mothers overall, including pregnancy intention, optimal birth spacing and postpartum contraception.

Birth spacing refers to the time from one birth until the beginning of the next pregnancy and is also called the interpregnancy interval. Pregnancies that start less than 18 months after the previous birth are associated with delayed prenatal care, preterm birth, low birth weight and neonatal morbidity.[1] Adequate birth spacing is particularly important for women with chronic health conditions in order to allow for interventions or clinical care to optimize their health prior to becoming pregnant again.

Pregnancy intention is a multidimensional concept that generally reflects a woman's intentions before she became pregnant and assumes that the woman went through a conscious decision-making process to become pregnant.[2] Unintended pregnancy, or a pregnancy that was unwanted or occurred earlier than desired, is associated with late entry into prenatal care, experience of IPV during pregnancy, and alcohol and tobacco use during pregnancy. Unintended pregnancy does not appear to be related to child development.[2] Utilization of contraception is associated with adequate birth spacing and a reduction of unintended pregnancy.[3,4]

In California, among women with a recent AIAN live birth, only 47.3% experienced an intended pregnancy, while 32.5% had a mistimed or unwanted pregnancy and 20.2% were unsure of their intentions (Figure 29). Mothers of AIAN infants were less likely than California mothers overall to have had an intended pregnancy and were more likely to be unsure of their intentions.

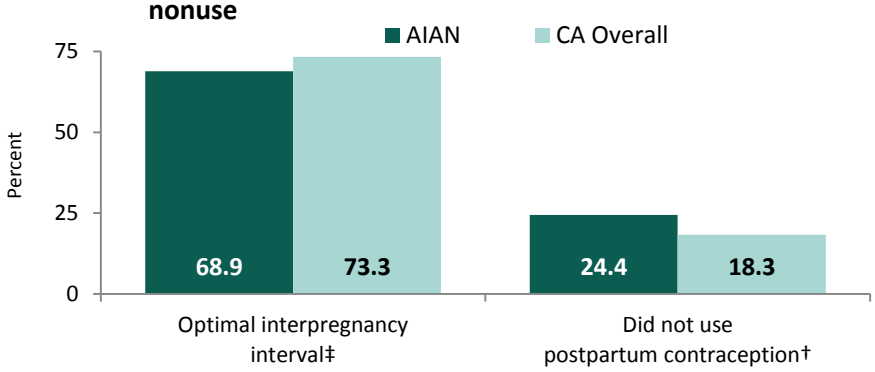
Figure 29. Pregnancy intention



Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014.

As shown in Figure 30, only two in three mothers of AIAN infants achieved an optimal interpregnancy interval of at least 18 months (68.9%), which was lower than California mothers overall (73.3%). Also, nearly one in four mothers of AIAN infants were not using postpartum contraception.

Figure 30. Interpregnancy interval and postpartum birth control nonuse



Data Sources: †Maternal and Infant Health Assessment (MIHA) survey, 2012-2014.
‡California Birth Statistical Master File (BSMF), 2012-2014.

Table 13. Pregnancy intention and family planning

	American Indian/Alaska Native			California Overall		
	%	95% CI	Annual Population Estimate	%	95% CI	Annual Population Estimate
Pregnancy intention†						
Intended pregnancy	**47.3**	41.6 - 52.9	6,400	**56.1**	54.7 - 57.4	274,000
Mistimed or unwanted pregnancy	**32.5**	26.8 - 38.2	4,400	**30.9**	29.7 - 32.2	151,200
Unsure of pregnancy intentions	**20.2**	15.8 - 24.7	2,700	**13.0**	12.1 - 13.9	63,600
Interpregnancy interval‡						
Optimal interpregnancy interval of at least 18 months	**68.9**	68.3 - 69.5	4,744	**73.3**	73.2 - 73.4	213,199
Postpartum contraception use†						
Highly effective method	**20.7**	16.9 - 24.4	2,700	**23.9**	22.8 - 25.1	114,900
Moderately effective method	**30.8**	24.8 - 36.7	4,100	**25.4**	24.2 - 26.5	121,700
Less effective method	**24.2**	19.7 - 28.7	3,200	**32.4**	31.1 - 33.7	155,500
Did not use contraception	**24.4**	19.1 - 29.6	3,200	**18.3**	17.2 - 19.4	87,800

Data Sources: † Maternal and Infant Health Assessment (MIHA) survey, 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates (rounded to the nearest hundred) are weighted to represent all women in California. Population estimates are a three-year average. Definitions of indicators and additional MIHA information are in the Appendix.
‡ California Birth Statistical Master File (BSMF), 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates are presented for births to all resident women in California. Population estimates are a three-year average, rounded down to the whole number. Definitions of indicators and additional BSMF information are in the Appendix.

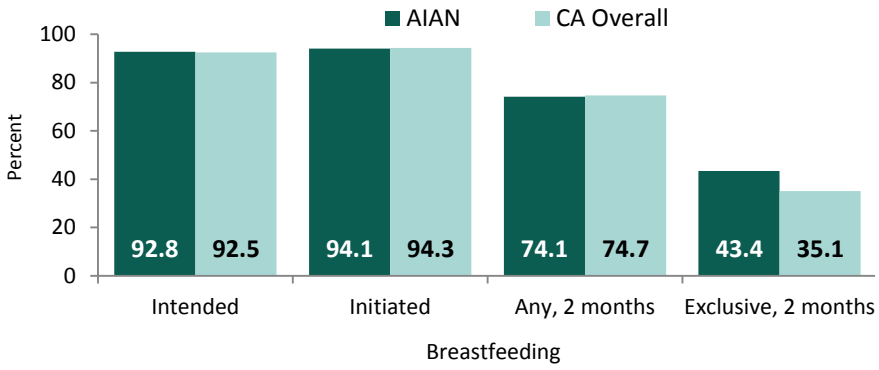
BREASTFEEDING PRACTICES

Breastfeeding is a traditional practice seen in many AIAN communities as not only providing the best nutrition to an infant, but also strengthening the newborn's mind and spirit and enhancing cultural connections between the generations. Across the country, many tribes and urban Indian communities are making efforts to revitalize breastfeeding by emphasizing its cultural role and promoting policy changes to support breastfeeding in hospitals, workplaces, and communities. Table 14 describes breastfeeding intentions prior to pregnancy, breastfeeding practices and mothers' experiences of hospital practices supportive of breastfeeding.

The health benefits of exclusive breastfeeding for both mother and infant are well established. Breastfeeding reduces an infant's risk for infections and development of chronic diseases later in life, such as diabetes, asthma and obesity.[1] Breastfed infants also have a lower risk of SIDS than infants who never breastfed.[1] For mothers, breastfeeding reduces postpartum weight retention, helping them return to a healthy weight more quickly.[1] This is particularly important among mothers of AIAN infants, 28.1% of whom were obese before pregnancy and 52.7% gained more than the recommended amount of weight during pregnancy (see Table 5).

As shown in Figure 31, a high proportion of mothers of AIAN infants (92.8%) intended to breastfeed before the baby was born and 94.1% actually initiated breastfeeding. By two months after delivery, the percentage of those who were breastfeeding at all dropped to 74.1%; only 43.4% were breastfeeding exclusively. Though more mothers of AIAN infants were breastfeeding exclusively at two months postpartum compared to California mothers overall (43.4% and 35.1%, respectively), several prominent organizations of public health professionals, including the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics , recommend that all mothers exclusively breastfeed for the first six months, followed by continued breastfeeding for one year or longer as mutually desired by mother and infant.[2]

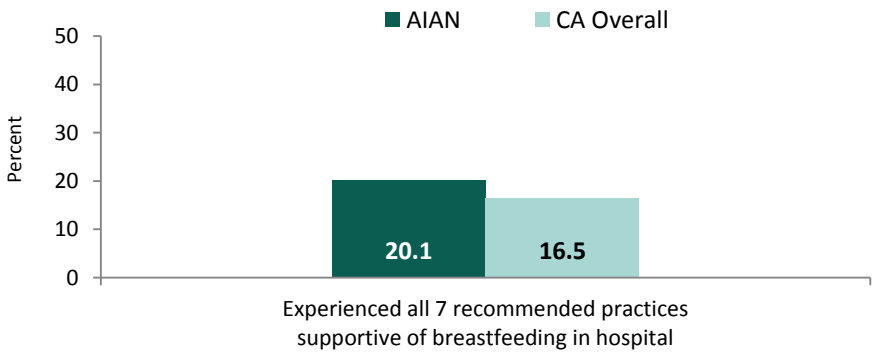
Figure 31. Breastfeeding intentions and practices



Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014.

A number of hospital practices supportive of breastfeeding are associated with longer duration of breastfeeding. These include the following seven post-delivery practices: encouraging early breastfeeding initiation, placing infant skin-to-skin on the mother, allowing infant to sleep in the same room as the mother, not providing pacifiers to infants, not feeding with formula, not giving gift packs containing formula, and providing contact information for breastfeeding support after discharge.[3] Unfortunately, relatively few mothers of AIAN infants, like mothers in California overall, experienced all seven of the recommended hospital practices supportive of breastfeeding (20.1%, AIAN and 16.5% California overall, Figure 32).

Figure 32. Hospital practices supportive of breastfeeding



Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2013.

Table 14. Breastfeeding practices

	American Indian/Alaska Native			California Overall		
	%	95% CI	Annual Population Estimate	%	95% CI	Annual Population Estimate
Before birth, intended to breastfeed with or without formula	**92.8**	90.8 - 94.8	12,200	**92.5**	91.7 - 93.2	444,600
Initiated breastfeeding	**94.1**	92.5 - 95.7	12,400	**94.3**	93.7 - 94.9	455,000
Any breastfeeding, 2 months after delivery	**74.1**	69.9 - 78.3	9,700	**74.7**	73.5 - 75.9	355,700
Exclusive breastfeeding, 2 months after delivery	**43.4**	37.3 - 49.4	5,700	**35.1**	33.8 - 36.4	165,000
Experienced all 7 recommended practices supportive of breastfeeding while in hospital^	**20.1**	13.8 - 26.5	2,000	**16.5**	14.5 - 18.5	65,700

Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates (rounded to the nearest hundred) are weighted to represent all women in California. Population estimates are a three-year average. Definitions of indicators and additional MIHA information are in the Appendix.
^ This indicator is only available for 2013.

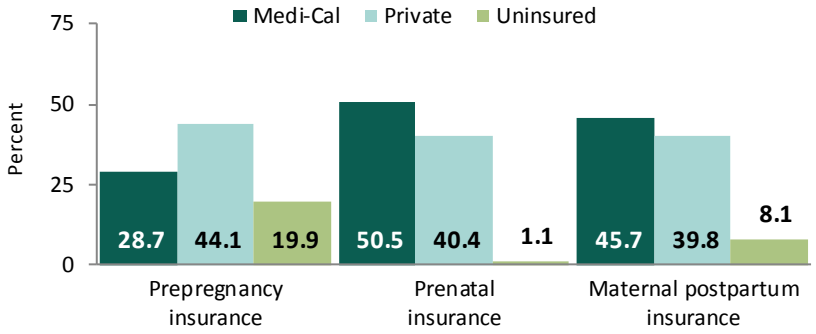
MATERNAL AND INFANT HEALTH INSURANCE

Health insurance coverage plays an important role in influencing access to and utilization of health care for AIAN in California. Certain individuals who reside in selected areas, and are enrolled in a federally recognized tribe or otherwise meet the legal definition of a "California Indian" may access health care services through IHS-funded, tribally-operated facilities or Urban Indian Health Organizations.[1] Importantly, the IHS is not health insurance and is not an entitlement program; therefore, there are no guaranteed benefits and services.[2] Because funds appropriated for IHS cover less than 60% of the health care needs of the eligible population, needed care may not be available through IHS, tribal or urban Indian health care facilities, or through contract relationships with external providers.[1,2] Therefore, health insurance coverage is essential to ensure that AIAN individuals are able to access necessary health care services. Table 15 provides information on health insurance coverage for the mother and infant.

Estimates provided below describe insurance coverage during the 2012-2014 time period. The Affordable Care Act was implemented in January 2014; therefore, the estimates provided in this report reflect health insurance coverage prior to any potential changes reflective of eligibility expansion, subsidies, and coverage requirements.

For mothers of AIAN infants, insurance status and coverage type fluctuated around the time of pregnancy (Figure 33). Before pregnancy, 44.1% had private insurance, 28.7% had Medi-Cal, and 19.9% were uninsured. During pregnancy, the percentage of uninsured women decreased substantially to 1.1% and the percentage with private insurance marginally decreased. The percentage with Medi-Cal increased to 50.5%, which reflects the expanded Medi-Cal eligibility criteria during pregnancy. In the postpartum period up to six weeks, Medi-Cal participation remained high (45.7%) and the proportion of AIAN women without insurance increased again, but not to prepregnancy levels. Similar patterns were observed among California mothers overall (Table 15).

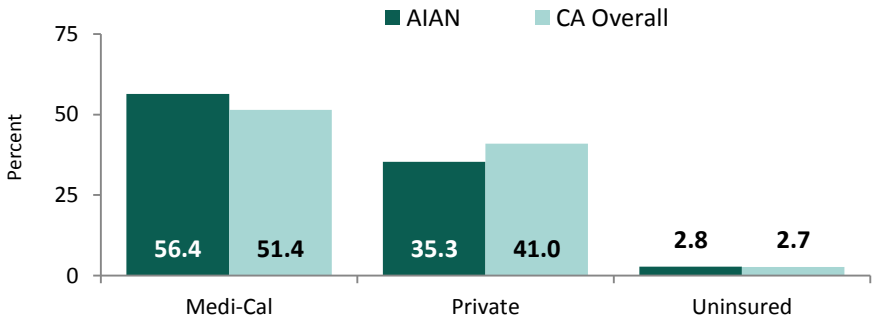
Figure 33. Prepregnancy, prenatal and postpartum health insuranc coverage among mothers of AIAN infants



Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014.

Figure 34 shows that more than half of AIAN infants participated in Medi-Cal (56.4%), approximately one third had private insurance (35.3%), and very few were uninsured (2.8%). Similar patterns were observed among California infants overall.

Figure 34. Infant health insurance coverage



Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014.

Table 15. Health insurance coverage

	American Indian/Alaska Native			California Overall		
	%	95% CI	Annual Population Estimate	%	95% CI	Annual Population Estimate
Prepregnancy insurance						
Medi-Cal	**28.7**	24.5 - 32.8	3,900	**24.5**	23.4 - 25.5	120,000
Private	**44.1**	38.3 - 49.9	6,000	**47.3**	46.2 - 48.3	231,700
Uninsured	**19.9**	15.8 - 24.0	2,700	**24.3**	23.2 - 25.4	119,200
Other	**7.3** *	2.7 - 12.0	1,000	**3.9**	3.5 - 4.4	19,400
Prenatal insurance						
Medi-Cal	**50.5**	44.8 - 56.3	6,800	**49.8**	48.8 - 50.8	244,100
Private	**40.4**	34.5 - 46.2	5,500	**44.1**	43.1 - 45.1	216,200
Uninsured	**1.1**	0.5 - 1.8	200	**1.6**	1.3 - 2.0	8,000
Other	**8.0**	3.3 - 12.6	1,100	**4.5**	3.9 - 5.0	22,000
Maternal postpartum insurance						
Medi-Cal	**45.7**	40.2 - 51.1	6,100	**35.6**	34.5 - 36.7	173,600
Private	**39.8**	33.9 - 45.6	5,300	**45.4**	44.4 - 46.5	221,500
Uninsured	**8.1**	5.2 - 11.0	1,100	**15.6**	14.6 - 16.6	76,000
Other	**6.4** *	1.8 - 11.1	900	**3.3**	2.9 - 3.8	16,200
Infant health insurance						
Medi-Cal	**56.4**	50.5 - 62.2	7,400	**51.4**	50.3 - 52.4	246,800
Private	**35.3**	29.3 - 41.2	4,600	**41.0**	40.0 - 42.0	197,000
Uninsured	**2.8**	1.5 - 4.1	400	**2.7**	2.2 - 3.2	12,900
Other	**5.5**	3.4 - 7.7	700	**5.0**	4.4 - 5.5	23,800

* Estimate should be interpreted with caution due to low statistical reliability (relative standard error is between 30% and 50%).

Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates (rounded to the nearest hundred) are weighted to represent all women in California. Population estimates are a three-year average. Definitions of indicators and additional MIHA information are in the Appendix.

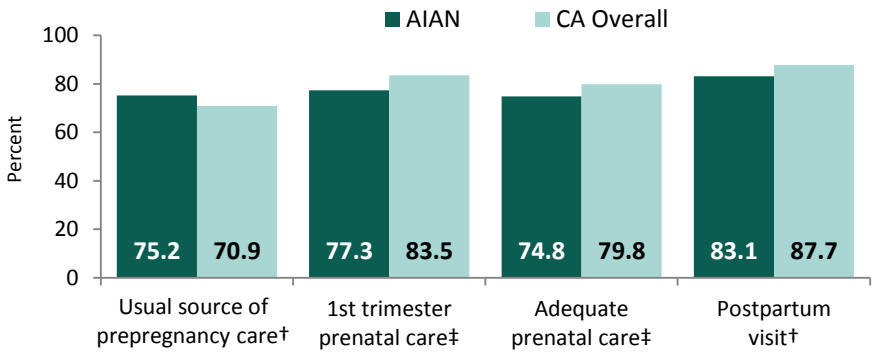
HEALTH CARE UTILIZATION

Utilization of routine and preventive care before pregnancy helps to ensure that women enter pregnancy in good health, which can prevent negative outcomes for infants and mothers. Early initiation of high quality prenatal care ensures that women receive appropriate risk assessment, health education and treatment to address any health conditions that have been identified.[1] The postpartum visit is recognized as a key component of interconception care.[2] Table 16 provides information on health care access and utilization before, during and after pregnancy, as well as receipt of selected components of prenatal care such as screening and counseling.

MEDICAL CARE

Among mothers of AIAN infants, 75.2% had a usual source of care before pregnancy, 77.3% initiated prenatal care in the first trimester, 74.8% had an adequate number of prenatal visits during pregnancy, and 83.1% had a postpartum visit (Figure 35). Though mothers of AIAN infants were at least as likely as California mothers overall to have had a usual source of care before pregnancy, they were less likely to initiate prenatal care during the first trimester, to have received an adequate number of visits during pregnancy, and to have had a postpartum visit than women in California overall.

Figure 35. Health care utilization around the time of pregnancy



Data Sources: †Maternal and Infant Health Assessment (MIHA) survey, 2012-2014.
‡California Birth Statistical Master File (BSMF), 2012-2014.

IMMUNIZATIONS

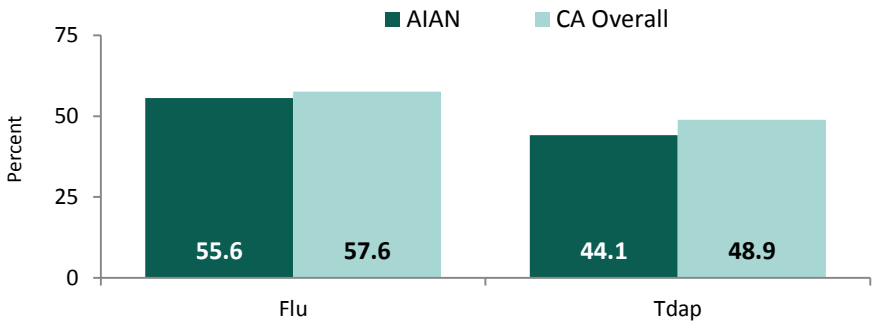
The American College of Obstetricians and Gynecologists, American Academy of Pediatrics and the Centers for Disease Control and Prevention recommend that women receive Tdap (tetanus, diphtheria and pertussis) and influenza vaccinations during each pregnancy.[3,4] Women who are pregnant or plan to become pregnant should receive the influenza vaccine at the earliest opportunity during an influenza season, and should receive the Tdap vaccine during the third trimester of pregnancy.

Influenza, or the flu, is a contagious respiratory illness caused by influenza viruses that can cause mild to severe illness, and can even lead to death.[5] Pregnant and postpartum women are at higher risk for severe illness and complications from influenza.[6] Risks to the fetus include preterm birth, low birth weight and stillbirth.[7] Maternal vaccination helps protect newborns until they can receive their first dose of influenza vaccine at six months of age. Infants of vaccinated mothers are less likely to be hospitalized for acute respiratory illnesses.[8] The flu is of particular concern for AIAN populations, who have higher rates of complications from the flu than the general population.[9]

Pertussis, or whooping cough, is a highly contagious bacterial disease that can be spread by coughing.[10] In recent years, California has seen a dramatic increase in pertussis cases. Of all age groups, young infants have the highest reported rates of illness, hospitalization and death from pertussis.[11] If the mother is immunized during pregnancy, the newborn will have protection against pertussis until they can receive their own Tdap vaccine at 6 to 8 weeks of age. Earlier research has suggested that within the IHS system, AIAN infants have experienced a higher burden of pertussis-related hospitalizations compared to the general US infant population, though recent surveillance indicates that pertussis incidence is lower among AIAN than for whites.[12,13]

Like mothers overall in California, mothers of AIAN infants have a very low prevalence of flu and Tdap vaccination during pregnancy (Figure 36). Based on self-report, 55.6% received the flu vaccine and 44.1% received Tdap.

Figure 36. Receipt of flu and Tdap vaccinations during pregnancy



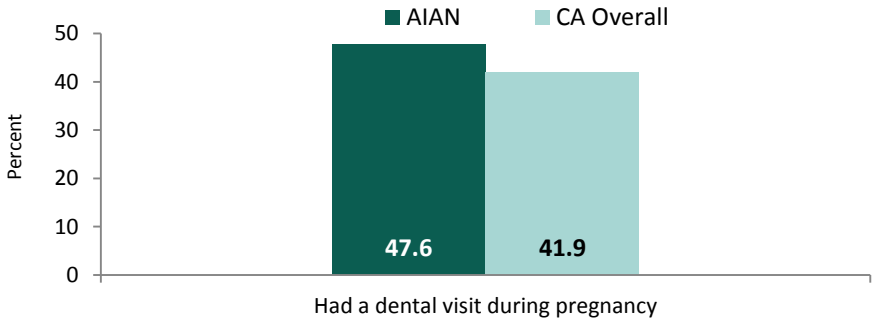
Data Source: Maternal and Infant Health Assessment (MIHA) survey, provisional 2015 data.

DENTAL CARE

AIAN populations experience the poorest oral health of any group in the US, with high rates of untreated decay and gum disease.[14] This is of particular concern given the role of oral health in influencing the overall health of women and the link between oral health conditions to numerous chronic diseases.[15-20] In general, pregnant women have higher rates of oral health conditions than non-pregnant women, and some studies have shown associations between oral disease and poor birth outcomes.[21-25] In addition, untreated dental caries (cavities) in the mother have been linked to caries in her children.[26,27]

Dental care during pregnancy is considered safe and is recommended by several medical and dental organizations, such as the American College of Obstetricians and Gynecologists and the California Dental Association.[28,29] Unfortunately, fewer than half of mothers of AIAN infants received dental care during pregnancy (47.6%, Figure 37).

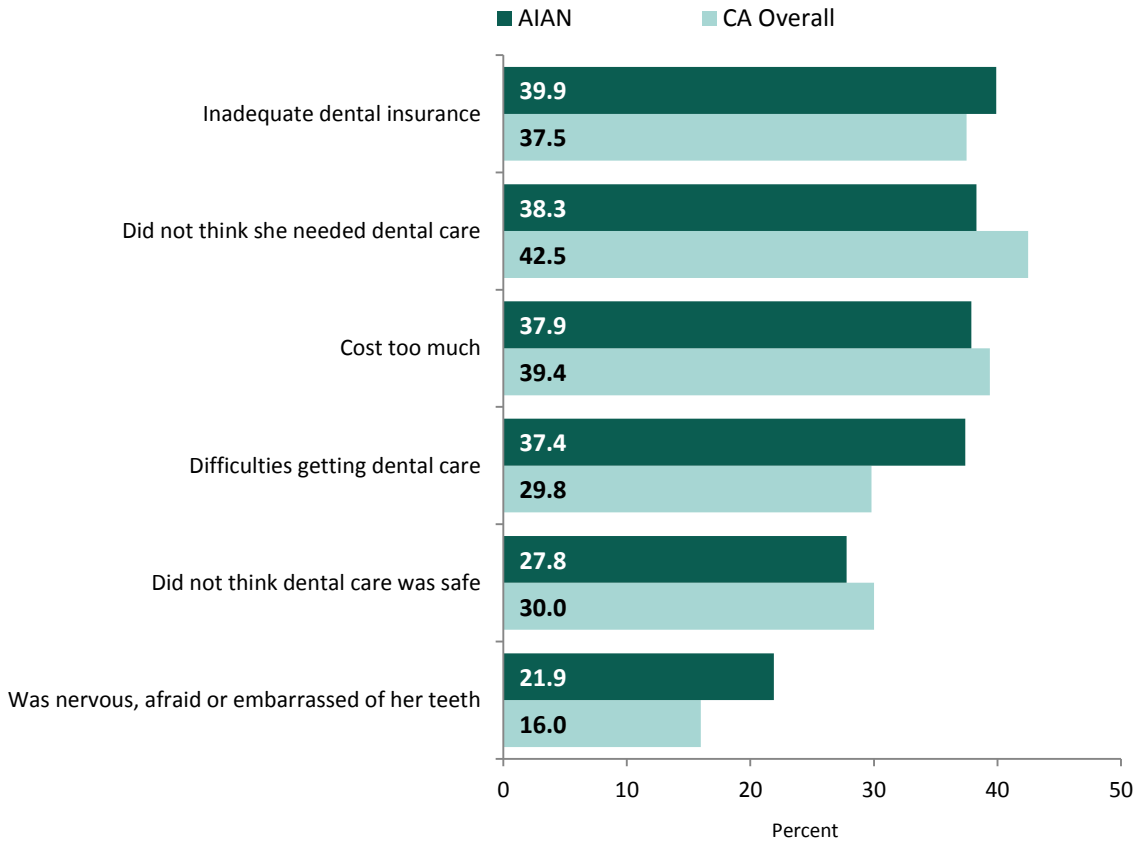
Figure 37. Dental care during pregnancy



Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012.

As shown in Figure 38, leading reasons for not receiving dental care during pregnancy were inadequate dental insurance (39.9%), not thinking she needed dental care (38.3%), cost (37.9%), and difficulty accessing care (37.4%). Additional reasons included not thinking dental care was safe (27.8%) and being nervous, afraid or embarrassed of her teeth (21.9%). Research among other California populations has shown that many women with Medi-Cal are not aware of their dental coverage during pregnancy.[30]

Figure 38. Leading reasons for not receiving dental care, among women with no dental care during pregnancy



Data Source: Maternal and Infant Health Assessment (MIHA) survey, 2012.

Table 16. Health care utilization

	American Indian/Alaska Native			California Overall		
	%	95% CI	Annual Population Estimate	%	95% CI	Annual Population Estimate
Prepregnancy health care†						
Had a usual source of prepregnancy health care	**75.2**	71.3 - 79.1	10,200	**70.9**	69.7 - 72.1	348,000
Prenatal care quantity‡						
Initiated prenatal care in 1st trimester	**77.3**	76.8 - 77.7	9,563	**83.5**	83.5 - 83.6	410,206
Received at least adequate prenatal care (Kotelchuck Index)‡	**74.8**	74.4 - 75.3	9,150	**79.8**	79.8 - 79.9	387,366
Content of prenatal care†±						
Provider asked if she smoked	**97.6**	96.2 - 99.0	12,800	**96.3**	95.6 - 96.9	469,500
Provider asked if she drank alcohol	**96.2**	94.4 - 98.1	12,600	**95.7**	95.0 - 96.3	466,300
Provider asked if she experienced IPV	**81.5**	76.4 - 86.7	10,700	**76.1**	74.6 - 77.5	369,300
Provider talked about appropriate weight gain	**78.2**	72.4 - 83.9	10,000	**78.8**	77.3 - 80.2	382,400
Had a birth defects screening	**72.1**	67.3 - 76.9	9,500	**68.9**	67.4 - 70.5	335,600
Dental care during pregnancy†^						
Had a dental visit during pregnancy	**47.6**	36.3 - 59.0	6,700	**41.9**	39.8 - 44.1	207,300
Leading reasons for no dental care during pregnancy†^						
Inadequate dental insurance	**39.9**	30.6 - 49.2	2,900	**37.5**	34.8 - 40.2	105,200
Did not think she needed dental care	**38.3**	29.0 - 47.6	2,800	**42.5**	39.6 - 45.3	119,000
Cost too much	**37.9**	28.9 - 47.0	2,800	**39.4**	36.6 - 42.1	110,300
Difficulties getting dental care	**37.4**	27.0 - 47.9	2,700	**29.8**	27.1 - 32.4	83,400
Did not think dental care was safe	**27.8**	17.4 - 38.2	2,000	**30.0**	27.3 - 32.8	84,100
Was nervous, afraid or embarrassed of her teeth	**21.9**	10.9 - 32.9	1,600	**16.0**	13.9 - 18.1	44,900
Immunizations during or after pregnancy†~						
Received flu shot during pregnancy	**55.6**	48.7 - 62.6	6,000	**57.6**	55.4 - 59.8	266,700
Received Tdap during pregnancy	**44.1**	35.2 - 53.0	5,200	**48.9**	46.7 - 51.1	228,200
Received Tdap in hospital at delivery	**24.5**	13.3 - 35.6	2,900	**18.1**	16.2 - 19.9	84,300
Postpartum care†						
Had a postpartum medical visit	**83.1**	79.2 - 86.9	11,200	**87.7**	86.8 - 88.6	429,300
Mom or infant needed but couldn't afford care postpartum	**15.0**	11.0 - 19.0	2,000	**13.3**	12.4 - 14.2	63,500

Data Sources: † Maternal and Infant Health Assessment (MIHA) survey, 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates (rounded to the nearest hundred) are weighted to represent all women in California. Population estimates are a three-year average. Definitions of indicators and additional MIHA information are in the Appendix.
‡ California Birth Statistical Master File (BSMF), 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates are presented for births to all resident women in California. Population estimates are a three-year average, rounded down to the whole number. Definitions of indicators and additional BSMF information are in the Appendix.
^ This indicator is only available for 2012.
± This indicator is only available for 2013-2014.
~ This indicator is only available for provisional 2015 data.

CONCLUSION

This report was the first of its kind to provide a comprehensive description of maternal and infant health for the statewide California AIAN population using an expanded definition of AIAN to address racial misclassification. According to this definition (AIAN reported in any maternal or paternal race field on the birth certificate, regardless of Hispanic ethnicity or country of birth), there were 12,773 AIAN births in California in 2014, which made up 2.5% of all resident live births. Compared to California maternity population overall, mothers of AIAN infants were younger and less likely to have received a college degree, but were similar in parity and marital status. Like California mothers in general, a high percentage of mothers of AIAN infants had an income below poverty or lived in a high poverty neighborhood.

KEY FINDINGS

By considering a broad range of indicators, the results presented in this report effectively document the scope of health disparities experienced by AIAN infants and their mothers. Listed below are several areas in need of targeted intervention to improve the health and well-being of California AIAN mothers and infants.

Infant Mortality

The infant mortality rate is higher among AIAN infants, particularly during the postneonatal period. Postneonatal mortality is considered to be more amenable to prevention efforts than infant deaths in the neonatal period, which may provide opportunities to reduce the high rates of infant mortality overall. Causes of death with the greatest disparities include sudden infant death syndrome (SIDS) and unintentional injuries, which include deaths due to accidental suffocation and strangulation in bed.

Sudden Unexpected Infant Death (SUID)

SUID was three times higher for AIAN infants compared to California infants overall. Opportunities for AIAN families to reduce risk factors for sleep-related infant death include the reduction of high rates of maternal smoking before, during and after pregnancy, and following safe infant sleep recommendations to place infants on their backs to sleep and reduce bedsharing, particularly in high risk situations, such as when excessively tired or when using substances. In addition, breastfeeding is a traditional practice that has been shown to reduce the risk of SIDS, one cause of death included under the umbrella grouping of SUID.

Efforts to address the disparities described in this report should draw upon the many strengths found in American Indian and Alaska Native communities, including traditional and cultural practices, Native language, strong social networks, and a connection to land and place.

Birth Outcomes

Despite the higher percentage of AIAN infants born preterm and with a low birth weight, fewer AIAN low birthweight births occur at Community or Regional level NICU facilities, which are staffed and equipped to handle the unique needs of these newborns. One effort to improve the number of births that take place in hospitals with the appropriate level of care is the CDPH Regional Perinatal Programs of California, which coordinates California's regionalized perinatal health system.

Maternal Nutrition and Weight

Mothers of AIAN infants were more likely to have inadequate nutrition, enter pregnancy at an unhealthy weight and gain excessive weight during pregnancy, increasing their risk for multiple pregnancy complications such as hypertension and gestational diabetes. In order to support the well-being of mothers and babies, women in prenatal care should be informed of nutrition programs, such as WIC and CalFresh, and their eligibility requirements.

Source: Depositphotos.com

Breastfeeding

While more mothers of AIAN infants breastfed exclusively at 2 months than mothers overall in California, additional efforts are needed to ensure that women can continue exclusively breastfeeding to six months postpartum. Opportunities include enhanced breastfeeding support at tribal clinics, implementation of policies that support breastfeeding in the workplace and at school, and community efforts to reestablish breastfeeding as the cultural norm in AIAN communities.

Childhood and Pregnancy Hardships

Mothers of AIAN infants experienced more hardships during their childhoods and pregnancies compared to California mothers overall. Childhood hardships can lead to toxic stress, which harms childhood development and has been associated with adult chronic conditions. During pregnancy, hardships can also lead to increased stress, which in turn has been linked to a number of poor outcomes. Prevention efforts that support pregnant women and families may reduce stressors. Interventions that strengthen cultural practices, social support, family functioning, and community and individual resilience may reduce the impact of hardships and provide children with the supportive environments they need to thrive.

Home visiting programs use individualized, strengths-based approaches to prevent and address existing hardships in families with young children and enhance the mother-child relationships. The CDPH California Home Visiting Program, the Department of Health Care Services American Indian Infant Health Initiative, and the California Tribal Maternal, Infant, and Early Childhood Home Visiting Programs are just three of the home visiting programs serving California families that could reduce exposure to childhood hardships among today's AIAN children, and prevent hardships in future generations.

Intimate Partner Violence (IPV)

IPV during pregnancy was nearly twice as common among mothers of AIAN infants as California mothers overall. Community-led social change initiatives can address the root causes of IPV, while efforts to train first responders, service providers, and justice system personnel will strengthen the response to violence. These efforts will benefit women, their children, and the broader community. For example, the Red Women Rising project supports culturally responsive domestic violence services for Urban Indians by increasing awareness and promoting best practices to address IPV at Urban Indian Health Organizations.

Mental Health

Mothers of AIAN infants had higher percentages of mental disorder diagnoses at delivery and postpartum depressive symptoms compared to California mothers overall. National guidelines recommend that women be screened for depression throughout their prenatal and postpartum care. Ensuring access to services that are affordable and culturally congruent, and that acknowledge the history of trauma common among AIAN women, and women with mental health conditions, could facilitate timely recognition of symptoms and the prevention of adverse outcomes. Doing so would improve their ability to care for themselves and their families during this sensitive period of early childhood development.

Through the California Reducing Disparities Project, the CDPH Office of Health Equity provides grant funding and support for AIAN community-based interventions to reduce mental health disparities in culturally responsive ways that acknowledge trauma and lift up culture as prevention. Interventions that have been funded to support mental health for the AIAN population in general include traditional Rite of Passage Ceremonies and Traditional Healers.

Oral Health

Fewer than half of mothers of AIAN infants received oral health care during pregnancy. Leading barriers to care included lack of insurance, cost, and not thinking it was important. Prenatal care providers can play an important role in promoting the importance and safety of oral health during pregnancy, which has been shown to increase oral health care utilization. In addition, Medi-Cal (half of the mothers of AIAN infants in California had Medi-Cal for prenatal care) covers selected pregnancy-related dental procedures, but many women are not aware of this benefit.

Though many Tribal and Urban Indian Health Programs have implemented dental care programs, access remains a challenge, particularly in rural areas. Efforts to enhance capacity to provide oral health education, deliver prevention interventions and treat dental disease can improve service utilization and oral health status for pregnant women. Two statewide examples include the IHS-funded Dental Support Center implemented by the California Rural Indian Health Board and the enhancement of Local Oral Health Programs funded through Proposition 56 and administered by the CDPH Oral Health Program.

Immunization

Similar to mothers overall, approximately half of mothers of AIAN infants receive the flu or Tdap vaccines during pregnancy. This leaves both women and their infants vulnerable to severe illness. Women are most likely to be immunized if vaccines are offered at their prenatal care provider's office.

Tobacco Use

Mothers of AIAN infants are more than two times as likely to use commercial tobacco before, during and after pregnancy than California mothers overall. Tobacco use during pregnancy increases the risks of infant outcomes that are more common among California AIAN infants, including preterm birth, infant mortality, and SIDS. In order to improve maternal and infant health, Tribes can exercise their sovereign

right to implement commercial smoke free policies, which reduce tobacco use and second hand smoke exposure in workplaces, housing, health facilities, schools, daycares and outdoor areas.[1]

With the launch of the AIAN Initiative to Reduce Tobacco-Related Disparities, the California Tobacco Control Program supports tribal sovereignty and efforts to reduce commercial tobacco use and smoke exposure by providing resources to assist with the adoption and implementation of smoke free policies. The California Smokers' Helpline (1-800-NO-BUTTS, or website: www.nobutts.org) supports smoking cessation through free counseling, text support, online chat and mobile apps, and nicotine patches tailored for pregnant women and individuals who live with children under age 5.

Alcohol Use

During the three months before pregnancy, approximately one in five mothers of AIAN infants binge drank and one in four drank heavily. Alcohol use patterns in the months prior to pregnancy may be similar to those during the earliest weeks of pregnancy, when many women do not yet realize they are pregnant and fetal development is particularly vulnerable to the effects of alcohol. Efforts to address binge drinking and heavy alcohol use among reproductive aged women could reduce risks for SIDS, as well as a number of birth defects and developmental delays.

While there is a lack of evidence about effective interventions to prevent and treat alcohol dependence among AIAN reproductive aged women and alcohol use among pregnant AIAN women,[2] research suggests that incorporation of traditional approaches and addressing historical loss, discrimination and childhood trauma are important factors in addressing alcohol dependence in AIAN populations.[3,4] A number of adaptations of prevention interventions hold promise for AIAN women.[2]

LOOKING FORWARD

Efforts to address the disparities described in this report should draw upon the many strengths found in AIAN communities, including traditional and cultural practices, Native language, strong social networks, and a connection to land and place. Cultural connectedness (e.g., involvement in traditional practices or identification with traditional culture) is a protective factor among AIAN populations that has been shown to promote healthy behaviors.[5,6]

The statewide findings included in the main body of this report are complemented by appendix tables that present information for AIAN residing in IHS Service Area counties and in counties served by California Urban Indian Health Organizations, as well as for AIAN by prenatal health insurance (Medi-Cal or private insurance). These appendix tables provide targeted estimates for these subgroups and can support AIAN stakeholders serving these populations. Together, the comprehensive, high quality data presented in this report can be used by tribes, Tribal Health Programs, Urban Indian Health Organizations, government agencies, and other partners to inform the development of policies, programs and services benefitting California AIAN infants and their mothers.

Source: Depositphotos.com

Appendices

DETAILED TABLES

OVERVIEW

Three sets of detailed tables are provided in this section. The first set of tables includes all maternal and infant health indicators presented by Medi-Cal and private health insurance among AIAN and the California overall population. The insurance type variable used to categorize Medi-Cal and private health insurance for all data sources was the expected principal source of payment for delivery from the BSMF. This BSMF variable was linked to each of the data sources. For one indicator, neonatal abstinence syndrome, the insurance type was the expected source of payment from the newborn's hospitalization record. Among mothers of AIAN infants, 48.6% had Medi-Cal and 44.1% had private insurance. Among mothers in California overall, 45.2% had Medi-Cal and 47.1% had private insurance.

The second and third sets of tables present the same indicators by AIAN and the overall population within two sub-state geographic areas. The second set of tables present indicators for a region composed of the 37 counties included in the IHS California Area (i.e., Contract Health Service Delivery Area, CHSDA counties) plus Alpine County (a California county that is part of the IHS Phoenix Area). Among mothers of AIAN infants, 48.5% resided within the IHS California Area plus Alpine County. Among mothers in California overall, 34.1% resided in the IHS California Area plus Alpine County. The third set of tables present indicators for a region composed of 16 counties served by IHS-funded Urban Indian Health Organizations (UIHO) in California. Among mothers of AIAN infants, 52.4% resided within California UIHO Counties. Among mothers in California overall, 65.7% resided within California UIHO Counties. These geographic areas were selected in consultation with stakeholders.

The table on the next page presents the counties included in each of the sub-state geographic areas. Readers should exercise caution not to compare the results from the two geographic areas, as there is some overlap in the counties included within the two regions.

Counties included in sub-state geographic areas

Counties included in the IHS California Area, plus Alpine	Counties served by California Urban Indian Health Organizations
Alpine	Alameda
Amador	Contra Costa
Butte	Fresno
Calaveras	Kern
Colusa	Los Angeles
Del Norte	Madera
El Dorado	Marin
Fresno	Sacramento
Glenn	San Diego
Humboldt	San Francisco
Imperial	San Luis Obispo
Inyo	San Mateo
Kings	Santa Barbara
Lake	Santa Clara
Lassen	Tulare
Madera	Ventura
Mariposa	
Mendocino	
Modoc	
Mono	
Nevada	
Placer	
Plumas	
Riverside	
San Bernardino	
San Diego	
Santa Barbara	
Shasta	
Sierra	
Siskiyou	
Sonoma	
Sutter	
Tehama	
Trinity	
Tulare	
Tuolumne	
Yolo	
Yuba	

Maternal and infant health indicators for American Indian/Alaska Natives and California overall, by prenatal health insurance type

	American Indian/Alaska Native						California overall					
	Medi-Cal			Private			Medi-Cal			Private		
	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate
Total	**48.6%**	48.1 - 49.1	6,108	**44.1%**	43.6 - 44.6	5,543	**45.2%**	45.1 - 45.3	225,734	**47.1%**	47.0 - 47.2	235,263
Maternal characteristics												
Age†												
Younger than 20	**13.6%**	13.1 - 14.1	830	**5.2%**	4.8 - 5.5	286	**10.5%**	10.4 - 10.6	23,665	**2.3%**	2.3 - 2.3	5,388
20-24	**33.1%**	32.4 - 33.8	2,023	**18.0%**	17.5 - 18.6	999	**28.7%**	28.6 - 28.8	64,825	**10.5%**	10.4 - 10.5	24,591
25-29	**27.8%**	27.2 - 28.5	1,701	**26.0%**	25.4 - 26.7	1,442	**28.0%**	27.9 - 28.1	63,119	**24.7%**	24.6 - 24.8	58,190
30-34	**16.9%**	16.4 - 17.5	1,033	**30.1%**	29.4 - 30.8	1,667	**19.8%**	19.7 - 19.9	44,792	**36.1%**	35.9 - 36.2	84,823
35 or older	**8.5%**	8.1 - 8.9	520	**20.7%**	20.1 - 21.3	1,148	**13.0%**	12.9 - 13.1	29,327	**26.5%**	26.4 - 26.6	62,266
Total live births†												
0 prior live births	**38.4%**	37.7 - 39.1	2,345	**45.6%**	44.9 - 46.4	2,528	**33.5%**	33.4 - 33.6	75,533	**44.1%**	44.0 - 44.2	103,766
1-2 prior live births	**43.0%**	42.2 - 43.7	2,622	**45.4%**	44.6 - 46.2	2,515	**48.8%**	48.7 - 48.9	110,161	**48.9%**	48.8 - 49.0	114,951
3 or more prior live births	**18.6%**	18.1 - 19.2	1,136	**9.0%**	8.5 - 9.4	496	**17.7%**	17.6 - 17.8	39,922	**7.0%**	6.9 - 7.0	16,410
Education†												
No high school or GED	**24.6%**	24.0 - 25.3	1,473	**5.0%**	4.7 - 5.3	272	**35.3%**	35.2 - 35.4	76,755	**3.9%**	3.8 - 3.9	8,704
High school diploma or GED	**37.6%**	36.9 - 38.3	2,252	**22.8%**	22.2 - 23.5	1,245	**35.1%**	35.0 - 35.2	76,328	**16.5%**	16.4 - 16.6	37,100
Some college	**33.8%**	33.1 - 34.5	2,023	**40.2%**	39.4 - 40.9	2,190	**24.1%**	24.0 - 24.2	52,499	**28.8%**	28.7 - 28.9	64,752
Bachelor's degree or higher	**3.9%**	3.6 - 4.2	234	**32.0%**	31.3 - 32.7	1,743	**5.5%**	5.5 - 5.6	12,022	**50.8%**	50.7 - 50.9	114,203
Marital status‡												
Married or living as married	**73.4%**	69.2 - 77.7	5,000	**90.4%** *	83.6 - 97.1	4,900	**74.0%**	72.4 - 75.7	179,200	**93.7%**	92.6 - 94.7	201,900
Single, separated, divorced or widowed	**26.6%**	22.3 - 30.8	1,800	**9.6%** *	2.9 - 16.4	500	**26.0%**	24.3 - 27.6	62,900	**6.3%**	5.3 - 7.4	13,700
Income as a percent of poverty‡												
0-100%	**74.5%**	68.2 - 80.8	4,800	**11.0%**	5.2 - 16.8	600	**74.7%**	73.1 - 76.3	168,300	**7.7%**	6.6 - 8.9	15,900
101-200%	**22.1%**	15.7 - 28.4	1,400	**19.1%**	11.8 - 26.3	1,000	**22.0%**	20.4 - 23.6	49,600	**15.7%**	14.2 - 17.3	32,400
>200%	**3.4%**	1.5 - 5.3	200	**69.9%**	61.1 - 78.8	3,600	**3.3%**	2.8 - 3.9	7,500	**76.5%**	74.7 - 78.3	157,600
Income as a percent of poverty, ACA cut off‡												
0-138.0%	**90.9%**	87.9 - 93.8	5,800	**19.7%**	11.6 - 27.7	1,000	**88.5%**	87.3 - 89.6	199,500	**14.5%**	13.0 - 16.1	30,000
138.1-400%	**8.8%**	5.9 - 11.7	600	**36.1%**	27.2 - 45.0	1,900	**11.0%**	9.9 - 12.1	24,800	**38.1%**	36.1 - 40.2	78,500
Neighborhood poverty†												
Lives in a high poverty neighborhood	**50.4%**	49.6 - 51.1	2,844	**23.5%**	22.9 - 24.2	1,251	**55.7%**	55.6 - 55.8	118,647	**19.4%**	19.3 - 19.5	44,174
Language usually spoken at home‡												
English	**89.5%**	84.2 - 94.9	6,100	**93.8%** *	89.1 - 98.5	5,000	**42.8%**	41.1 - 44.6	103,000	**72.2%**	70.2 - 74.2	153,200
Another language	**10.5%**	5.1 - 15.8	700	**6.2%** *	1.5 - 10.9	300	**57.2%**	55.4 - 58.9	137,300	**27.8%**	25.8 - 29.8	59,100

Maternal and infant health indicators for American Indian/Alaska Natives and California overall, by prenatal health insurance type

	American Indian/Alaska Native						California overall					
	Medi-Cal			Private			Medi-Cal			Private		
	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate
Total	**48.6%**	48.1 - 49.1	6,108	**44.1%**	43.6 - 44.6	5,543	**45.2%**	45.1 - 45.3	225,734	**47.1%**	47.0 - 47.2	235,263
Birth outcomes and delivery[†]												
Gestational age among singletons												
Preterm (<37 weeks)	**8.2%**	7.8 - 8.6	488	**7.1%**	6.7 - 7.5	375	**7.4%**	7.4 - 7.5	16,337	**6.3%**	6.3 - 6.4	14,277
Very preterm (<32 weeks)	**1.3%**	1.1 - 1.5	76	**1.1%**	0.9 - 1.2	57	**1.2%**	1.1 - 1.2	2,565	**0.9%**	0.9 - 0.9	2,016
Moderately and late preterm (33-36 weeks)	**6.9%**	6.6 - 7.3	412	**6.0%**	5.6 - 6.4	318	**6.3%**	6.2 - 6.3	13,771	**5.4%**	5.4 - 5.5	12,261
Early term (37-38 weeks)	**23.4%**	22.8 - 24.0	1,387	**22.7%**	22.0 - 23.3	1,206	**25.3%**	25.2 - 25.4	55,714	**23.0%**	22.9 - 23.1	51,772
Term (39 weeks or more)	**68.4%**	67.7 - 69.1	4,057	**70.3%**	69.5 - 71.0	3,736	**67.3%**	67.2 - 67.4	148,120	**70.7%**	70.6 - 70.8	159,213
Birth weight among singletons												
Low birth weight (<2,500g)	**6.2%**	5.8 - 6.6	368	**5.1%**	4.7 - 5.4	270	**5.7%**	5.7 - 5.8	12,609	**4.7%**	4.7 - 4.8	10,706
Very low birth weight (<1,500g)	**1.2%**	1.0 - 1.3	68	**1.0%**	0.9 - 1.2	53	**1.0%**	1.0 - 1.0	2,200	**0.8%**	0.8 - 0.8	1,739
Moderately LBW (1,500-2,499g)	**5.0%**	4.7 - 5.4	300	**4.1%**	3.8 - 4.4	216	**4.7%**	4.7 - 4.8	10,408	**4.0%**	3.9 - 4.0	8,967
Normal birth weight (2,500g-3,999g)	**84.8%**	84.2 - 85.3	5,045	**84.4%**	83.8 - 84.9	4,493	**86.5%**	86.4 - 86.6	190,764	**86.2%**	86.1 - 86.2	194,289
High birth weight (≥4,000g)	**9.0%**	8.6 - 9.5	538	**10.5%**	10.1 - 11.0	561	**7.8%**	7.8 - 7.9	17,244	**9.1%**	9.0 - 9.2	20,516
Delivery												
% very low birth weight infants born in a hospital with the appropriate level of care	**72.7%**	66.7 - 78.0	57	**73.0%**	66.6 - 78.5	51	**81.5%**	80.6 - 82.3	2,212	**78.8%**	77.9 - 79.7	2,022
Cesarean section, among all women	**33.6%**	32.9 - 34.3	2,049	**33.4%**	32.7 - 34.1	1,847	**33.0%**	32.9 - 33.1	74,427	**33.4%**	33.3 - 33.5	78,536
Cesarean section, among low risk women with a first birth	**25.8%**	24.7 - 26.9	508	**27.7%**	26.6 - 28.8	583	**25.5%**	25.3 - 25.7	16,150	**27.1%**	27.0 - 27.3	23,465
Infant mortality[§]												
Infant mortality (deaths per 1,000 live births)												
Infant mortality	**7.4**	6.5 - 8.5	42	**4.7**	4.0 - 5.6	24	**5.5**	5.4 - 5.6	1,339	**3.9**	3.8 - 4.0	938
Neonatal mortality	**3.9**	3.2 - 4.7	22	**3.3**	2.7 - 4.1	17	**3.7**	3.6 - 3.8	897	**2.9**	2.8 - 3.0	688
Postneonatal mortality	**3.5**	2.9 - 4.3	20	**1.4**	1.0 - 1.9	<10	**1.8**	1.7 - 1.9	441	**1.0**	1.0 - 1.1	249
Leading causes of infant death (deaths per 100,000 live births)												
Congenital malformations, deformations and chromosomal abnormalities	**134.9**	98.7 - 184.3	<10	**107.5**	74.4 - 155.3	<10	**151.5**	144.7 - 158.6	369	**97.4**	92.0 - 103.2	233
Sudden infant death syndrome	**131.4**	95.8 - 180.3	<10	**53.7**	32.0 - 90.2	<10	**46.9**	43.2 - 50.9	114	**18.5**	16.3 - 21.2	44
Disorders related to short gestation and low birth weight, not elsewhere classified	**55.3**	34.1 - 89.9	<10	**53.7**	32.0 - 90.2	<10	**74.5**	69.8 - 79.5	181	**61.2**	56.9 - 65.8	146
Accidents (unintentional injuries)	**51.9**	31.4 - 85.6	<10	--			**13.0**	11.1 - 15.1	31	**6.1**	4.9 - 7.7	14
Newborn affected by complications of placenta, cord and membranes	--			--			**21.8**	19.3 - 24.6	53	**19.9**	17.5 - 22.6	47
Special cause of infant death (deaths per 100,000 live births)												
Sudden unexplained infant death	**228.3**	179.5 - 290.3	13	**84.4**	55.8 - 127.8	<10	**68.0**	63.5 - 72.7	165	**28.7**	25.8 - 31.9	68
Infant sleep environment[‡]												
Was told in the hospital to place infant on back to sleep	**94.1%**	91.1 - 97.1	5,600	--			**87.3%**	84.9 - 89.8	201,900	**94.0%**	92.0 - 96.0	192,800
Usually placed infant back to sleep[‖]	**72.1%**	65.6 - 78.5	4,700	**84.7%**	78.2 - 91.1	4,600	**74.2%**	72.5 - 76.0	176,600	**83.9%**	82.3 - 85.5	178,400
Infant always or often shared bed[¶]	**39.2%**	31.7 - 46.7	2,700	**40.1%**	27.7 - 52.4	2,100	**38.4%**	36.1 - 40.7	91,000	**28.8%**	26.3 - 31.2	61,600

Maternal and infant health indicators for American Indian/Alaska Natives and California overall, by prenatal health insurance type

	American Indian/Alaska Native						California overall					
	Medi-Cal			Private			Medi-Cal			Private		
	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate
Total	**48.6%**	48.1 - 49.1	6,108	**44.1%**	43.6 - 44.6	5,543	**45.2%**	45.1 - 45.3	225,734	**47.1%**	47.0 - 47.2	235,263
Maternal nutrition and weight												
Daily folic acid use, month before pregnancy‡	**19.9%**	15.8 - 24.0	1,400	**44.0%**	33.3 - 54.8	2,400	**22.4%**	20.8 - 23.9	54,500	**45.3%**	43.2 - 47.4	97,800
Prepregnancy weight†												
Underweight	**4.2%**	3.9 - 4.5	242	**3.3%**	3.0 - 3.6	171	**3.6%**	3.6 - 3.7	7,748	**4.0%**	3.9 - 4.0	8,720
Healthy weight	**39.8%**	39.1 - 40.6	2,285	**45.1%**	44.3 - 45.9	2,362	**40.8%**	40.6 - 40.9	86,799	**54.1%**	54.0 - 54.2	119,370
Overweight	**25.2%**	24.5 - 25.8	1,445	**25.2%**	24.5 - 25.9	1,318	**28.6%**	28.5 - 28.7	60,940	**23.8%**	23.7 - 23.9	52,590
Obese	**30.8%**	30.1 - 31.5	1,767	**26.4%**	25.8 - 27.1	1,384	**27.0%**	26.9 - 27.1	57,463	**18.1%**	18.0 - 18.2	40,041
Gestational weight gain†												
Inadequate	**18.4%**	17.8 - 19.1	942	**16.8%**	16.2 - 17.5	795	**23.8%**	23.7 - 23.9	45,827	**19.1%**	19.0 - 19.2	38,378
Appropriate	**28.0%**	27.3 - 28.7	1,430	**31.1%**	30.3 - 31.8	1,466	**32.6%**	32.5 - 32.7	62,750	**36.2%**	36.1 - 36.4	72,668
Excessive	**53.6%**	52.8 - 54.4	2,738	**52.1%**	51.3 - 52.9	2,461	**43.6%**	43.4 - 43.7	83,856	**44.6%**	44.5 - 44.8	89,520
Food security‡												
Low food security	**22.1%**	15.8 - 28.5	1,500	**6.9%** *	1.6 - 12.2	400	**19.2%**	17.7 - 20.8	46,300	**3.7%**	3.1 - 4.4	8,100
Very low food security	**13.8%**	10.7 - 16.8	900	**4.0%**	1.7 - 6.3	200	**9.0%**	7.9 - 10.1	21,700	**1.2%**	0.8 - 1.6	2,700
Participated in food and nutrtion assistance programs during pregnancy‡												
On WIC at any time in this pregnancy, among eligible women	**87.6%**	84.0 - 91.1	5,900	**57.8%**	42.6 - 73.0	1,000	**88.5%**	87.5 - 89.5	212,600	**64.5%**	60.7 - 68.3	35,700
Received CalFresh (food stamps), among all women	**60.2%**	53.8 - 66.5	4,000	**9.6%** *	2.8 - 16.4	500	**46.8%**	45.0 - 48.7	113,000	**2.5%**	1.8 - 3.1	5,300
Maternal health conditions												
Maternal health status before pregnancy‡												
In good to excellent health before pregnancy	**88.2%**	85.3 - 91.1	6,000	**96.6%** *	93.9 - 99.2	5,300	**87.8%**	86.6 - 89.1	214,200	**97.4%**	96.7 - 98.0	210,200
Maternal health conditions at delivery**												
Pre-existing diabetes	**6.6%**	6.3 - 7.0	382	**8.5%**	8.1 - 8.9	429	**7.7%**	7.6 - 7.7	17,808	**9.0%**	8.9 - 9.1	20,277
Gestational diabetes	**1.3%**	1.2 - 1.5	77	**1.2%**	1.0 - 1.4	59	**1.1%**	1.1 - 1.1	2,507	**0.8%**	0.8 - 0.8	1,849
Hypertension (chronic or gestational)	**9.4%**	9.0 - 9.9	542	**8.9%**	8.4 - 9.3	447	**7.3%**	7.3 - 7.4	17,026	**7.6%**	7.5 - 7.7	17,116
Asthma	**5.9%**	5.6 - 6.3	339	**6.5%**	6.1 - 6.9	327	**2.4%**	2.4 - 2.4	5,613	**3.7%**	3.7 - 3.8	8,355
Childhood experiences of support and hardships experienced by the mother‡												
Had adult support during childhood	**84.0%**	80.7 - 87.2	5,700	**94.8%**	92.8 - 96.9	5,200	**85.3%**	84.0 - 86.6	205,900	**93.3%**	92.2 - 94.4	200,400
Hardships experienced during childhood												
Parents divorced or separated	**51.7%**	45.8 - 57.6	3,500	**37.6%**	28.7 - 46.5	2,000	**32.3%**	30.5 - 34.1	78,000	**24.4%**	22.7 - 26.2	52,600
Parent had serious drug or alcohol problem	**33.0%**	27.9 - 38.1	2,200	**23.3%**	16.5 - 30.2	1,300	**17.3%**	16.0 - 18.7	41,800	**12.0%**	10.7 - 13.2	25,700
Family had problems paying for basic needs	**36.8%**	30.9 - 42.7	2,500	**16.0%**	11.1 - 20.9	900	**29.8%**	28.0 - 31.6	72,100	**12.2%**	10.9 - 13.5	26,200
Family moved due to problems paying for rent or mortgage	**34.8%**	28.7 - 40.8	2,300	**13.5%**	9.3 - 17.7	700	**17.7%**	16.2 - 19.1	42,400	**10.0%**	8.9 - 11.1	21,500
Parent had trouble with the law or went to jail	**27.0%**	22.6 - 31.3	1,800	**17.9%**	11.1 - 24.7	1,000	**12.3%**	11.1 - 13.5	29,500	**6.6%**	5.6 - 7.6	14,200
Family experienced hunger	**19.9%**	15.7 - 24.1	1,300	**9.1%**	5.4 - 12.7	500	**14.4%**	13.1 - 15.8	34,900	**3.9%**	3.2 - 4.5	8,300
Was placed in foster care	**14.4%**	11.3 - 17.5	1,000	**3.5%** *	0.7 - 6.3	200	**4.5%**	3.8 - 5.2	10,900	**1.1%**	0.7 - 1.6	2,400

Maternal and infant health indicators for American Indian/Alaska Natives and California overall, by prenatal health insurance type

	American Indian/Alaska Native						California overall					
	Medi-Cal			Private			Medi-Cal			Private		
	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate
Total	**48.6%**	48.1 - 49.1	6,108	**44.1%**	43.6 - 44.6	5,543	**45.2%**	45.1 - 45.3	225,734	**47.1%**	47.0 - 47.2	235,263
Total number of hardships experienced by the mother during her childhood‡												
0	**23.4%**	18.8 - 28.0	1,600	**52.0%**	41.9 - 62.0	2,700	**42.7%**	40.8 - 44.6	101,200	**62.8%**	60.8 - 64.8	134,200
1	**23.3%**	17.8 - 28.8	1,600	**20.0%**	13.9 - 26.1	1,000	**25.0%**	23.3 - 26.7	59,200	**20.7%**	19.0 - 22.4	44,200
2 or 3	**30.6%**	24.5 - 36.7	2,000	**15.1%**	9.9 - 20.4	800	**22.4%**	20.8 - 24.0	53,100	**12.1%**	10.8 - 13.4	25,900
4 or more	**22.7%**	18.6 - 26.8	1,500	**12.9%**	8.4 - 17.4	700	**9.8%**	8.8 - 10.9	23,200	**4.4%**	3.6 - 5.1	9,300
Worried about racism‡												
Somewhat or very often worried about racism throughout lifetime	**21.2%**	16.6 - 25.7	1,400	**14.6%**	8.3 - 20.8	800	**16.6%**	15.2 - 17.9	39,800	**11.8%**	10.5 - 13.2	25,100
Support and hardships experienced during pregnancy‡												
Had practical or emotional support during pregnancy	**96.7%**	95.4 - 98.0	6,600	**98.3%** *	96.9 - 99.6	5,300	**92.9%**	91.9 - 93.9	226,300	**97.9%**	97.3 - 98.5	211,600
Hardships experienced during pregnancy												
Woman or partner lost job	**25.7%**	20.3 - 31.0	1,700	**10.9%**	4.8 - 17.0	600	**22.4%**	20.8 - 24.0	53,800	**8.2%**	7.1 - 9.3	17,700
Woman or partner had pay or hours cut back	**20.0%**	14.6 - 25.5	1,400	**12.2%**	7.7 - 16.7	700	**16.4%**	15.0 - 17.8	39,300	**8.7%**	7.5 - 9.8	18,600
Moved due to problems paying rent or mortgage	**16.0%**	12.5 - 19.6	1,100	**4.5%**	2.5 - 6.4	200	**10.6%**	9.5 - 11.8	25,600	**3.0%**	2.3 - 3.7	6,500
Someone close had a bad drug/drinking problem	**16.2%**	12.5 - 19.8	1,100	**4.3%**	2.6 - 5.9	200	**7.9%**	6.9 - 8.8	18,900	**3.8%**	3.0 - 4.6	8,100
Became separated or divorced	**16.4%**	11.3 - 21.4	1,100	**2.7%**	1.4 - 4.0	100	**12.0%**	10.8 - 13.3	29,000	**2.8%**	2.1 - 3.4	5,900
Homeless or did not have a regular place to sleep	**15.2%**	11.1 - 19.3	1,000	--			**5.2%**	4.5 - 6.0	12,500	**0.8%**	0.4 - 1.1	1,700
Woman or partner went to jail	**10.1%**	6.5 - 13.6	700	**1.0%** *	0.3 - 1.8	100	**3.8%**	3.2 - 4.5	9,200	**1.0%**	0.6 - 1.4	2,100
Intimate partner violence during pregnancy‡												
Physical or psychological IPV during pregnancy	**18.4%**	13.5 - 23.3	1,300	--			**11.4%**	10.2 - 12.6	27,600	**3.2%**	2.5 - 4.0	6,900
Maternal mental health												
Prenatal depressive symptoms‡	**22.6%**	17.5 - 27.7	1,500	**8.9%**	5.0 - 12.9	500	**20.0%**	18.4 - 21.5	48,600	**8.1%**	7.0 - 9.2	17,500
Postpartum depressive symptoms‡	**23.2%**	17.1 - 29.2	1,600	**14.5%**	7.0 - 22.0	800	**17.5%**	16.0 - 18.9	42,500	**10.1%**	8.9 - 11.3	21,800
Mental disorder at delivery**	**10.4%**	10.0 - 10.9	600	**6.2%**	5.8 - 6.5	311	**3.5%**	3.4 - 3.5	8,045	**3.5%**	3.4 - 3.5	7,795
Substance use												
Maternal tobacco use before, during and after pregnancy‡												
Any smoking, 3 months before pregnancy	**33.5%**	28.1 - 39.0	2,300	**14.1%**	7.2 - 21.1	800	**14.9%**	13.5 - 16.2	36,000	**7.4%**	6.4 - 8.5	16,000
Any smoking, 3rd trimester	**11.2%**	7.9 - 14.6	800	**2.1%** *	0.6 - 3.5	100	**4.1%**	3.4 - 4.8	10,000	**0.8%**	0.5 - 1.0	1,600
Any smoking, postpartum	**22.8%**	18.3 - 27.4	1,500	**4.3%**	2.3 - 6.3	200	**8.2%**	7.2 - 9.1	19,800	**2.3%**	1.8 - 2.9	5,100
Quit smoking during pregnancy	**68.3%**	59.6 - 77.0	1,500	**85.3%** *	73.8 - 96.7	600	**73.6%**	69.5 - 77.7	26,100	**89.8%**	86.7 - 92.9	14,400
Postpartum relapse among women who smoked before and quit during pregnancy	**50.8%**	39.2 - 62.4	800	**17.3%** *	3.9 - 30.7	100	**40.9%**	35.3 - 46.6	10,600	**22.3%**	16.1 - 28.5	3,200
Maternal alcohol use before and during pregnancy‡												
Any binge drinking, 3 months before pregnancy	**23.3%**	17.5 - 29.0	1,500	**17.1%**	12.1 - 22.1	900	**13.0%**	11.7 - 14.2	31,200	**15.5%**	14.1 - 16.9	33,200
Heavy drinking, 3 months before pregnancy	**28.7%**	23.0 - 34.5	1,900	**19.8%**	14.3 - 25.2	1,100	**16.3%**	14.9 - 17.7	39,200	**17.3%**	15.8 - 18.8	37,100
Any alcohol use, 3rd trimester	**4.0%**	2.6 - 5.4	300	**11.0%**	5.5 - 16.4	600	**3.6%**	2.8 - 4.4	8,700	**10.9%**	9.6 - 12.2	23,400
Any binge drinking during pregnancy	**10.3%**	6.5 - 14.1	700	**5.4%**	3.2 - 7.6	300	**6.9%**	5.9 - 7.9	16,700	**5.1%**	4.3 - 6.0	11,100
Infant substance exposure (per 1,000 newborns)												
Neonatal abstinence syndrome**	**5.9**	4.9 - 7.1	34	**1.3**	0.8 - 2.0	<10	**2.1**	2.0 - 2.2	494	**0.6**	0.5 - 0.6	129

Maternal and infant health indicators for American Indian/Alaska Natives and California overall, by prenatal health insurance type

	American Indian/Alaska Native						California overall					
	Medi-Cal			Private			Medi-Cal			Private		
	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate
Total	**48.6%**	48.1 - 49.1	6,108	**44.1%**	43.6 - 44.6	5,543	**45.2%**	45.1 - 45.3	225,734	**47.1%**	47.0 - 47.2	235,263
Pregnancy intention and family planning												
Pregnancy intention‡												
Intended pregnancy	**35.3%**	29.8 - 40.7	2,400	**63.1%**	52.7 - 73.5	3,400	**42.9**	41.1 - 44.8	104,100	**70.7**	68.8 - 72.6	152,000
Mistimed or unwanted pregnancy	**36.9%**	31.5 - 42.2	2,500	**24.0%**	14.0 - 33.9	1,300	**40.7**	38.8 - 42.6	98,700	**20.0**	18.4 - 21.7	43,000
Unsure of pregnancy intentions	**27.9%**	21.6 - 34.2	1,900	**13.0%**	6.5 - 19.4	700	**16.4**	15.0 - 17.8	39,700	**9.3**	8.0 - 10.5	19,900
Interpregnancy interval†												
Optimal interpregnancy interval of at least 18 months	**67.2%**	66.3 - 68.1	2,380	**71.8%**	70.8 - 72.7	2,036	**74.0**	73.8 - 74.1	107,001	**72.9**	72.7 - 73.0	90,701
Postpartum contraception use‡												
Highly effective method	**23.9%**	19.0 - 28.8	1,600	**17.4%**	11.5 - 23.3	900	**26.3**	24.7 - 28.0	62,600	**21.6**	19.9 - 23.3	45,700
Moderately effective method	**27.6%**	22.2 - 33.0	1,800	**31.6%**	21.5 - 41.7	1,700	**26.9**	25.3 - 28.6	64,000	**23.3**	21.6 - 25.1	49,500
Less effective method	**22.0%**	17.5 - 26.4	1,500	**29.0%**	19.9 - 38.0	1,600	**30.0**	28.2 - 31.9	71,400	**35.5**	33.4 - 37.5	75,200
Did not use contraception	**26.5%**	20.5 - 32.5	1,800	**22.0%**	12.3 - 31.7	1,200	**16.7**	15.3 - 18.1	39,700	**19.6**	17.9 - 21.4	41,500
Breastfeeding practices‡												
Before birth, intended to breastfeed with or without formula	**90.5%**	87.9 - 93.2	5,900	**95.8%** *	92.9 - 98.6	5,200	**90.4**	89.3 - 91.4	10,042	**95.0**	94.0 - 96.0	202,200
Initiated breastfeeding	**91.2%**	88.6 - 93.7	6,000	**97.9%**	96.8 - 99.0	5,300	**91.9**	90.9 - 93.0	219,300	**96.9**	96.2 - 97.6	206,800
Any breastfeeding, 2 months after delivery	**65.2%**	59.3 - 71.0	4,200	**83.7%**	78.6 - 88.9	4,400	**67.8**	66.0 - 69.6	159,300	**82.5**	80.9 - 84.1	173,700
Exclusive breastfeeding, 2 months after delivery	**36.3%**	30.8 - 41.7	2,300	**50.8%**	40.4 - 61.2	2,700	**29.1**	27.4 - 30.8	67,000	**41.3**	39.2 - 43.3	86,200
Experienced all 7 recommended practices supportive of breastfeeding while in hospital¶	**17.3%**	10.7 - 23.8	900	**25.1%**	12.2 - 37.9	1,000	**10.2**	7.9 - 12.5	19,700	**23.0**	19.6 - 26.5	41,000
Health insurance coverage‡												
Prepregnancy insurance												
Medi-Cal	**54.8%**	48.8 - 60.9	3,700	--			**48.1%**	46.2 - 50.0	116,900	**0.6%** *	0.2 - 1.0	1,400
Private	**10.1%**	6.8 - 13.3	700	**95.0%** *	91.9 - 98.0	5,200	**7.3%**	6.4 - 8.2	17,800	**97.2%**	96.6 - 97.9	209,900
Uninsured	**33.4%**	27.2 - 39.6	2,300	**2.5%** *	0.9 - 4.0	100	**42.5%**	40.6 - 44.4	103,200	**1.8%**	1.3 - 2.4	4,000
Other	**1.7%**	0.8 - 2.6	100	**0.9%** *	0.1 - 1.8	100	**2.1%**	1.6 - 2.6	5,000	**0.3%**	0.1 - 0.5	700
Maternal postpartum insurance												
Medi-Cal	**83.6%**	78.3 - 89.0	5,600	**5.6%** *	0.4 - 10.8	300	**68.7%**	67.0 - 70.5	165,300	**2.2%**	1.6 - 2.8	4,800
Private	**3.5%**	1.6 - 5.4	200	**91.7%** *	86.3 - 97.0	5,000	**4.6%**	3.9 - 5.2	11,000	**95.5%**	94.6 - 96.3	206,300
Uninsured	**12.2%**	7.0 - 17.5	800	**2.7%**	1.2 - 4.3	100	**25.8%**	24.2 - 27.5	62,100	**2.0%**	1.4 - 2.7	4,400
Other	**0.6%** *	0.1 - 1.1	<100	--			**0.9%**	0.6 - 1.2	2,100	**0.3%** *	0.1 - 0.4	600
Infant health insurance												
Medi-Cal	**94.2%**	91.9 - 96.5	6,100	**13.6%**	6.7 - 20.5	700	**92.1%**	91.0 - 93.1	218,500	**8.6%**	7.5 - 9.7	18,300
Private	**2.0%** *	0.3 - 3.6	100	**81.8%**	74.5 - 89.0	4,400	**2.8%**	2.2 - 3.3	6,600	**88.1%**	86.8 - 89.4	187,600
Uninsured	**2.0%** *	0.7 - 3.4	100	**3.1%** *	0.7 - 5.4	200	**2.8%**	2.1 - 3.5	6,600	**1.8%**	1.3 - 2.4	3,800
Other	**1.8%**	0.7 - 2.8	100	**1.5%**	0.6 - 2.4	100	**2.4%**	1.9 - 2.9	5,700	**1.5%**	1.0 - 1.9	3,200

Maternal and infant health indicators for American Indian/Alaska Natives and California overall, by prenatal health insurance type

	American Indian/Alaska Native						California overall					
	Medi-Cal			Private			Medi-Cal			Private		
	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate
Total	**48.6%**	48.1 - 49.1	6,108	**44.1%**	43.6 - 44.6	5,543	**45.2%**	45.1 - 45.3	225,734	**47.1%**	47.0 - 47.2	235,263
Health care utilization												
Prepregnancy health care‡												
Had a usual source of prepregnancy health care	**64.8%**	59.4 - 70.2	4,400	**87.9%**	83.3 - 92.5	4,800	**59.1%**	57.3 - 61.0	144,200	**85.2%**	83.7 - 86.7	183,900
Prenatal care quantity†												
Initiated prenatal care in 1st trimester	**69.0%**	68.3 - 69.7	4,135	**87.0%**	86.5 - 87.5	4,762	**77.3%**	77.2 - 77.4	170,982	**90.4%**	90.3 - 90.4	209,501
Received at least adequate prenatal care (Kotelchuck Index)	**69.1%**	68.5 - 69.8	4,084	**82.7%**	82.1 - 83.2	4,480	**76.0%**	75.8 - 76.1	165,961	**85.6%**	85.6 - 85.7	196,115
Content of prenatal care‡‖												
Provider asked if she smoked	**97.4%** *	95.2 - 99.7	6,900	**98.1%** *	96.6 - 99.7	5,000	**97.2%**	96.5 - 97.8	235,100	**95.3%**	94.1 - 96.5	205,700
Provider asked if she drank alcohol	**96.7%** *	94.4 - 99.0	6,900	**95.7%** *	92.3 - 99.1	4,900	**96.9%**	96.3 - 97.6	234,500	**94.2%**	92.8 - 95.5	203,200
Provider asked if she experienced IPV	**88.0%**	83.9 - 92.1	6,200	**73.9%**	62.9 - 84.9	3,800	**85.2%**	83.6 - 86.8	205,600	**65.2%**	62.6 - 67.8	140,000
Provider asked if she felt sad, empty, or depressed	**91.1%**	87.9 - 94.3	6,400	**87.9%**	83.3 - 92.6	4,500	**88.3%**	86.7 - 89.9	212,000	**75.6%**	73.2 - 77.9	162,600
Provider talked about appropriate weight gain	**80.6%**	74.8 - 86.4	5,500	**78.0%**	67.2 - 88.8	4,000	**80.8%**	78.9 - 82.7	194,300	**77.2%**	75.0 - 79.4	166,300
Had a birth defects screening	**69.1%**	62.7 - 75.5	4,900	**77.1%**	69.6 - 84.7	4,000	**64.3%**	62.1 - 66.6	155,100	**75.9%**	73.8 - 78.1	164,500
Dental care during pregnancy‡#												
Had a dental visit during pregnancy	**32.3%**	24.9 - 39.6	2,000	**59.6%**	42.6 - 76.7	3,600	**30.7%**	27.8 - 33.5	75,400	**55.8%**	52.5 - 59.2	119,600
Leading reasons for no dental care during pregnancy‡#												
Inadequate dental insurance	**56.8%**	45.5 - 68.1	2,300	**16.4%** *	5.9 - 26.8	400	**51.1%**	47.5 - 54.8	84,900	**14.0%**	10.3 - 17.6	12,900
Did not think she needed dental care	**42.5%**	31.0 - 54.0	1,700	**37.9%**	19.4 - 56.4	900	**36.1%**	32.6 - 39.6	59,900	**54.2%**	48.9 - 59.6	50,200
Cost too much	**51.0%**	39.5 - 62.5	2,100	**18.8%** *	7.2 - 30.3	500	**51.4%**	47.7 - 55.0	85,300	**18.3%**	14.6 - 22.0	16,900
Difficulties getting dental care	**27.5%**	19.5 - 35.5	1,100	**45.6%**	22.8 - 68.3	1,100	**28.3%**	25.0 - 31.6	47,100	**32.3%**	27.3 - 37.2	29,800
Did not think dental care was safe	**23.7%**	15.6 - 31.8	1,000	**40.6%**	16.8 - 64.4	1,000	**29.0%**	25.5 - 32.4	48,100	**33.3%**	28.1 - 38.6	30,800
Was nervous, afraid or embarrassed of her teeth	**13.4%**	7.7 - 19.2	500	**37.3%** *	12.0 - 62.7	900	**15.0%**	12.2 - 17.8	24,900	**18.3%**	14.5 - 22.1	16,900
Immunizations during or after pregnancy‡††												
Received flu shot during pregnancy	**50.6%**	42.0 - 59.3	3,300	**64.4%**	52.9 - 75.8	2,400	**50.5%**	47.3 - 53.7	117,900	**65.4%**	62.1 - 68.7	132,200
Received Tdap during pregnancy	**39.2%**	27.6 - 50.8	3,000	**55.5%**	41.7 - 69.4	2,100	**35.9%**	33.0 - 38.7	84,700	**65.2%**	61.9 - 68.5	132,300
Received Tdap in hospital at delivery	**30.8%**	15.1 - 46.5	2,300	**10.5%**	4.9 - 16.1	400	**21.2%**	18.5 - 23.8	50,000	**13.7%**	11.1 - 16.2	27,700
Postpartum care‡												
Had a postpartum medical visit	**76.0%**	70.4 - 81.7	5,200	**93.1%**	89.6 - 96.6	5,100	**81.6%**	80.2 - 83.1	198,400	**95.1%**	94.1 - 96.1	205,000
Mom or infant needed but couldn't afford care postpartum	**19.4%**	13.6 - 25.2	1,300	**9.6%** *	3.8 - 15.5	500	**19.7%**	18.1 - 21.3	46,600	**5.7%**	4.8 - 6.6	11,900

-- Data not shown: In MIHA, the relative standard error (RSE) is greater than 50% or fewer than 5 women reported. In BSMF, CFDSMF, CBCF, or PDD-VS, fewer than 10 events in the reporting period.

* Estimate should be interpreted with caution due to low statistical reliability (relative standard error is between 30% and 50%).

Data Sources: † California Birth Statistical Master File (BSMF), 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates are presented for births to all resident women in California. Population estimates are a three-year average, rounded down to the whole number.

‡ Maternal and Infant Health Assessment (MIHA) survey, 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates (rounded to the nearest hundred) are weighted to represent all women in California. Population estimates are a three-year average.

§ California Birth Cohort File (CBCF), 2008-2012. Rate, 95% confidence interval (95% CI) and annual number of deaths are presented for all resident deaths to infants under one year of age. Number of deaths are a five-year average, rounded down to the whole number.

** California Patient Discharge Data linked to Vital Statistics files (PDD-VS), 2010-2012. Percent (%) and 95% confidence interval (95% CI) are presented for all resident women in California. Annual population estimate is a three-year average of the number of deliveries, rounded down to the whole number.

Definitions of indicators and additional BSMF, MIHA, CBCF and PDD-VS information are in the Appendix.

‖ This indicator is only available for 2013-2014.

This indicator is only available for 2012.

¶ This indicator is only available for 2013.

†† This indicator is only available for provisional 2015 data.

Maternal and infant health indicators for American Indians/Alaksa Natives and the overall population, within the Indian Health Services (IHS) California Area plus Alpine County

	IHS California Area plus Alpine County					
	American Indian/Alaska Native			Overall		
	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate
Total			18,326			511,808
Characteristics of the mother						
Age[†]						
Younger than 20	**10.6%**	10.2 - 11.1	647	**7.2%**	7.1 - 7.2	12,212
20-24	**29.2%**	28.6 - 29.9	1,785	**23.1%**	23.0 - 23.2	39,423
25-29	**27.9%**	27.3 - 28.6	1,705	**28.4%**	28.3 - 28.5	48,434
30-34	**21.1%**	20.5 - 21.7	1,288	**25.6%**	25.5 - 25.7	43,674
35 or older	**11.2%**	10.7 - 11.6	683	**15.7%**	15.6 - 15.8	26,858
Total live births[†]						
0 prior live births	**39.5%**	38.8 - 40.2	2,413	**37.3%**	37.1 - 37.4	63,513
1-2 prior live births	**44.8%**	44.0 - 45.5	2,732	**49.0%**	48.9 - 49.1	83,529
3 or more prior live births	**15.7%**	15.2 - 16.2	959	**13.8%**	13.7 - 13.8	23,451
Education[†]						
No high school or GED	**16.4%**	15.9 - 17.0	982	**18.7%**	18.6 - 18.8	30,481
High school diploma or GED	**35.2%**	34.5 - 35.9	2,105	**29.5%**	29.4 - 29.7	48,227
Some college	**35.9%**	35.2 - 36.6	2,143	**29.1%**	29.0 - 29.2	47,518
Bachelor's degree or higher	**12.5%**	12.0 - 13.0	746	**22.7%**	22.6 - 22.8	37,000
Marital status[‡]						
Married or living as married	**83.2%**	79.5 - 86.9	5,300	**83.1%**	81.7 - 84.5	138,500
Single, separated, divorced or widowed	**16.8%**	13.1 - 20.5	1,100	**16.9%**	15.5 - 18.3	28,100
Income as a percent of poverty[‡]						
0-100%	**46.4%**	39.3 - 53.6	2,800	**45.0%**	43.3 - 46.7	71,600
101-200%	**24.5%**	17.3 - 31.7	1,500	**21.7%**	20.1 - 23.3	34,500
>200%	**29.0%**	21.4 - 36.7	1,800	**33.3%**	31.7 - 34.8	52,900
Income as a percent of poverty, ACA cut off[‡]						
0-138.0%	**61.6%**	54.1 - 69.2	3,700	**59.5%**	50.2 - 68.7	4,000
138.1-400%	**24.8%**	19.0 - 30.6	1,500	**18.1%**	13.4 - 22.9	1,200
Neighborhood poverty[†]						
Lives in a high poverty neighborhood	**40.4%**	39.7 - 41.2	2,244	**40.3%**	40.2 - 40.5	64,835
Language usually spoken at home[‡]						
English	**91.6% ***	85.7 - 97.4	5,800	**62.0%**	60.2 - 63.8	103,100
Another language	**8.4% ***	2.6 - 14.3	500	**38.0%**	36.2 - 39.8	63,200
Birth outcomes and delivery[†]						
Gestational age among singletons						
Preterm (<37 weeks)	**7.8%**	7.4 - 8.2	461	**6.9%**	6.8 - 6.9	11,320
Very preterm (<32 weeks)	**1.3%**	1.2 - 1.5	77	**1.1%**	1.0 - 1.1	1,744
Moderately and late preterm (33-36 weeks)	**6.5%**	6.1 - 6.9	384	**5.8%**	5.7 - 5.9	9,576
Early term (37-38 weeks)	**23.1%**	22.5 - 23.7	1,368	**23.7%**	23.6 - 23.8	39,034
Term (39 weeks or more)	**69.1%**	68.4 - 69.8	4,087	**69.5%**	69.3 - 69.6	114,554
Birth weight among singletons						
Low birth weight (<2,500g)	**5.6%**	5.3 - 6.0	334	**5.1%**	5.1 - 5.2	8,467
Very low birth weight (<1,500g)	**1.1%**	0.9 - 1.2	63	**0.9%**	0.9 - 0.9	1,469
Moderately LBW (1,500-2,499g)	**4.6%**	4.3 - 4.9	271	**4.2%**	4.2 - 4.3	6,998
Normal birth weight (2,500g-3,999g)	**84.7%**	84.1 - 85.2	5,024	**86.1%**	86.0 - 86.1	142,212
High birth weight (≥4,000g)	**9.7%**	9.3 - 10.1	575	**8.8%**	8.7 - 8.9	14,585

Maternal and infant health indicators for American Indians/Alaksa Natives and the overall population, within the Indian Health Services (IHS) California Area plus Alpine County

	IHS California Area plus Alpine County					
	American Indian/Alaska Native			Overall		
	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate
Total			18,326			511,808
Birth outcomes and delivery[†]						
Delivery						
% very low birth weight infants born in a hospital with the appropriate level of care	**68.3%**	62.0 - 73.9	52	**71.5%**	70.4 - 72.7	1,402
Cesarean section, among all women	**32.7%**	32.0 - 33.4	1,996	**32.9%**	32.8 - 33.1	56,205
Cesarean section, among low risk women with a first birth	**25.9%**	24.8 - 27.0	533	**26.4%**	26.2 - 26.7	14,442
Infant mortality[§]						
Infant mortality (deaths per 1,000 live births)						
Infant mortality	**7.8**	6.8 - 8.9	44	**5.3**	5.1 - 5.4	924
Neonatal mortality	**4.4**	3.7 - 5.2	25	**3.7**	3.6 - 3.8	652
Postneonatal mortality	**3.4**	2.8 - 4.2	19	**1.5**	1.5 - 1.6	272
Leading causes of infant death (deaths per 100,000 live births)						
Congenital malformations, deformations and chromosomal abnormalities	**160.1**	120.0 - 213.4	<10	**137.3**	129.8 - 145.3	241
Sudden infant death syndrome	**100.9**	70.3 - 144.9	<10	**37.8**	33.9 - 42.1	66
Disorders related to short gestation and low birth weight, not elsewhere classified	**55.7**	34.3 - 90.4	<10	**65.5**	60.3 - 71.0	115
Accidents (unintentional injuries)	**59.1**	36.9 - 94.7	<10	**12.3**	10.2 - 14.8	21
Newborn affected by complications of placenta, cord and membranes	**--**			**29.9**	26.5 - 33.8	52
Special cause of infant death (deaths per 100,000 live births)						
Sudden unexplained infant death	**208.8**	162.2 - 268.6	12	**61.0**	56.1 - 66.4	107
Infant sleep environment[‡]						
Was told in the hospital to place infant on back to sleep	**95.6% ***	92.5 - 98.7	5,700	**91.9%**	89.9 - 93.8	146,800
Usually placed infant back to sleep[‖]	**77.0%**	70.7 - 83.2	4,700	**78.8%**	77.3 - 80.4	129,400
Infant always or often shared bed[¶]	**32.9%**	24.9 - 40.9	2,000	**35.2%**	32.9 - 37.6	57,900
Maternal nutrition and weight						
Daily folic acid use, month before pregnancy[‡]	**29.5%**	22.0 - 36.9	1,900	**32.8%**	30.9 - 34.6	54,900
Prepregnancy weight[†]						
Underweight	**3.7%**	3.5 - 4.0	217	**3.5%**	3.5 - 3.6	5,767
Healthy weight	**41.8%**	41.1 - 42.6	2,428	**45.9%**	45.8 - 46.1	74,991
Overweight	**25.5%**	24.8 - 26.1	1,477	**26.6%**	26.5 - 26.7	43,424
Obese	**29.0%**	28.3 - 29.6	1,680	**23.9%**	23.8 - 24.0	39,021
Gestational weight gain[†]						
Inadequate	**17.7%**	17.1 - 18.3	916	**20.9%**	20.7 - 21.0	30,816
Appropriate	**29.1%**	28.4 - 29.9	1,510	**33.5%**	33.3 - 33.6	49,457
Excessive	**53.2%**	52.4 - 54.0	2,757	**45.7%**	45.5 - 45.8	67,477
Food security[‡]						
Low food security	**15.4%**	9.6 - 21.3	1,000	**12.9%**	11.6 - 14.1	21,400
Very low food security	**8.5%**	6.0 - 11.0	500	**5.7%**	4.8 - 6.5	9,400
Participated in food and nutrtion assistance programs during pregnancy[‡]						
On WIC at any time in this pregnancy, among eligible women	**86.5%**	82.8 - 90.2	4,000	**81.3%**	79.6 - 82.9	94,300
Received CalFresh (food stamps), among all women	**38.4%**	31.9 - 44.9	2,400	**28.9%**	27.3 - 30.4	48,100

Maternal and infant health indicators for American Indians/Alaksa Natives and the overall population, within the Indian Health Services (IHS) California Area plus Alpine County

	IHS California Area plus Alpine County					
	American Indian/Alaska Native			Overall		
	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate
Total			18,326			511,808
Maternal health conditions						
Maternal health status before pregnancy‡						
In good to excellent health before pregnancy	**93.2%**	91.0 95.3	5,900	**92.0%**	91.1 - 93.0	154,100
Maternal health conditions at delivery**						
Pre-existing diabetes	**1.3%**	1.1 1.5	69	**0.9%**	0.9 - 0.9	1,427
Gestational diabetes	**6.9%**	6.5 7.3	369	**7.5%**	7.5 - 7.6	12,079
Hypertension (chronic or gestational)	**9.2%**	8.8 9.6	494	**7.2%**	7.2 - 7.3	11,630
Asthma	**5.0%**	4.7 5.4	270	**3.1%**	3.1 - 3.2	5,012
Childhood experiences of support and hardships experienced by the mother‡						
Had adult support during childhood	**88.0%**	85.0 - 90.9	5,500	**88.9%**	87.7 - 90.1	147,600
Hardships experienced during childhood						
Parents divorced or separated	**48.2%**	41.0 - 55.3	3,000	**32.5%**	30.7 - 34.3	53,900
Parent had serious drug or alcohol problem	**30.0%**	24.4 - 35.7	1,900	**16.8%**	15.4 - 18.1	27,800
Family had problems paying for basic needs	**30.0%**	23.7 - 36.3	1,900	**23.2%**	21.6 - 24.8	38,600
Family moved due to problems paying for rent or mortgage	**27.1%**	21.0 - 33.2	1,700	**16.2%**	14.8 - 17.5	26,800
Parent had trouble with the law or went to jail	**23.2%**	18.6 - 27.9	1,500	**11.6%**	10.5 - 12.7	19,200
Family experienced hunger	**15.7%**	11.7 - 19.8	1,000	**9.5%**	8.5 - 10.4	15,700
Was placed in foster care	**9.2%**	6.5 - 11.8	600	**3.4%**	2.8 - 4.0	5,700
Total number of hardships experienced by the mother during her childhood‡						
0	**33.3%**	25.5 - 41.1	2,100	**48.1%**	46.2 - 50.1	78,600
1	**21.6%**	16.6 - 26.6	1,300	**23.6%**	21.9 - 25.2	38,500
2 or 3	**26.2%**	19.7 - 32.7	1,600	**19.7%**	18.1 - 21.2	32,100
4 or more	**18.9%**	14.8 - 23.0	1,200	**8.6%**	7.7 - 9.6	14,100
Worried about racism‡						
Somewhat or very often worried about racism throughout lifetime	**14.9%**	10.7 - 19.0	900	**13.0%**	11.8 - 14.3	21,600
Support and hardships experienced during pregnancy‡						
Had practical or emotional support during pregnancy	**97.1%**	95.6 - 98.6	6,200	**95.8%**	95.1 - 96.5	160,600
Hardships experienced during pregnancy						
Woman or partner lost job	**16.4%**	12.6 - 20.3	1,000	**15.4%**	14.1 - 16.7	25,500
Woman or partner had pay or hours cut back	**12.6%**	9.0 - 16.2	800	**12.5%**	11.4 - 13.7	20,700
Moved due to problems paying rent or mortgage	**9.7%**	6.8 - 12.5	600	**7.8%**	6.8 - 8.8	13,000
Someone close had a bad drug/drinking problem	**12.5%**	9.0 - 15.9	800	**6.8%**	5.9 - 7.7	11,300
Became separated or divorced	**9.2%**	5.6 - 12.7	600	**8.8%**	7.7 - 9.9	14,600
Homeless or did not have a regular place to sleep	**9.7%**	5.8 - 13.7	600	**3.5%**	2.9 - 4.2	5,900
Woman or partner went to jail	**4.9%**	2.0 - 7.8	300	**2.5%**	1.9 - 3.0	4,100
Intimate partner violence during pregnancy‡						
Physical or psychological IPV during pregnancy	**10.7%**	7.9 - 13.6	700	**8.0%**	7.0 - 9.0	13,400

Maternal and infant health indicators for American Indians/Alaksa Natives and the overall population, within the Indian Health Services (IHS) California Area plus Alpine County

	IHS California Area plus Alpine County					
	American Indian/Alaska Native			Overall		
	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate
Total			18,326			511,808
Maternal mental health						
Prenatal depressive symptoms‡	**13.4%**	10.4 16.5	900	**14.9%**	13.6 - 16.2	24,900
Postpartum depressive symptoms‡	**16.1%**	10.7 21.5	1,000	**13.6%**	12.4 - 14.9	22,800
Mental disorder at delivery**	**8.8%**	8.4 9.3	474	**4.0%**	3.9 - 4.0	6,359
Substance use						
Maternal tobacco use before, during and after pregnancy‡						
Any smoking, 3 months before pregnancy	**26.1%**	20.5 31.6	1,600	**14.2%**	12.9 - 15.5	23,600
Any smoking, 3rd trimester	**8.7%**	5.5 12.0	600	**3.6%**	3.0 - 4.1	5,900
Any smoking, postpartum	**16.9%**	12.4 21.4	1,100	**7.2%**	6.3 - 8.1	12,000
Quit smoking during pregnancy	**67.6%**	56.9 - 78.2	1,100	**75.9%**	72.3 - 79.6	17,700
Postpartum relapse among women who smoked before and quit during pregnancy	**48.0%**	33.8 - 62.2	500	**35.8%**	30.4 - 41.2	6,400
Maternal alcohol use before and during pregnancy‡						
Any binge drinking, 3 months before pregnancy	**20.0%**	14.5 - 25.5	1,200	**16.5%**	15.0 - 18.0	27,200
Heavy drinking, 3 months before pregnancy	**25.8%**	20.0 - 31.7	1,600	**19.1%**	17.6 - 20.6	31,500
Any alcohol use, 3rd trimester	**7.6%**	3.5 - 11.8	500	**7.0%**	5.8 - 8.1	11,600
Any binge drinking during pregnancy	**9.2%**	5.7 - 12.8	600	**7.2%**	6.1 - 8.3	11,900
Infant substance exposure (per 1,000 newborns)						
Neonatal abstinence syndrome**	**4.4**	3.5 - 5.6	23	**1.6**	1.5 - 1.7	259
Pregnancy intention and family planning						
Pregnancy intention‡						
Intended pregnancy	**53.5%**	46.5 - 60.5	3,400	**54.4%**	52.5 - 56.3	90,500
Mistimed or unwanted pregnancy	**28.4%**	23.1 - 33.8	1,800	**31.5%**	29.7 - 33.2	52,300
Unsure of pregnancy intentions	**18.1%**	12.6 - 23.6	1,100	**14.1%**	12.8 - 15.5	23,500
Interpregnancy interval†						
Optimal interpregnancy interval of at least 18 months	**67.5%**	66.6 - 68.4	2,309	**72.0%**	71.8 - 72.2	73,691
Postpartum contraception use‡						
Highly effective method	**21.3%**	15.8 - 26.7	1,300	**24.7%**	23.1 - 26.4	40,700
Moderately effective method	**26.7%**	21.4 - 32.0	1,700	**29.8%**	28.0 - 31.5	48,900
Less effective method	**21.5%**	17.0 - 25.9	1,300	**28.6%**	26.8 - 30.4	47,000
Did not use contraception	**30.6%**	22.2 - 39.0	1,900	**16.9%**	15.4 - 18.4	27,800
Breastfeeding practices‡						
Before birth, intended to breastfeed with or without formula	**91.7%**	88.9 - 94.6	5,600	**92.0%**	91.1 - 93.0	151,600
Initiated breastfeeding	**91.6%**	88.8 - 94.5	5,700	**94.4%**	93.6 95.1	155,500
Any breastfeeding, 2 months after delivery	**71.9%**	65.5 - 78.4	4,400	**73.3%**	71.6 - 74.9	119,200
Exclusive breastfeeding, 2 months after delivery	**40.1%**	33.0 - 47.3	2,400	**36.1%**	34.2 - 38.0	57,800
Experienced all 7 recommended practices supportive of breastfeeding while in hospital¶	**15.0%**	8.9 - 21.2	700	**21.1%**	17.6 - 24.7	65,700

Maternal and infant health indicators for American Indians/Alaksa Natives and the overall population, within the Indian Health Services (IHS) California Area plus Alpine County

	IHS California Area plus Alpine County					
	American Indian/Alaska Native			Overall		
	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate
Total			18,326			511,808
Health insurance coverage[‡]						
Pre-pregnancy insurance						
Medi-Cal	**30.0%**	24.6 - 35.3	1,900	**26.0%**	24.5 - 27.4	43,500
Private	**39.3%**	31.9 - 46.6	2,500	**42.1%**	40.5 - 43.7	70,500
Uninsured	**24.5%**	17.8 - 31.1	1,600	**26.3%**	24.7 - 27.8	44,000
Other	**6.3%** *	2.6 - 10.0	400	**5.7%**	4.8 - 6.6	9,500
Prenatal insurance						
Medi-Cal	**58.0%**	50.7 - 65.3	3,700	**53.7%**	52.2 - 55.2	89,900
Private	**33.9%**	26.5 - 41.2	2,100	**37.6%**	36.1 - 39.2	63,000
Uninsured	**1.0%** *	0.3 - 1.6	100	**2.1%**	1.5 - 2.7	3,500
Other	**7.2%**	3.2 - 11.1	500	**6.6%**	5.6 - 7.6	11,000
Maternal postpartum insurance						
Medi-Cal	**48.7%**	41.7 - 55.8	3,000	**38.9%**	37.3 - 40.4	64,700
Private	**35.1%**	27.7 - 42.5	2,200	**39.8%**	38.2 - 41.4	66,300
Uninsured	**10.9%**	5.5 - 16.4	700	**16.3%**	15.0 - 17.7	27,200
Other	**5.3%** *	1.6 - 9.0	300	**5.0%**	4.2 - 5.8	8,300
Infant health insurance						
Medi-Cal	**61.1%**	53.8 - 68.4	3,800	**55.7%**	54.2 - 57.3	91,200
Private	**28.6%**	21.5 - 35.7	1,800	**34.9%**	33.3 - 36.5	57,100
Uninsured	**3.3%** *	1.1 - 5.4	200	**2.7%**	2.1 - 3.4	4,500
Other	**7.1%**	3.2 - 11.0	400	**6.6%**	5.7 - 7.6	10,900
Health care utilization						
Prepregnancy health care[‡]						
Had a usual source of prepregnancy health care	**74.3%**	68.9 - 79.8	4,700	**69.8%**	68.1 - 71.5	117,000
Prenatal care quantity[†]						
Initiated prenatal care in 1st trimester	**75.1%**	74.4 - 75.7	4,521	**81.8%**	81.7 - 81.9	138,096
Received at least adequate prenatal care (Kotelchuck Index)	**73.9%**	73.3 - 74.6	4,410	**78.3%**	78.1 - 78.4	131,086
Content of prenatal care[‡‖]						
Provider asked if she smoked	**97.2%** *	94.7 - 99.6	6,200	**96.0%**	95.0 - 97.1	160,200
Provider asked if she drank alcohol	**96.0%** *	93.4 - 98.6	6,100	**95.3%**	94.2 - 96.4	159,000
Provider asked if she experienced IPV	**82.5%**	77.1 - 87.8	5,300	**78.2%**	76.1 - 80.3	130,300
Provider asked if she felt sad, empty, or depressed	**89.7%**	86.3 - 93.1	5,600	**85.8%**	84.1 - 87.5	142,700
Provider talked about appropriate weight gain	**75.3%**	67.3 - 83.2	4,600	**79.4%**	77.3 - 81.5	132,100
Had a birth defects screening	**74.7%**	68.4 - 81.0	4,800	**65.3%**	63.0 - 67.7	108,800
Dental care during pregnancy[‡#]						
Had a dental visit during pregnancy	**38.2%**	28.3 - 48.0	2,400	**40.4%**	37.7 - 43.0	67,800
Leading reasons for no dental care during pregnancy[‡#]						
Inadequate dental insurance	**43.7%**	31.4 - 56.0	1,600	**38.5%**	35.2 - 41.7	37,900
Did not think she needed dental care	**41.3%**	28.3 - 54.2	1,600	**40.0%**	36.6 - 43.4	39,400
Cost too much	**39.2%**	27.5 - 50.9	1,500	**41.3%**	38.0 - 44.7	40,700
Difficulties getting dental care	**32.5%**	22.5 - 42.5	1,200	**32.8%**	29.5 - 36.1	32,300
Did not think dental care was safe	**19.1%**	11.2 - 26.9	700	**28.5%**	25.4 - 31.6	28,100
Was nervous, afraid or embarrassed of her teeth	**16.8%**	7.3 - 26.2	600	**18.2%**	15.5 - 20.9	17,900

Maternal and infant health indicators for American Indians/Alaksa Natives and the overall population, within the Indian Health Services (IHS) California Area plus Alpine County

	IHS California Area plus Alpine County					
	American Indian/Alaska Native			Overall		
	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate
Total			18,326			511,808
Health care utilization						
Immunizations during or after pregnancy‡††						
Received flu shot during pregnancy	**49.6%**	39.6 - 59.5	2,500	**52.9%**	49.5 - 56.3	84,200
Received Tdap during pregnancy	**43.8%**	29.3 - 58.3	2,700	**42.0%**	38.7 - 45.4	67,700
Received Tdap in hospital at delivery	**30.9% ***	12.0 - 49.8	1,900	**22.1%**	19.2 - 25.1	35,700
Postpartum care‡						
Had a postpartum medical visit	**80.1%**	73.5 - 86.6	5,100	**86.0%**	84.6 - 87.3	143,600
Mom or infant needed but couldn't afford care postpartum	**14.2%**	8.5 - 20.0	900	**13.7%**	12.4 - 15.0	22,400

-- Data not shown: In MIHA, the relative standard error (RSE) is greater than 50% or fewer than 5 women reported. In BSMF, CFDSMF, CBCF, or PDD, fewer than 10 events in the reporting period.

* Estimate should be interpreted with caution due to low statistical reliability (relative standard error is between 30% and 50%).

Data Sources: † California Birth Statistical Master File (BSMF), 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates are presented for births to all resident women in California. Population estimates are a three-year average, rounded down to the whole number.

‡ Maternal and Infant Health Assessment (MIHA) survey, 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates (rounded to the nearest hundred) are weighted to represent all women in California. Population estimates are a three-year average.

§ California Birth Cohort File (CBCF), 2008-2012. Rate, 95% confidence interval (95% CI) and annual number of deaths are presented for all resident deaths to infants under one year of age. Number of deaths are a five-year average, rounded down to the whole number.

** California Patient Discharge Data linked to Vital Statistics files (PDD-VS), 2010-2012. Percent (%) and 95% confidence interval (95% CI) are presented for all resident women in California. Annual population estimate is a three-year average of the number of deliveries, rounded down to the whole number.

Definitions of indicators and additional BSMF, MIHA, CBCF and PDD-VS information are in the Appendix.

‖ This indicator is only available for 2013-2014.

This indicator is only available for 2012.

¶ This indicator is only available for 2013.

†† This indicator is only available for provisional 2015 data.

Maternal and infant health indicators for American Indians/Alaska Natives and the overall population, within counties served by California Urban Indian Health Organizations (UIHO)

	California UIHO Counties					
	American Indian/Alaska Native			Overall		
	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate
Total			19,794			986,636
Characteristics of the mother						
Age[†]						
Younger than 20	**8.7%**	8.3 - 9.1	574	**5.9%**	5.9 - 6.0	19,415
20-24	**24.3%**	23.7 - 24.9	1,601	**18.3%**	18.3 - 18.4	60,264
25-29	**26.4%**	25.7 - 27.0	1,739	**25.5%**	25.4 - 25.5	83,703
30-34	**24.4%**	23.8 - 25.0	1,607	**29.0%**	28.9 - 29.1	95,241
35 or older	**16.3%**	15.8 - 16.8	1,077	**21.4%**	21.3 - 21.4	70,253
Total live births[†]						
0 prior live births	**43.5%**	42.8 - 44.2	2,867	**40.4%**	40.3 - 40.5	132,602
1-2 prior live births	**43.4%**	42.7 - 44.1	2,860	**48.4%**	48.3 - 48.5	158,962
3 or more prior live births	**13.1%**	12.7 - 13.6	865	**11.3%**	11.2 - 11.3	37,035
Education[†]						
No high school or GED	**13.9%**	13.4 - 14.4	897	**18.3%**	18.2 - 18.4	57,047
High school diploma or GED	**27.7%**	27.1 - 28.4	1,792	**23.9%**	23.8 - 24.0	74,517
Some college	**37.1%**	36.5 - 37.8	2,400	**25.4%**	25.3 - 25.5	79,344
Bachelor's degree or higher	**21.2%**	20.7 - 21.8	1,372	**32.4%**	32.3 - 32.5	101,250
Marital status[‡]						
Married or living as married	**81.1%**	75.3 - 86.9	5,800	**83.8%**	82.4 - 85.1	269,000
Single, separated, divorced or widowed	**18.9%**	13.1 - 24.7	1,300	**16.2%**	14.9 - 17.6	52,100
Income as a percent of poverty[‡]						
0-100%	**48.2%**	39.1 - 57.4	3,200	**40.9%**	39.3 - 42.5	123,300
101-200%	**17.5%**	11.7 - 23.3	1,200	**19.3%**	17.9 - 20.8	58,300
>200%	**34.2%**	24.9 - 43.5	2,300	**39.8%**	38.3 - 41.2	119,800
Income as a percent of poverty, ACA cut off[‡]						
0-138.0%	**61.6%**	54.1 - 69.2	3,700	**56.8%**	55.2 - 58.5	90,400
138.1-400%	**24.8%**	19.0 - 30.6	1,500	**27.0%**	25.3 - 28.7	43,000
Neighborhood poverty[†]						
Lives in a high poverty neighborhood	**35.0%**	34.3 - 35.7	2,204	**36.2%**	36.1 - 36.3	114,410
Language usually spoken at home[‡]						
English	**92.3%**	88.1 - 96.6	6,500	**54.4%**	52.7 - 56.2	172,500
Another language	**7.7%**	3.4 - 11.9	500	**45.6%**	43.8 - 47.3	144,600
Birth outcomes and delivery[†]						
Gestational age among singletons						
Preterm (<37 weeks)	**7.9%**	7.5 - 8.2	499	**6.9%**	6.8 - 6.9	21,902
Very preterm (<32 weeks)	**1.2%**	1.0 - 1.3	74	**1.0%**	1.0 - 1.0	3,269
Moderately and late preterm (33-36 weeks)	**6.7%**	6.3 - 7.1	425	**5.9%**	5.8 - 5.9	18,633
Early term (37-38 weeks)	**22.9%**	22.3 - 23.5	1,456	**24.2%**	24.1 - 24.3	76,919
Term (39 weeks or more)	**69.3%**	68.6 - 69.9	4,408	**68.9%**	68.8 - 69.0	218,845
Birth weight among singletons						
Low birth weight (<2,500g)	**5.8%**	5.5 - 6.2	372	**5.3%**	5.2 - 5.3	16,843
Very low birth weight (<1,500g)	**1.1%**	1.0 - 1.3	72	**0.9%**	0.9 - 0.9	2,820
Moderately LBW (1,500-2,499g)	**4.7%**	4.4 - 5.0	300	**4.4%**	4.4 - 4.4	14,023
Normal birth weight (2,500g-3,999g)	**84.5%**	84.0 - 85.0	5,389	**86.5%**	86.4 - 86.6	275,242
High birth weight (≥4,000g)	**9.7%**	9.3 - 10.1	618	**8.2%**	8.1 - 8.3	26,090

Maternal and infant health indicators for American Indians/Alaska Natives and the overall population, within counties served by California Urban Indian Health Organizations (UIHO)

	California UIHO Counties					
	American Indian/Alaska Native			Overall		
	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate
Total			19,794			986,636
Birth outcomes and delivery†						
Delivery						
% very low birth weight infants born in a hospital with the appropriate level of care	**74.0%**	68.5 - 78.8	67	**80.8%**	80.1 - 81.5	3,053
Cesarean section, among all women	**33.6%**	33.0 - 34.3	2,219	**33.3%**	33.2 - 33.4	109,558
Cesarean section, among low risk women with a first birth	**28.0%**	27.0 - 29.0	670	**26.6%**	26.4 - 26.7	29,281
Infant mortality§						
Infant mortality (deaths per 1,000 live births)						
Infant mortality	**5.7**	4.9 - 6.5	35	**4.8**	4.7 - 4.9	1,629
Neonatal mortality	**3.6**	3.0 - 4.3	22	**3.3**	3.3 - 3.4	1,138
Postneonatal mortality	**2.1**	1.6 - 2.6	12	**1.4**	1.4 - 1.5	490
Leading causes of infant death (deaths per 100,000 live births)						
Congenital malformations, deformations and chromosomal abnormalities	**96.3**	67.5 - 137.5	<10	**118.5**	113.5 - 123.8	404
Sudden infant death syndrome	**96.3**	67.5 - 137.5	<10	**37.7**	34.9 - 40.7	128
Disorders related to short gestation and low birth weight, not elsewhere classified	**70.6**	46.7 - 107.0	<10	**76.4**	72.4 - 80.7	260
Accidents (unintentional injuries)	**--**			**8.1**	6.9 - 9.6	27
Newborn affected by complications of placenta, cord and membranes	**--**			**21.5**	19.4 - 23.8	73
Special cause of infant death (deaths per 100,000 live births)						
Sudden unexplained infant death	**138.1**	102.5 - 185.9	<10	**50.1**	46.9 - 53.6	170
Infant sleep environment‡						
Was told in the hospital to place infant on back to sleep	**97.6% ***	95.6 - 99.6	5,700	**90.6%**	88.4 - 92.7	275,900
Usually placed infant back to sleep‖	**76.7%**	69.9 - 83.5	5,400	**77.8%**	76.2 - 79.4	245,800
Infant always or often shared bed¶	**43.0%**	33.5 - 52.6	2,900	**32.8%**	30.7 - 35.0	103,400
Maternal nutrition and weight						
Daily folic acid use, month before pregnancy‡	**33.7%**	24.2 - 43.3	2,400	**34.0%**	32.3 - 35.7	109,700
Prepregnancy weight†						
Underweight	**3.9%**	3.6 - 4.2	241	**4.1%**	4.0 - 4.1	12,547
Healthy weight	**44.1%**	43.4 - 44.8	2,733	**49.4%**	49.3 - 49.5	151,752
Overweight	**25.2%**	24.5 - 25.8	1,559	**25.6%**	25.5 - 25.7	78,676
Obese	**26.8%**	26.2 - 27.5	1,663	**20.9%**	20.8 - 20.9	64,032
Gestational weight gain†						
Inadequate	**17.6%**	17.0 - 18.2	979	**21.7%**	21.6 - 21.8	60,427
Appropriate	**30.8%**	30.1 - 31.5	1,714	**35.3%**	35.2 - 35.4	98,355
Excessive	**51.6%**	50.8 - 52.3	2,867	**43.1%**	42.9 - 43.2	120,032
Food security‡						
Low food security	**15.4%**	9.2 - 21.6	1,100	**11.3%**	10.1 - 12.4	36,000
Very low food security	**8.4%**	5.8 - 10.9	600	**5.1%**	4.2 - 5.9	16,200
Participated in food and nutrtion assistance programs during pregnancy‡						
On WIC at any time in this pregnancy, among eligible women	**78.3%**	70.8 - 85.9	3,800	**83.6%**	82.1 - 85.1	169,300
Received CalFresh (food stamps), among all women	**34.0%**	26.9 - 41.1	2,400	**24.1%**	22.6 - 25.5	77,100

Maternal and infant health indicators for American Indians/Alaska Natives and the overall population, within counties served by California Urban Indian Health Organizations (UIHO)

	California UIHO Counties					
	American Indian/Alaska Native			Overall		
	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate
Total			19,794			986,636
Maternal health conditions						
Maternal health status before pregnancy‡						
In good to excellent health before pregnancy	**92.5%**	89.7 - 95.2	6,600	**92.7%**	91.7 - 93.7	299,300
Maternal health conditions at delivery**						
Pre-existing diabetes	**1.2%**	1.1 - 1.4	72	**0.9%**	0.9 - 1.0	3,018
Gestational diabetes	**7.5%**	7.1 - 7.9	444	**8.4%**	8.3 - 8.4	26,590
Hypertension (chronic or gestational)	**9.0%**	8.6 - 9.4	534	**7.5%**	7.5 - 7.6	23,845
Asthma	**6.9%**	6.5 - 7.2	408	**3.1%**	3.0 - 3.1	9,714
Childhood experiences of support and hardships experienced by the mother‡						
Had adult support during childhood	**90.7%**	88.0 - 93.3	6,500	**89.1%**	88.0 - 90.3	284,700
Hardships experienced during childhood						
Parents divorced or separated	**46.9%**	38.1 - 55.6	3,300	**27.7%**	26.1 - 29.3	88,600
Parent had serious drug or alcohol problem	**29.8%**	21.5 - 38.1	2,100	**14.2%**	13.0 - 15.5	45,600
Family had problems paying for basic needs	**28.8%**	20.6 - 36.9	2,000	**21.0%**	19.5 - 22.5	67,400
Family moved due to problems paying for rent or mortgage	**26.3%**	17.9 - 34.7	1,800	**12.9%**	11.7 - 14.1	41,100
Parent had trouble with the law or went to jail	**22.1%**	16.2 - 28.0	1,600	**9.0%**	8.0 - 10.1	28,900
Family experienced hunger	**14.2%**	9.8 - 18.6	1,000	**9.3%**	8.3 - 10.4	29,900
Was placed in foster care	**9.8%**	6.6 - 13.0	700	**2.9%**	2.4 - 3.5	9,400
Total number of hardships experienced by the mother during her childhood‡						
0	**35.1%**	26.1 - 44.2	2,400	**53.7%**	51.8 - 55.5	169,800
1	**23.5%**	16.9 - 30.0	1,600	**23.0%**	21.4 - 24.6	72,800
2 or 3	**20.3%**	14.8 - 25.8	1,400	**16.4%**	15.1 - 17.7	51,900
4 or more	**21.1%**	13.0 - 29.3	1,500	**6.9%**	6.0 - 7.8	21,800
Worried about racism‡						
Somewhat or very often worried about racism throughout lifetime	**24.8%**	16.1 - 33.4	1,800	**14.6%**	13.4 - 15.9	46,400
Support and hardships experienced during pregnancy‡						
Had practical or emotional support during pregnancy	**96.8%**	95.4 - 98.3	6,900	**95.1%**	94.3 - 96.0	307,200
Hardships experienced during pregnancy						
Woman or partner lost job	**18.7%**	12.4 - 24.9	1,300	**15.1%**	13.8 - 16.4	48,200
Woman or partner had pay or hours cut back	**19.5%**	13.3 - 25.7	1,400	**11.9%**	10.7 - 13.0	37,900
Moved due to problems paying rent or mortgage	**10.9%**	7.6 - 14.1	800	**6.3%**	5.5 - 7.2	20,300
Someone close had a bad drug/drinking problem	**11.2%**	7.8 - 14.6	800	**5.4%**	4.6 - 6.2	17,300
Became separated or divorced	**11.3%**	6.3 - 16.3	800	**7.4%**	6.4 - 8.3	23,600
Homeless or did not have a regular place to sleep	**10.4%**	5.4 - 15.4	700	**3.1%**	2.5 - 3.7	9,900
Woman or partner went to jail	**7.3%**	3.8 - 10.7	500	**2.4%**	1.9 - 2.9	7,600
Intimate partner violence during pregnancy‡						
Physical or psychological IPV during pregnancy	**18.5%**	10.1 - 26.9	1,300	**7.4%**	6.4 - 8.4	23,900

Maternal and infant health indicators for American Indians/Alaska Natives and the overall population, within counties served by California Urban Indian Health Organizations (UIHO)

	California UIHO Counties					
	American Indian/Alaska Native			Overall		
	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate
Total			19,794			986,636
Maternal mental health						
Prenatal depressive symptoms‡	**19.5%**	13.7 - 25.3	1,400	**14.5%**	13.2 - 15.8	46,700
Postpartum depressive symptoms‡	**19.5%**	13.2 - 25.7	1,400	**13.5%**	12.3 - 14.8	43,600
Mental disorder at delivery**	**8.1%**	7.7 - 8.5	481	**3.3%**	3.2 - 3.3	10,351
Substance use						
Maternal tobacco use before, during and after pregnancy‡						
Any smoking, 3 months before pregnancy	**24.9%**	17.9 - 31.8	1,800	**11.3%**	10.1 - 12.4	36,200
Any smoking, 3rd trimester	**6.2%**	3.2 - 9.2	400	**2.4%**	1.8 - 2.9	7,600
Any smoking, postpartum	**14.4%**	10.0 - 18.8	1,000	**5.0%**	4.2 - 5.8	16,000
Quit smoking during pregnancy	**76.0%**	64.4 - 87.5	1,300	**79.8%**	75.4 - 84.2	28,500
Postpartum relapse among women who smoked before and quit during pregnancy	**40.9%**	23.9 - 57.8	500	**30.2%**	24.5 - 35.8	8,600
Maternal alcohol use before and during pregnancy‡						
Any binge drinking, 3 months before pregnancy	**20.5%**	14.3 - 26.8	1,400	**14.5%**	13.2 - 15.7	46,200
Heavy drinking, 3 months before pregnancy	**24.0%**	17.5 - 30.4	1,700	**17.0%**	15.7 - 18.4	54,300
Any alcohol use, 3rd trimester	**7.4%**	4.7 - 10.2	500	**7.9%**	6.9 - 8.9	25,300
Any binge drinking during pregnancy	**7.7%**	4.1 - 11.2	500	**6.0%**	5.1 - 6.9	19,300
Infant substance exposure (per 1,000 newborns)						
Neonatal abstinence syndrome**	**3.1**	2.4 - 4.1	18	**1.1**	1.1 - 1.2	365
Pregnancy intention and family planning						
Pregnancy intention‡						
Intended pregnancy	**43.6%**	35.3 - 52.0	3,100	**56.9%**	55.1 - 58.6	182,500
Mistimed or unwanted pregnancy	**34.8%**	25.4 - 44.2	2,500	**30.7%**	29.0 - 32.5	98,700
Unsure of pregnancy intentions	**21.5%**	14.7 - 28.3	1,500	**12.4%**	11.2 - 13.6	39,800
Interpregnancy interval†						
Optimal interpregnancy interval of at least 18 months	**69.3%**	68.4 - 70.2	2,466	**73.7%**	73.6 - 73.8	138,161
Postpartum contraception use‡						
Highly effective method	**22.7%**	16.5 - 28.9	1,600	**23.3%**	21.8 - 24.8	73,400
Moderately effective method	**33.2%**	23.3 - 43.0	2,300	**24.8%**	23.3 - 26.4	78,300
Less effective method	**22.6%**	16.0 - 29.3	1,600	**33.4%**	31.6 - 35.2	105,300
Did not use contraception	**21.5%**	15.1 - 27.9	1,500	**18.4%**	17.0 - 19.9	58,000
Breastfeeding practices‡						
Before birth, intended to breastfeed with or without formula	**93.5%**	90.8 - 96.3	6,500	**92.6%**	91.7 - 93.5	292,300
Initiated breastfeeding	**95.7%**	94.1 - 97.3	6,700	**94.2%**	93.3 - 95.0	298,500
Any breastfeeding, 2 months after delivery	**78.2%**	73.1 - 83.3	5,400	**75.2%**	73.6 - 76.8	235,600
Exclusive breastfeeding, 2 months after delivery	**46.2%**	36.9 - 55.6	3,200	**35.4%**	33.6 - 37.1	109,300
Experienced all 7 recommended practices supportive of breastfeeding while in hospital¶	**21.3%**	11.0 - 31.7	1,100	**16.1%**	13.5 - 18.7	41,900

Maternal and infant health indicators for American Indians/Alaska Natives and the overall population, within counties served by California Urban Indian Health Organizations (UIHO)

	California UIHO Counties					
	American Indian/Alaska Native			Overall		
	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate
Total			19,794			986,636
Health insurance coverage[‡]						
Prepregnancy insurance						
Medi-Cal	**27.1%**	20.7 - 33.4	1,900	**24.4%**	23.0 - 25.9	78,600
Private	**44.8%**	35.9 - 53.6	3,200	**48.6%**	47.1 - 50.0	156,400
Uninsured	**18.6%**	12.8 - 24.4	1,300	**23.4%**	21.9 - 24.9	75,400
Other	**9.6%** *	1.5 - 17.6	700	**3.6%**	3.0 - 4.2	11,600
Prenatal insurance						
Medi-Cal	**47.5%**	38.9 - 56.1	3,400	**48.3%**	46.9 - 49.7	155,500
Private	**42.2%**	33.2 - 51.1	3,000	**46.0%**	44.6 - 47.4	148,200
Uninsured	**1.1%** *	0.1 - 2.1	100	**1.6%**	1.2 - 2.1	5,200
Other	**9.2%** *	1.2 - 17.2	700	**4.1%**	3.4 - 4.8	13,200
Maternal postpartum insurance						
Medi-Cal	**45.4%**	36.9 - 53.8	3,200	**34.9%**	33.3 - 36.4	111,600
Private	**41.3%**	32.4 - 50.1	2,900	**47.0%**	45.6 - 48.4	150,500
Uninsured	**5.3%**	3.1 - 7.4	400	**15.0%**	13.7 - 16.3	47,900
Other	--			**3.1%**	2.6 3.7	10,100
Infant health insurance						
Medi-Cal	**55.6%**	46.6 - 64.5	3,900	**49.3%**	47.9 - 50.7	155,900
Private	**38.0%**	28.9 - 47.0	2,600	**43.1%**	41.7 - 44.5	136,300
Uninsured	**2.3%** *	0.8 - 3.8	200	**2.9%**	2.2 - 3.6	9,200
Other	**4.2%**	2.0 - 6.4	300	**4.7%**	3.9 - 5.4	14,700
Health care utilization						
Prepregnancy health care[‡]						
Had a usual source of prepregnancy health care	**75.6%**	69.7 - 81.6	5,400	**71.6%**	69.9 - 73.2	230,800
Prenatal care quantity[†]						
Initiated prenatal care in 1st trimester	**79.2%**	78.6 - 79.7	5,130	**84.7%**	84.6 - 84.7	272,526
Received at least adequate prenatal care (Kotelchuck Index)	**75.9%**	75.3 - 76.5	4,862	**80.4%**	80.3 - 80.4	255,187
Content of prenatal care[‡‖]						
Provider asked if she smoked	**97.2%** *	95.6 - 98.9	6,700	**96.5%**	95.6 - 97.3	308,700
Provider asked if she drank alcohol	**97.1%**	95.4 - 98.7	6,700	**96.0%**	95.2 - 96.9	307,300
Provider asked if she experienced IPV	**82.7%**	74.4 - 91.1	5,700	**76.5%**	74.6 - 78.4	244,300
Provider asked if she felt sad, empty, or depressed	**92.2%**	89.0 - 95.4	6,300	**82.7%**	81.0 - 84.5	263,300
Provider talked about appropriate weight gain	**75.6%**	66.4 - 84.8	5,200	**78.1%**	76.2 - 80.1	249,300
Had a birth defects screening	**70.7%**	63.4 - 77.9	4,900	**70.7%**	68.7 - 72.8	225,900
Dental care during pregnancy[‡#]						
Had a dental visit during pregnancy	**57.6%**	41.6 - 73.6	4,400	**43.7%**	40.8 - 46.6	142,300
Leading reasons for no dental care during pregnancy[‡#]						
Inadequate dental insurance	**40.9%**	28.5 - 53.4	1,300	**35.4%**	31.6 - 39.2	63,200
Did not think she needed dental care	**38.8%**	25.9 - 51.7	1,200	**44.4%**	40.3 - 48.5	79,300
Cost too much	**38.8%**	26.5 - 51.0	1,200	**37.5%**	33.7 - 41.3	67,000
Difficulties getting dental care	**35.5%**	23.6 - 47.4	1,100	**29.9%**	26.1 - 33.6	53,400
Did not think dental care was safe	**25.7%**	16.8 - 34.5	800	**30.1%**	26.2 - 34.0	53,800
Was nervous, afraid or embarrassed of her teeth	**16.1%**	9.1 - 23.1	500	**15.7%**	12.7 - 18.7	28,100

Maternal and infant health indicators for American Indians/Alaska Natives and the overall population, within counties served by California Urban Indian Health Organizations (UIHO)

	California UIHO Counties					
	American Indian/Alaska Native			Overall		
	Rate	95% CI	Annual Population Estimate	Rate	95% CI	Annual Population Estimate
Total			19,794			986,636
Health care utilization						
Immunizations during or after pregnancy‡††						
Received flu shot during pregnancy	**63.4%**	53.4 - 73.4	3,600	**60.7%**	57.8 - 63.6	184,100
Received Tdap during pregnancy	**52.1%**	40.7 - 63.4	3,000	**51.1%**	48.3 - 53.9	156,000
Received Tdap in hospital at delivery	**15.4%**	9.8 - 21.1	900	**17.4%**	15.0 - 19.8	53,000
Postpartum care‡						
Had a postpartum medical visit	**84.4%**	79.8 - 88.9	6,000	**88.2%**	87.0 - 89.4	283,800
Mom or infant needed but couldn't afford care postpartum	**15.2%**	9.6 - 20.8	1,100	**12.6%**	11.3 - 13.8	39,300

-- Data not shown: In MIHA, the relative standard error (RSE) is greater than 50% or fewer than 5 women reported. In BSMF, CFDSMF, CBCF, or PDD, fewer than 10 events in the reporting period.

* Estimate should be interpreted with caution due to low statistical reliability (relative standard error is between 30% and 50%).

Data Sources: † California Birth Statistical Master File (BSMF), 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates are presented for births to all resident women in California. Population estimates are a three-year average, rounded down to the whole number.

‡ Maternal and Infant Health Assessment (MIHA) survey, 2012-2014. Percent (%), 95% confidence interval (95% CI) and annual population estimates (rounded to the nearest hundred) are weighted to represent all women in California. Population estimates are a three-year average.

§ California Birth Cohort File (CBCF), 2008-2012. Rate, 95% confidence interval (95% CI) and annual number of deaths are presented for all resident deaths to infants under one year of age. Number of deaths are a five-year average, rounded down to the whole number.

** California Patient Discharge Data linked to Vital Statistics files (PDD-VS), 2010-2012. Percent (%) and 95% confidence interval (95% CI) are presented for all resident women in California. Annual population estimate is a three-year average of the number of deliveries, rounded down to the whole number.

Definitions of indicators and additional BSMF, MIHA, CBCF and PDD-VS information are in the Appendix.

‖ This indicator is only available for 2013-2014.

This indicator is only available for 2012.

¶ This indicator is only available for 2013.

†† This indicator is only available for provisional 2015 data.

DEFINITION OF INDICATORS

OVERVIEW

Indicators and data sources included in this report are defined in this section. Unless otherwise noted, years for each data source are: 2012-2014 for the California Birth Statistical Master File (BSMF), 2008-2012 for the California Birth Cohort File (CBCF), 2012-2014 for the Patient Discharge Data linked to Vital Statistics files (PDD-VS), and 2012-2014 for the Maternal and Infant Health Assessment (MIHA) survey. The denominator for each indicator includes all women living in California (resident women) with a live birth in the years presented, unless otherwise indicated.

Births

Birth: Live births to California resident women. (BSMF)

Maternal characteristics

Age: Age of mother at time of birth. (BSMF)

Total live births: The number of live births the mother delivered prior to the most recent birth. Twins and triplets are considered one birth. (BSMF)

Education: Highest level of education completed by the mother at time of birth. (BSMF)

Marital status: At the time of birth, was single (never married); separated, divorced, or widowed; married or living with someone like they were married, but not legally married. (MIHA)

Income as a percent of poverty: Calculated from monthly family income, before taxes from all sources, including jobs, welfare, disability, unemployment, child support, interest, dividends, and support from family members, and the number of people living on that income. See the annual Poverty Guidelines published by the U.S. Department of Health and Human Services for more detail: aspe.hhs.gov/poverty/index.cfm. (MIHA)

Lives in a high poverty neighborhood: Lives in a neighborhood, as defined by census tract of residence, in which 20% or more of people are living below the federal poverty threshold. The estimated percent of people below poverty by census tract is obtained from American Community Survey 5-year estimates from the most recent year: http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml. (MIHA)

Language usually spoken at home: Usually speaks English or another language at home (if more than one language spoken, the one used most often; women who speak English and Spanish equally are included in the English-speaking group). (MIHA)

Birth outcomes and delivery

Gestational age among singletons: The best obstetric estimate of the infant's gestation in completed weeks based on the birth attendant's final estimate of gestation, also called the clinical estimate of gestation. A singleton birth occurs when there is only one infant born, not a twin or other multiple birth. Following National Center for Health Statistics (NCHS) guidelines, births with gestational age less than 17 weeks or greater than 47 weeks were excluded. (BSMF)

Birth weight among singletons: The body weight of an infant at its birth (shown in grams). A singleton birth occurs when there is only one infant born, not a twin or other multiple birth. Following NCHS guidelines, births with birth weight less than 227 grams or greater than 8,165 grams were excluded. (BSMF)

Very low birth weight infants born in a hospital with the appropriate level of care: Very low birth weight (less than 1,500 grams) infants born in a hospital with a Regional or Community Level Neonatal Intensive Care Unit (NICU), a subspecialty facility equipped to handle high-risk neonates. The list of approved Regional and Community hospitals for NICUs was provided by California Children's Services as of December 31, 2016. Following NCHS guidelines, births with birth weight less than 227 grams or greater than 8,165 grams were excluded. The denominator for this indicator includes all very low birth weight births that occurred in California, not limited by California resident status. (BSMF)

Cesarean section, among all women: Among all women with a live birth, delivery method at birth was cesarean section. The denominator for this indicator includes all live births that occurred in California, not limited by California resident status. (BSMF)

Cesarean section, among low risk women with a first birth: Among first-time mothers delivering a single baby in a head-down position after 37 weeks gestational age, delivery method at birth was cesarean section. Following NCHS guidelines, births with gestational age greater than 47 weeks were excluded. The denominator for this indicator includes all births to low risk women with a first birth that occurred in California, not limited by California resident status. (BSMF)

Infant mortality

Infant mortality: The number of deaths in live-born infants under one year of age per 1,000 live births. The infant mortality indicator computed from the birth cohort file comprises birth certificate information on all births that occur in a calendar year (denominator) plus death certificate information linked to the birth certificate for those infants who were born in that year but subsequently died within 12 months of birth (numerator). (CBCF)

Neonatal mortality: The number of deaths in live-born infants less than 28 days of age per 1,000 live births. The neonatal mortality indicator computed from the birth cohort file comprises birth certificate information on all births that occur in a calendar year (denominator) plus death certificate information linked to the birth certificate for those infants who were born in that year but subsequently died within 28 days of birth (numerator). (CBCF)

Postneonatal mortality: The number of deaths in infants 28 days to under one year of age per 1,000 live births. The postneonatal mortality indicator computed from the birth cohort file comprises birth certificate information on all births that occur in a calendar year (denominator) plus death certificate information linked to the birth certificate for those infants who were born in that year but subsequently died within 28 days to 12 months of birth (numerator). (CBCF)

Leading causes of infant death: The leading causes of infant death are ranked based on the National Center for Health Statistics' (NCHS) List of 130 Selected Causes of Infant Death.[1] The tabulation lists and rules for ranking leading causes of death are published in the NCHS Instructions Manual, Part 9, ICD-10 Cause-of-death Lists for Tabulating Mortality Statistics, Effective 1999.[2,3] (CBCF)

Sudden unexpected infant death (SUID): A special cause-of-death category, defined as the death of an infant under one year of age that occurs suddenly and unexpectedly, the cause of which is not immediately known before the death is investigated.[4] SUID is closely related to the narrower cause of infant death, sudden infant death syndrome (SIDS), which is defined as the sudden death of an infant younger than 1 year of age that cannot be explained even after a full investigation that includes a complete autopsy, examination of the death scene, and review of the clinical history.[5] (CBCF)

Maternal nutrition and weight

Daily folic acid use, month before pregnancy: Took a multivitamin, prenatal vitamin, or folic acid vitamin every day of the week during the month before pregnancy. (MIHA)

Prepregnancy weight: Body Mass Index (BMI) calculated from self-reported weight and height, classified as overweight (25-29.99) or obese (30+). BMI calculated only for women reporting height within 48-83 inches and weight within 75-399 pounds. BMI values outside 13-69.99 were also excluded. (BSMF)

Gestational weight gain: Adequacy of total weight gained during pregnancy, given prepregnancy BMI, was based on the National Academies of Science, Engineering and Medicine guidelines and restricted to women who delivered at 37-42 weeks gestation, singletons and twins, prenatal weight gain within 0-97 pounds, height within 48-83 inches, prepregnancy weight within 75-399 pounds, and BMI values within 13-69.99. See guidelines for more detail http://www.nationalacademies.org/hmd/Reports/2009/Weight-Gain-During-Pregnancy-Reexamining-the-Guidelines.aspx . (BSMF)

Food insecurity: Calculated from the modified U.S. Department of Agriculture (USDA) Food Security Module Six Item Short Form and categorized as low food security (reduced quality, variety or desirability of diet with little or no indication of reduced food intake) or very low food security (multiple indications of disrupted eating patterns and reduced food intake). Responses with one or two missing values were imputed. See USDA guidelines for more detail (https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/definitions-of-food-security.aspx). (MIHA)

Participated in WIC: WIC is the Special Supplemental Nutrition Program for Women, Infants, and Children. Participation in WIC during pregnancy was based on self-report on the MIHA survey. (MIHA)

Was eligible, but did not participate in WIC: Self-reported no WIC participation during pregnancy among women who either had Medi-Cal for prenatal care or delivery on the birth certificate, or self-reported an income in MIHA that was less than or equal to 185% of the Federal Poverty Guideline. (MIHA)

Received CalFresh (food stamps): CalFresh, formerly known as food stamps, is the California Supplemental Nutrition Assistance Program. (MIHA)

Maternal health conditions

In good to excellent health before pregnancy: Self-rated health just before pregnancy. (MIHA)

Maternal health conditions at delivery: Maternal health conditions in this report were calculated using California resident live births that successfully matched with the mother's delivery hospitalization record in the PDD-VS file. Multiple births (e.g., twins, triplets) were counted as one delivery. Maternal health conditions were identified based on International Classification of Diseases, Ninth Revision, Clinical

Modification (ICD-9-CM) diagnosis for the primary and up to 24 other diagnosis codes associated with each delivery record.

The use of ICD codes to assess maternal health conditions involves certain limitations. These ICD codes do not distinguish degrees of severity of the health condition. Also, it is unclear whether pre-existing medical conditions, such as pre-existing diabetes, chronic hypertension or asthma, are reported simply because of their existence or because of the development of problems during labor and delivery.[6,7]

Pre-existing diabetes: Linked delivery record with ICD-9-CM diagnosis codes 250 and 648.0. (PDD-VS)

Gestational diabetes: Linked delivery record with ICD-9-CM diagnosis code 648.8. (PDD-VS)

Hypertension (chronic or gestational): Linked delivery record with ICD-9-CM diagnosis codes 401, 642.0-642.7 and 642.9.[8] (PDD-VS)

Asthma: Linked delivery record with ICD-9-CM diagnosis code 493. (PDD-VS)

Childhood experiences of support and hardships experienced by the mother

Had adult support: During childhood through 13 years of age, had an adult who believed in her and who she could count on to help her most of the time. (MIHA)

Parents divorced or separated: During childhood through 13 years of age, a parent or guardian that she lived with got divorced or separated. (MIHA)

Parent had serious drug or alcohol problem: During childhood through 13 years of age, a parent or guardian that she lived with had a serious drinking or drug problem. (MIHA)

Family had problems paying for basic needs: During childhood through 13 years of age, her family had a hard time paying for basic needs like food or housing somewhat or very often. (MIHA)

Family moved due to problems paying rent or mortgage: During childhood through 13 years of age, had to move because of problems paying the rent or mortgage. (MIHA)

Parent had trouble with the law or went to jail: During childhood through 13 years of age, a parent or guardian got in trouble with the law or went to jail. (MIHA)

Family experienced hunger: During childhood through age 13 years, she or someone in her family went hungry because they could not afford enough food. (MIHA)

Was placed in foster care: During childhood through 13 years of age, she was placed in foster care (removed from her home by the court or child welfare agency). (MIHA)

Total number of hardships experienced by the mother during her childhood: Composite indicator measuring number of hardships experienced during the woman's childhood (from birth through age 13). Hardships included: a parent or guardian she lived with got divorced or separated; she moved because of problems paying the rent or mortgage; someone in her family went hungry because family could not afford enough food; her parent or guardian got in trouble with the law or went to jail; a parent or guardian she lived with had a serious drinking or drug problem; she was in foster care (removed from her home by

the court of child welfare agency), and very often or somewhat often her family experienced difficulty paying for basic needs like food or housing. (MIHA)

Somewhat or very often worried about racism throughout lifetime: During her life until now, she worried somewhat or very often that she might be treated or judged unfairly because of her race or ethnic group. (MIHA)

Support and hardships experienced during pregnancy

Had practical or emotional support: During pregnancy, had someone to turn to for practical help, like getting a ride somewhere, or help with shopping or cooking a meal; or someone to turn to if she needed someone to comfort or listen to her. (MIHA)

Became separated or divorced: Became separated or divorced from partner during pregnancy. (MIHA)

Homeless or did not have a regular place to sleep: Did not have a regular place to sleep at night (moved from house to house) or was homeless (had to sleep outside, in a car or in a shelter) during pregnancy. (MIHA)

Moved due to problems paying rent or mortgage: Had to move to a new address during pregnancy because of problems paying the rent or mortgage. (MIHA)

Woman or partner lost job: Lost job even though wanted to go on working, or husband or partner lost their job during pregnancy. (MIHA)

Woman or partner had pay or hours cut back: Had pay or hours cut back or partner had pay or hours cut back during pregnancy. (MIHA)

Someone close had a bad drug/drinking problem: During pregnancy, someone close to her had a bad problem with drinking or drugs. (MIHA)

Woman or partner went to jail: Went to jail or husband or partner went to jail during her pregnancy. (MIHA)

Intimate partner violence during pregnancy

Physical or psychological IPV during pregnancy: During pregnancy, experienced any of the following: pushed, hit, slapped, kicked, choked, or physically hurt in any way by current or former partner; frightened for safety of self, family, or friends because of current or former partner's anger/threats; current or former partner tried to control most/all daily activities. (MIHA)

Maternal mental health

Prenatal depressive symptoms: During pregnancy, experienced both of the following for two weeks or longer: felt sad, empty or depressed for most of the day; lost interest in most things she usually enjoyed. (MIHA)

Postpartum depressive symptoms: Since most recent birth, experienced both of the following for two weeks or longer: felt sad, empty or depressed for most of the day; lost interest in most things she usually enjoyed. (MIHA)

Mental disorder at delivery: Calculated using California resident live births that successfully matched with the mother's delivery hospitalization record in the PDD-VS file. Multiple births (e.g., twins, triplets) were counted as one delivery. Mental disorders were identified based on ICD-9-CM diagnosis for the primary and up to 24 other diagnosis codes associated with each delivery record. For this report, mental disorders were identified using the following ICD-9-CM codes: mood disorders (300.4, 311, 298.0, 296.0, 296.2, 296.3, 296.4, 296.5, 296.6, 296.7, 296.80, 296.81, 296.82, 296.89), anxiety disorders (300.0, 300.01, 300.2, 300.21, 300.3, 308.0, 309.81), adjustment disorders (309), substance use disorders (291, 292, 303, 304, 305, 648.3), psychotic disorders (295, 297), cognitive disorders (293.0, 293.1) and eating disorders (307.1, 307.50, 307.51, 307.52, 307.53, 307.54).[7] (PDD-VS)

Maternal substance use

Any smoking, 3 months before pregnancy: Smoked any cigarettes on an average day during the three months before pregnancy. (MIHA)

Any smoking, 3rd trimester: Smoked any cigarettes on an average day during the last three months of pregnancy. (MIHA)

Any smoking, postpartum: Smoked any cigarettes at the time of the survey. (MIHA)

Quit smoking during pregnancy: Smoked any cigarettes during the three months before pregnancy, but quit (did not smoke any cigarettes) in the 3rd trimester. (MIHA)

Postpartum smoking relapse among women who smoked before and quit during pregnancy: Smoked any cigarettes at the time of the survey, among women who smoked in the three months before pregnancy but quit in the 3rd trimester. (MIHA)

Any binge drinking, 3 months before pregnancy: Drank four or more alcoholic drinks in one sitting (within about two hours) at least one time during the three months before pregnancy. (MIHA)

Heavy drinking, 3 months before pregnancy: If age at least 21 years, drank seven or more alcoholic drinks in an average week during the three months before pregnancy. If under 21 years, drank any alcoholic drinks during the three months before pregnancy. (MIHA)

Any alcohol use, 3rd trimester: Drank any alcoholic drinks in an average week during the last three months of pregnancy. (MIHA)

Any binge drinking during pregnancy: Drank four or more alcoholic drinks in one sitting (within about two hours) at least one time during pregnancy, including before she knew she was pregnant for sure. (MIHA)

Neonatal abstinence syndrome (NAS) per 1,000 newborns: Calculated using California resident live births that successfully matched with the newborn's delivery hospitalization record in the PDD-VS file. Newborns with NAS were identified based on ICD-9-CM diagnosis for the primary and up to 24 other diagnosis codes associated with each hospitalization record. For this report, newborns with NAS were identified with ICD-9-CM code 779.5 (drug withdrawal syndrome in a newborn). Infants with presumed NAS caused by medical treatment were excluded as described elsewhere.[10] (PDD-VS)

Pregnancy intention and family planning

Intended pregnancy: Just before pregnancy, felt that she wanted to get pregnant. (MIHA)

Mistimed or unwanted pregnancy: Just before pregnancy, felt that she did not want to get pregnant or wanted to get pregnant later. (MIHA)

Unsure of pregnancy intentions: Just before pregnancy, felt that she was not sure if she wanted to get pregnant. (MIHA)

Optimal interpregnancy interval of at least 18 months: Among women with a prior live birth, the pregnancy for this birth began at least 18 months following the most recent live birth. The denominator includes only singleton births with gestational ages 17-47 weeks born to mothers aged 15-44 years. A singleton birth occurs when there is only one infant born, not a twin or other multiple birth. (BSMF)

Highly effective contraceptive method: At the time of the survey, woman or husband/partner were using an intrauterine device (Mirena, ParaGard, Sklya), implant (Implanon, Nexplanon), female sterilization, or vasectomy. Excluded from the denominator were women who were currently pregnant or had a hysterectomy/oophorectomy. (MIHA)

Moderately effective contraceptive method: At the time of the survey, woman or husband/partner were using birth control pills, patch, vaginal ring; or shots or injections (Depo-Provera). Excluded from the denominator were women who were currently pregnant or had a hysterectomy/oophorectomy. (MIHA)

Less effective contraceptive method: At the time of the survey, woman or husband/partner were using condoms, natural family planning (rhythm, temperature), or withdrawal. Excluded from the denominator were women who were currently pregnant or had a hysterectomy/oophorectomy. (MIHA)

Did not use contraception: At the time of the survey, woman or husband/partner were abstinent or were not using a method of contraception. Excluded from the denominator were women who were currently pregnant or had a hysterectomy/oophorectomy. (MIHA)

Infant sleep environment

Was told in the hospital to place infant on back to sleep: Among women with a hospital birth, was told by a doctor, nurse or other health care worker in the hospital to place her baby down to sleep on his/her back; excluding from the denominator women whose infant did not reside with them at the time of the survey. (MIHA, 2013)

Usually placed infant back to sleep: Put baby down to sleep on his or her back most of the time, excluding from the denominator women whose infant did not reside with them at the time of the survey. (MIHA)

Infant always or often shared bed: Baby always or often slept in the same bed with her or someone else, excluding from the denominator women whose infant did not reside with them at the time of the survey. (MIHA)

Breastfeeding practices

Before birth, intended to breastfeed with or without formula: Before delivery, planned to breastfeed only or to breastfeed and use formula, excluding from the denominator women whose infant did not reside with them at the time of the survey. (MIHA)

Experienced all 7 recommended practices supportive of breastfeeding while in the hospital: Among women with a hospital birth, experienced all of the following seven recommended hospital practices supportive of breastfeeding in the hospital: breastfeeding initiated within one hour of a vaginal birth or two hours after a caesarean section; baby stayed in the same room as mother for at least 23 hours each day at the hospital; baby was not fed anything other than breast milk in the hospital; baby did not use a pacifier in the hospital; hospital gave woman telephone number to call for help with breastfeeding postpartum; hospital did not give gift pack with formula; baby was held skin-to-skin for at least 30 minutes within 2 hours after birth; excluding from the denominator women whose infant did not reside with them at the time of the survey. (MIHA, 2013)

Initiated breastfeeding: Infant was ever breastfed or fed breast milk; excluding from the denominator women whose infant did not reside with them at the time of the survey. (MIHA)

Any breastfeeding, 2 months after delivery: Fed infant breast milk for at least two months after delivery with or without supplementing with formula, other liquids or food; excluding from the denominator women whose infant did not reside with them or whose infant was not yet three months old at the time of the survey (infant age calculated from date of birth on the birth certificate). (MIHA)

Exclusive breastfeeding, 2 months after delivery : Fed infant only breast milk (no supplementation with formula, other liquids or food) for at least two months after delivery; excluding from the denominator women whose infant did not reside with them or whose infant was not yet two months old at the time of the survey (infant age calculated from date of birth on the birth certificate). (MIHA)

Health insurance coverage

Prepregnancy/postpartum insurance: During the month before pregnancy/at the time of the survey, had Medi-Cal or a health plan paid for by Medi-Cal; private insurance through her or her husband's/partner's job, her parents, or purchased directly; or was uninsured. Women with both Medi-Cal and private insurance were categorized as Medi-Cal. Women with other forms of coverage, including military insurance, Indian Health Service, Healthy Families, Medicare, international insurance, were categorized as Other. Women were asked to provide the name of their health insurance plan, which was used to categorize insurance with greater precision. (MIHA)

Prenatal insurance: During pregnancy, had Medi-Cal or a health plan paid for by Medi-Cal; private insurance through her or her husband's/partner's job, her parents, or purchased directly; or was uninsured. Women with both Medi-Cal and private insurance were categorized as Medi-Cal. Women with other forms of coverage, including military insurance, Indian Health Service, Healthy Families, Medicare, international insurance, were categorized as Other. Women also were asked to provide the name of their health insurance plan, which was used to categorize insurance with greater precision. (MIHA)

Infant health insurance: Infant had Medi-Cal or a health plan paid for my Medi-Cal; private insurance through parent's job or purchased directly; or was uninsured. Infants with other forms of coverage, including military insurance, Indian Health Service, Healthy Families, California Children's Services or

Medicare, were categorized as Other. Women were asked to provide the name of their infant's health insurance plan, which was used to categorize insurance with greater precision. Women whose infant did not reside with them at the time of the survey were excluded from the denominator. (MIHA)

Health care utilization

Had a usual source of prepregnancy health care: Just before pregnancy, had a particular doctor, nurse, or clinic that she usually went to for health care. (MIHA)

Initiated prenatal care in 1st trimester: Had first prenatal care visit during the first trimester (first, second or third month) of pregnancy. (BSMF)

Received at least adequate prenatal care (Kotelchuck Index): Number of prenatal care visits received, calculated based on the expected number of visits given the infant's gestational age and the month that care began. Adequate care includes women who initiated prenatal care within first 4 months of pregnancy and received at least 80% of expected visits. The Kotelchuck Index uses recommendations for low-risk pregnancies, and may not measure the adequacy of care for high-risk women.[11] (BSMF)

Had a postpartum medical visit: Had a postpartum check-up for herself (the medical check-up 4-6 weeks after a woman gives birth). (MIHA)

Mom or infant needed but couldn't afford care postpartum: Since her most recent birth, there was a time when she needed to see a doctor or nurse for her own medical care or for her infant, but didn't go because she couldn't afford to pay for it. (MIHA)

Provider asked if she smoked: During any prenatal care visit, a doctor, nurse or other health care worker asked if she was smoking cigarettes. (MIHA, 2013-2014)

Provider asked if she drank alcohol: During any prenatal care visit, a doctor, nurse or other health care worker asked if she was drinking alcohol. (MIHA, 2013-2014)

Provider asked if she experienced IPV: During any prenatal care visit, a doctor, nurse or other health care worker asked if someone was hurting her emotionally or physically. (MIHA, 2013-2014)

Provider talked about appropriate weight gain: During any prenatal care visit, a doctor, nurse or other health care worker talked with her about how much weight she should gain during her pregnancy. (MIHA, 2013-2014)

Had a birth defects screening: Had any test for birth defects, including expanded AFP or prenatal screening, the integrated test, quad screen, amniocentesis or chorionic villus sampling (CVS). (MIHA, 2013-2014)

Immunizations during or after pregnancy

Received a flu shot during pregnancy: Received a flu shot during pregnancy. (MIHA, provisional 2015)

Received Tdap during pregnancy: Received a Tdap shot during pregnancy. A Tdap vaccination is a shot that protects against tetanus, diphtheria, and pertussis (whooping cough). (MIHA, provisional 2015)

Received Tdap at the hospital at delivery: Received a Tdap shot in the hospital when she delivered. A Tdap vaccination is a shot that protects against tetanus, diphtheria, and pertussis (whooping cough). (MIHA, provisional 2015)

Dental care during pregnancy

Had a dental visit during pregnancy: Visited a dentist, dental clinic or received dental care at any other health clinic during pregnancy. (MIHA, 2012)

Leading reasons for no dental care during pregnancy

Inadequate dental insurance: Among women who did not receive dental care during pregnancy, did not get care because they lacked dental insurance, thought Medi-Cal did not include dental coverage, or had insurance problems. (MIHA, 2012)

Did not think she needed dental care: Among women who did not receive dental care during pregnancy, did not get care because she did not think she needed dental care, she went before her pregnancy or she had no problems. (MIHA, 2012)

Cost was too high: Among women who did not receive dental care during pregnancy, did not get care because it cost too much. (MIHA, 2012)

Difficulties getting to dental care: Among women who did not receive dental care during pregnancy, did not get care because of logistical barriers including lack of childcare, transportation or she was too busy. (MIHA, 2012)

Did not think dental care was safe: Among women who did not receive dental care during pregnancy, did not get care because she did not think that during pregnancy it was safe to go to the dentist, to receive x-rays, or to be exposed to chemicals or medications, or was told by a lay person that dental care was unsafe during pregnancy. (MIHA, 2012)

Was nervous, afraid or embarrassed of her teeth: Among women who did not receive dental care during pregnancy, did not get care because she was nervous, afraid, embarrassed, or did not want to deal with dental problems. (MIHA, 2012)

ANNOTATION AND SUPPRESSION CRITERIA

Indicators from the BSMF, CBCF or PDD-VS based on rates with fewer than 10 events in the numerator during the reporting period are suppressed.

Indicators from the MIHA survey are suppressed when:

1. the sample numerator is less than 5,
2. the number of women in the population of interest (population denominator) is less than 100,
3. the relative standard error (RSE) is greater than 50%, or
4. a measure has been determined to address a sensitive topic and the prevalence is greater than 80% and the unweighted population divided by the weighted population is greater than 50%.

Additionally, estimates are annotated and users are warned to interpret with caution if the RSE is between 30% and 50%. The RSE is a commonly used measure of reliability, or precision, of survey estimates and is calculated using the following formulas:

For estimates with a prevalence <= 50%:

Standard error / estimate

For estimates with a prevalence >50%:

Standard error / (1 – estimate)

REFERENCES

Introduction

1. Garrow R, Korenbrot C, Crouch J, LeBeau M. American Indian and Alaska Native Health Assessment in California. California Rural Indian Health Board, Inc. (CRIHB); October 2010.

2. California Tribal Court-State Court Forum. Frequently Asked Questions: Indian Tribes and Tribal Communities in California. http://www.courts.ca.gov/documents/TribalFAQs.pdf. Accessed March 2018.

3. Bureau of Indian Affairs, Office of Trust Services, Division of Water and Power. Indian Lands in the United States. https://www.bia.gov/cs/groups/public/documents/text/idc013422.pdf. Published December 2014.

4. Indian Health Care Improvement Act, Pub. L. No. 94-437, Section 4(3), Approved September 30, 1976; 25 U.S.C. 1601.

5. Schmidt RW. American Indian Identity and Blood Quantum in the 21st Century: A Critical Review. *Journal of Anthropology*. 2011; Volume 2011(2011), Article ID 549521. doi:10.1155/2011/549521

6. Cook K. Cook: Women are the First Environment. *Indian Country Today*. Published December 23, 2003. Accessed August 14, 2018. Accessed at https://newsmaven.io/indiancountrytoday/archive/cook-women-are-the-first-environment-bZbKXN9CME-UabNOEhKgqg/.

Methods

1. Johnson S, Kao C, Korenbrot CC. Disparities in Deaths for American Indian and Alaska Natives who use Tribal Health Programs American Indian Health in California Report Series. California Rural Indian Health Board. December 2006;Volume 1, Report 1.

2. *Adjusting miscoding of Indian race on state death certificates*. Indian Health Service. November 1996

3. Garrow R, Korenbrot C, Crouch J, LeBeau M. American Indian and Alaska Native Health Assessment in California. California Rural Indian Health Board, Inc. (CRIHB); October 2010.

4. Bauer UE, Plescia M. Addressing Disparities in the Health of American Indian and Alaska Native People: The Importance of Improved Public Health Data. *Am J Public Health.* 2014 Jun;104 Suppl 3:S255-7. doi: 10.2105/AJPH.2013.301602. Epub 2014 Apr 22.

5. Grossman DC. Measuring disparity among American Indians and Alaska Natives; who's counting whom? *Med Care*. 2003 May;41(5):579-81.

6. Korenbrot CC, Ehlers S, Crouch JA. Disparities in hospitalizations of rural American Indians. *Med Care.* 2003;41:626–636.

7. Epstein M, Moreno R, Bacchetti P. The underreporting of deaths of American Indian children in California, 1979 through 1993. *Am J Public Healt*h. 1997;87:1363–1366.

8. Becker TM, Bettles J, Lapidus J, et al. Improving Cancer Incidence Estimates for American Indians and Alaska Natives in the Pacific Northwest. *Am J Public Health.* 2002 Sep;92(9):1469-71.

Births

1. Garrow R, Korenbrot C, Crouch J, LeBeau M. American Indian and Alaska Native Health Assessment in California. California Rural Indian Health Board, Inc. (CRIHB); October 2010.

2. California Tribal Court-State Court Forum. Native American Statistical Abstract: Population Characteristics. http://www.courts.ca.gov/documents/Tribal-ResearchUpdate-NAStats.pdf. Published March 2012.

Maternal characteristics

1. Braveman PA, Cubbin C, Egerter S, Williams DR, Pamuk E. Socioeconomic Disparities in Health in the United States: What the Patterns Tell Us*. American Journal of Public Health*. 2010;100(S1):S186–S196. doi: 10.2105/AJPH.2009.166082.

2. Braveman P, Marchi K, Egerter S, et al. Poverty, Near-Poverty, and Hardship Around the Time of Pregnancy. *Matern Child Health J*. 2010;14(20). doi:10.1007/s10995-008-0427-0.

3. Blumenshine P, Egerter S, Barclay CJ, Cubbin C, Braveman PA.. Socioeconomic Disparities in Adverse Birth Outcomes: A Systematic Review. *American Journal of Preventive Medicine.* 2012;39(3):263–72. doi: 10.1016/j.amepre.2010.05.012.

4. Centers for Disease Control and Prevention (CDC). Poverty and Infant Mortality -- United States, 1988. *MMWR Morb Mortal Wkly Rep*. 1995;44(49);923-7

5. Beyers M, Brown J, Cho S, et al. Life and death from unnatural causes: Health and social inequity in Alameda County. Oakland, CA: Alameda County Public Health Department; April 2008.

Birth outcomes and delivery

1. Mathews TJ, MacDorman MF, Thoma ME. Infant mortality statistics from the 2013 period linked birth/infant death data set. *National vital statistics reports*; vol 64 no 9. Hyattsville, MD: National Center for Health Statistics; 2015.

2. Institute of Medicine. Preterm Birth: Causes, consequences, and prevention. Washington DC: National Academy Press; 2007.

3. Raglan GB, Lannon SM, Jones KM, Schulkin J. Racial and Ethnic Disparities in Preterm Birth Among American Indian and Alaska Native Women. *Matern Child Health J*. 2016;20:16–24. doi: 10.1007/s10995-015-1803-1.

4. March of Dimes. Low Birthweight. March of Dimes. http://www.marchofdimes.org/complications/low-birthweight.aspx#. Published October 2014. Accessed November 7, 2016.

5. US Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau. Child Health USA 2014. Preterm Birth and Low Birth Weight. http://mchb.hrsa.gov/chusa14/health-status-behaviors/infants/preterm-birth-low-birth-weight.html. Accessed December 1, 2016.

6. Kim SY, Sharma AJ, Sappenfield W, Wilson HG, Salihu HM. Association of Maternal Body Mass Index, Excessive Weight Gain, and Gestational Diabetes Mellitus With Large-for-Gestational-Age Births. *Obstet Gynecol*. 2014;123(4):737–744. doi:10.1097/AOG.0000000000000177.

7. Rockhill K, Dorfman H, Srinath M, Hogue C. The Effects of Prepregnancy Body Mass Index and Gestational Weight Gain on Fetal Macrosomia Among American Indian/Alaska Native Women. *Matern Child Health J.* 2015;19(11):2480-91.

Infant mortality

1. Mathews TJ, MacDorman MF, Thoma ME. Infant mortality statistics from the 2013 period linked birth/infant death data set. *National Vital Statistics Reports*; vol 64 no 9. Hyattsville, MD: National Center for Health Statistics; 2015.

2. MacDorman MF, Mathews TJ. Understanding racial and ethnic disparities in U.S. infant mortality rates. *NCHS data brief*; no 74. Hyattsville, MD: National Center for Health Statistics; 2011.

3. Centers for Disease Control and Prevention (CDC). Quick Stats: Leading Causes of Neonatal and Postneonatal Deaths — United States, 2002. *MMWR Morb Mortal Wkly Rep*. 2005;54(38):966.

4. Wong CA, Gachupin FC, Holman RC, et al. American Indian and Alaska Native Infant and Pediatric Mortality, United States, 1999–2009. *Am J Public Health*. 2014;104 Suppl 3:S320-8. doi: 10.2105/AJPH.2013.301598

5. Centers for Disease Control and Prevention (CDC). Postneonatal mortality among Alaska Native infants - Alaska, 1989-2009. *MMWR Morb Mortal Wkly Rep*. 2012 Jan 13;61(1):1-5.

6. Shapiro-Mendoza CK, Tomashek KM, Anderson RN, Wingo J. Recent national trends in sudden, unexpected infant deaths: More evidence supporting a change in classification or reporting. *Am J Epidemiol.* 163(8):762–9. 2006.

7. Willinger M, James LS, Catz C. Defining the sudden infant death syndrome (SIDS): deliberations of an expert panel convened by the National Institute of Child Health and Human Development. *Pediatr Pathol*. 1991;11(5):677-684.

8. Centers for Disease Control and Prevention. Sudden Unexpected Infant Death and Sudden Infant Death Syndrome. https://www.cdc.gov/sids/aboutsuidandsids.htm. Page last updated October 3, 2016. Accessed November 8, 2016.

9. AAP Task Force on Sudden Infant Death Syndrome. SIDS and Other Sleep-Related Infant Deaths: Updated 2016 Recommendations for a Safe Infant Sleeping Environment. *Pediatrics.* 2016;138(5):e20162938.

Maternal nutrition and weight

1. Halpern, P. Obesity and American Indians/Alaska Natives. Washington DC: U.S. Department of Health and Human Services Office of the Assistant Secretary for Planning and Evaluation. April 2007.

2. Institute of Medicine. *Weight Gain During Pregnancy: Reexamining the Guidelines*. Washington, DC: The National Academies Press; 2009.

3. United States Department of Agriculture, Economic Research Service. Definitions of Food Security. http://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/definitions-of-food-security.aspx. Page last updated October 4, 2016. Accessed November 21, 2016.

4. National Research Council, Committee on National Statistics, Division of Behavioral and Social Sciences and Education. *Food Insecurity and Hunger in the United States: An Assessment of the Measure*. Washington, DC: The National Academies Press. 2006.

5. Gordon A, Oddo V. Addressing Child Hunger and Obesity in Indian Country: Report to Congress. Mathematica Policy Research; 2012.

6. Carmichael SL, Yang W, Feldkamp ML*, et al.* Reduced risks of neural tube defects and orofacial clefts with higher diet quality. *Archives of pediatrics & adolescent medicine.* 2011; 2011.2185 v2011.

7. Stotland NE, Cheng YW, Hopkins LM, Caughey AB. Gestational weight gain and adverse neonatal outcome among term infants. *Obstetrics & Gynecology.*2006;108**:** 635-643.

8. *Making Connections: Understanding Women's Reasons for Not Enrolling in WIC during Pregnancy, California 2010-2012*. Sacramento: California Department of Public Health, Center for Family Health; 2016.

Maternal health conditions

1. Amparo P, Farr SL, Dietz PM. Chronic disease risk factors among American Indian/Alaska Native women of reproductive age. *Prev Chronic Dis*. 2011;8(6):A118.

2. US Department of Health and Human Services, Indian Health Service, The Federal Health Program for American Indians. Disparities. https://www.ihs.gov/newsroom/factsheets/disparities/. Published March 2016. Accessed December 22, 2016.

3. American College of Obstetricians and Gynecologists. ACOG Practice Bulletin. Clinical management guidelines for obstetrician-gynecologists. Number 60, March 2005. Pregestational diabetes mellitus. *Obstet Gynecol.* 2005;105:675–685.

4. Wallis AB, Saftlas AF, Hsia J, Atrash HK. Secular trends in the rates of preeclampsia, eclampsia, and gestational hypertension, United States, 1987-2004. *Am J Hypertens*. 2008;21(5):521-526.

5. American College of Allergy, Asthma & Immunology. Pregnancy and Asthma. American College of Allergy, Asthma & Immunology. http://acaai.org/asthma/who-has-asthma/pregnancy. Accessed November 17, 2016.

6. American College of Obstetricians and Gynecologists. ACOG Releases New Recommendations on the Management of Asthma During Pregnancy. American College of Obstetricians and Gynecologists. http://www.acog.org/About-ACOG/News-Room/News-Releases/2008/ACOG-Releases-New-Recommendations-on-the-Management-of-Asthma. Accessed November 17, 2016.

Hardships and protective factors across the maternal life course

1. Lu MC, Halfon N. Racial and ethnic disparities in birth outcomes: a life-course perspective. *Maternal Child Health Journal*. March 2003; 7(1):13-30.

2. NCAI Policy Research Center. (2015). Resilience & Trauma: A Backgrounder. 2015. Washington, DC: National Congress of American Indians.

3. Alhusen JL, Bower KM, Epstein E, Sharps P. Racial Discrimination and Adverse Birth Outcomes: An Integrative Review. *J Midwifery Womens Health*. 2016 Nov;61(6):707-720. doi: 10.1111/jmwh.12490. Epub 2016 Oct 13.

4. March of Dimes. Issue Brief: Stress and Pregnancy. http://www.marchofdimes.org/materials/Maternal-Stress-Issue-Brief-January2015.pdf. Published January 2015.

5. Hobel CJ, Goldstein A, Barrett ES. Psychosocial stress and pregnancy outcome. *Clin Obstet Gynecol.* 2008;51(2):333-48.

Intimate partner violence during pregnancy

1. Centers for Disease Control and Prevention. Adverse health conditions and health risk behaviors associated with intimate partner violence --- United States, 2005. *Morbidity and Mortality Weekly Report* (*MMWR*) *57*(05): 113-117.

2. US Department of Justice, Office of Justice Programs, Bureau of Justice Statistics; American Indians and Crime, 1992-96 Report.

3. BigFoot DS, Schmidt SR. Honoring children, mending the circle: cultural adaptation of trauma-focused cognitive-behavioral therapy for American Indian and Alaska native children. *J Clin Psychol*. 2010 Aug;66(8):847-56. doi: 10.1002/jclp.20707.

4. Futures without violence. The facts on Violence Against American Indian/Alaskan Native Women. http://www.futureswithoutviolence.org/userfiles/file/Violence%20Against%20AI%20AN%20Women%20Fact%20Sheet.pdf. Accessed December 22,2016.

5. Bachman R et al. Violence Against American Indian and Alaska Native Women and the Criminal Justice Response: What is Known. Federally-funded grant report submitted to National Criminal Justice Reference Service, US Department of Justice. https://www.ncjrs.gov/pdffiles1/nij/grants/223691.pdf. Accessed March 9, 2018.

6. Estefan LF, Coulter ML, VandeWeerd C. Depression in Women Who Have Left Violent Relationships: The Unique Impact of Frequent Emotional Abuse. *Violence Against Women*. Oct 2016; 22(11):1397-413. doi: 10.1177/1077801215624792. Epub 2016 Jan 29.

7. Sarkar NN. The impact of intimate partner violence on women's reproductive health and pregnancy outcome. *J Obstet Gynaecol*. Apr 2008; 28(3):266-71. doi: 10.1080/01443610802042415.

8. The National Child Traumatic Stress Network. Children and Domestic Violence. http://www.nctsn.org/content/children-and-domestic-violence. Accessed November 22, 2016.

9. Appel AE, Holden GW. The co-occurrence of spouse and physical child abuse: A review and appraisal. *J of Family Psychol.* 1998;12:578–599.

10. Margolin G, Gordis AB. The Effects of Family and Community Violence on Children. *Annual Review of Psychology.* February 2000;51:445-479.

Maternal mental health

1. Manson SM, Altschul DB. Cultural Diversity Series: Meeting the Mental Health Needs of American Indians and Alaska Natives. http://www.icctc.org/Meeting%20the%20Mental%20Health%20Needs%20of%20AI-AN%202004.pdf 2004.

2. Katherine JG, Sheila MM. Effect of Maternal Mental Illness on Pregnancy Outcomes. *Expert Rev of Obstet Gynecol*. 2008;3(3):391-401.

3. Maternal, Child and Adolescent Health Needs Assessment for the California Maternal and Child Health Services Title V Block Grant 2011-2015. Sacramento: California Department of Public Health, Center for Family Health; Maternal, Child and Adolescent Health Division; 2011.

4. American Academy of Periodontology. Baby Steps to Healthy Pregnancy and On-Time Delivery. http://www.perio.org/consumer/pregnancy.htm. Accessed May 15, 2010.

5. Halbreich U, Karkun S. Cross-cultural and social diversity of prevalence of postpartum depression and depressive symptoms. *J Affect Disord*. Apr 2006;91(2-3):97-111.

6. Dietz PM, Williams SB, Callaghan WM, Bachman DJ, Whitlock EP, Hornbrook MC. Clinically identified maternal depression before, during, and after pregnancies ending in live births. *Am J Psychiatry*. Oct 2007; 164(10):1515-1520.

7. Schetter CD, Tanner L. Anxiety, depression and stress in pregnancy: implications for mothers, children, research, and practice. *Curr Opin Psychiatry*. March 2012; 25(2): 141–148. doi:10.1097/YCO.0b013e3283503680.

8. American College of Obstetricians and Gynecologists. Postpartum Depression. http://www.acog.org/publications/patient_education/bp091.cfm. Accessed May 15, 2010.

9. *Young Children Develop in an Environment of Relationships: Working Paper No. 1.*: National Scientific Council on the Developing Child; 2004.

10. Shonkoff JP, Boyce WT, McEwen BS. Neuroscience, molecular biology, and the childhood roots of health disparities: building a new framework for health promotion and disease prevention. *JAMA.* Jun 3 2009;301(21):2252-2259.

11. Leigh B, Milgrom J. Risk factors for antenatal depression, postnatal depression and parenting stress. *BMC Psychiatry*. 2008;8:24. doi:10.1186/1471-244X-8-24.

12. Dennis CL, McQueen K. The relationship between infant-feeding outcomes and postpartum depression: a qualitative systematic review. *Pediatrics.* Apr 2009;123(4):e736-751.

Maternal substance use

1. Whitesell NR, Beals J, Crow CB, Mitchell CM, Novins DK. Epidemiology and etiology of substance use among American Indians and Alaska Natives: risk, protection, and implications for prevention. *Am J Drug Alcohol Abuse*. 2012 Sep;38(5):376-82. doi: 10.3109/00952990.2012.694527.

2. National Native Network, Keep It Sacred. Traditional Tobacco. http://keepitsacred.itcmi.org/tobacco-and-tradition/traditional-tobacco-use/. Accessed December 22,2016.

3. National Native Network, Keep It Sacred. Commercial Tobacco. http://keepitsacred.itcmi.org/tobacco-and-tradition/commercial-tobacco/. Accessed December 22, 2016.

4. Centers for Disease Control and Prevention. Current Cigarette Smoking Among Adults—United States, 2005–2014. *MMWR Morb Mortal Wkly Rep.* 2015;64(44):1233–40. Accessed November 2, 2016.

5. Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality. Results from the 2013 National Survey on Drug Use and Health: Detailed Tables. https://www.samhsa.gov/data/sites/default/files/NSDUH-DetTabs2013/NSDUH-DetTabs2013.htm Accessed November 2, 2016.

6. Curtin SC, Mathews TJ. Smoking prevalence and cessation before and during pregnancy: Data from the birth certificate, 2014. *Natl Vital Stat Rep.* 2016 Feb 10;65(1):1-14.

7. Center for Disease Control and Prevention. Trends in Smoking Before, During, and After Pregnancy – Pregnancy Risk Assessment Monitoring System, United States, 40 Sites, 2000-2010. *MMWR Morb Mortal Wkly Rep.* 2013; 62(SS06):1-19.

8. Satter DE, Roby DH, Smith LM and Wallace SP. Costs of Smoking and Secondhand Smoke Exposure in California American Indian Communities. Los Angeles, CA: UCLA Center for Health Policy Research, 2010.

9. Hodge FS, Fredericks L, Kipnis P. Patient and smoking patterns in northern California American Indian Clinics. Urban and rural contrasts. *Cancer*. 1996 Oct 1;78(7 Suppl):1623-8.

10. Hodge FS, Cummings S, Fredericks L, Kipnis P, Williams M, Teehee K. Prevalence of smoking among adult American Indian clinic users in northern California. *Prev Med*. 1995 Sep;24(5):441-6.

11. US Department of Health and Human Services. The Health Consequences of Smoking—50 Years of Progress: A Report of the Surgeon General. Atlanta: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health; 2014.

12. Task Force on Sudden Infant Death Syndrome. SIDS and Other Sleep-Related Infant Deaths: Evidence Base for 2016 Updated Recommendations for a Safe Infant Sleeping Environment. *Pediatrics*. 2016; 138(5)e20162940; doi: 10.1542/peds.2016-2940

13. Smoking cessation during pregnancy. Committee Opinion No. 471. American College of Obstetricians and Gynecologists. *Obstet Gynecol.* 2010;116:1241–4.

14. Khan BA, Robinson RF, Smith JJ, Dillard DA. Prenatal alcohol exposure among Alaska Native/American Indian infants. *International Journal of Circumpolar Health.* 2013;72:10.3402/ijch.v72i0.20973. doi:10.3402/ijch.v72i0.20973.

15. Centers for Disease Control and Prevention. Prescription Opioid Overdose Data. http://www.cdc.gov/drugoverdose/data/overdose.html. Published June 21, 2016.

16. Ko JY, Patrick SW, Tong VT, Patel R, Lind JN, Barfield WD. Incidence of Neonatal Abstinence Syndrome — 28 States, 1999–2013. *MMWR Morb Mortal Wkly Rep.* 2016;65:799–802. doi: http://dx.doi.org/10.15585/mmwr.mm6531a2

Pregnancy intention and family planning

1. March of Dimes. Fact sheet: Birth Spacing and Birth Outcomes. http://www.marchofdimes.org/materials/MOD-Birth-Spacing-Factsheet-November-2015.pdf. November 2015. Accessed November 23, 2016.

2. Santelli J, et al. The measurement and meaning of unintended pregnancy. *Perspectives on Sexual and Reproductive Health*. 2003;35(2):94–101.

3. Secura G. Long-acting reversible contraception: a practical solution to reduce unintended pregnancy. *Minerva Ginecologica.* 2013;65(3):271-7.

4. Nelson AL, Kaunitz AM. Long-Acting Reversible Contraception: An Important Solution to Reduce Unintended Pregnancy. *Am J Obstet Gynecol*. 2017 Mar 8. pii: S0002-9378(17)30415-5. doi: 10.1016/j.ajog.2017.03.004.

Breastfeeding practices

1. Ip S, Chung M, Raman G, Chew P, et al. Breastfeeding and maternal and infant health outcomes in developed countries: evidence report/ technology assessment no. 153. Rockville, MD: Agency for Healthcare Research and Quality; 2007. AHRQ Publication No. 07-E007**.**

2. Eidelman AI, Schanler RJ, Johnston M, et al. Breastfeeding and the use of human milk. *Pediatrics.* 2012;129(3):e827-e841.

3. *The Ten Steps to Successful Breastfeeding, Protecting, Promoting and Supporting Breast-feeding: The Special Role of Maternity Services.* Geneva: WHO, 1989.

Maternal and infant health insurance

1. Garrow R, Korenbrot C, Crouch J, LeBeau M. American Indian and Alaska Native Health Assessment in California. California Rural Indian Health Board, Inc. (CRIHB); October 2010.

2. US Department of Health and Human Services, Indian Health Service, The Federal Health Program for American Indians. Frequently Asked Questions for Patients. https://www.ihs.gov/forpatients/faq/ Accessed November 23, 2016.

Healthcare utilization

1. Handler, A. & Johnson, K. A Call to Revisit the Prenatal Period as a Focus for Action Within the Reproductive and Perinatal Care Continuum. *Matern Child Health J.* 2016;20:2217. doi:10.1007/s10995-016-2187-6

2. Centers for Disease Control and Prevention. Recommendations to Improve Preconception Health and Health Care - United States: a Report of the CDC/ATSDR Preconception Care Work Group and the Select Panel on Preconception Care. Vol 55. Atlanta, GA: Centers for Disease Control and Prevention; 2006.

3. Centers for Disease Control and Prevention. Updated Recommendations for Use of Tetanus Toxoid, Reduced Diphtheria Toxoid and Acellular Pertussis Vaccine (Tdap) in Pregnant Women – Advisory Committee on Immunization Practices (ACIP), 2012. *MMWR Morb Mortal Wkly Rep*. 2013; 62(07); 131-135.

4. Centers for Disease Control and Prevention. Prevention and Control of Seasonal Influenza with Vaccines. Recommendations of the Advisory Committee on Immunization Practices – United States, 2013-2014. *MMWR Morb Mortal Wkly Rep*. 2013; 62(07).

5. California Department of Public Health. Influenza (Flu) and Other Respiratory Diseases. https://www.cdph.ca.gov/healthinfo/discond/pages/influenza(flu).aspx. Last Updated on November 18, 2016. Accessed November 23, 2016.

6. Centers for Disease Control and Prevention. Pregnant Women & Influenza (Flu). http://www.cdc.gov/flu/protect/vaccine/pregnant.htm. Last Updated on November 14, 2016. Accessed November 23, 2016.

7. Creanga AA, et al. Severity of 2009 pandemic influenza (H1N1) virus infection in pregnant women. *Obstet Gynecol*. 2010;115(4): 717-26

8. Poehling KA, Szilagyi PG et al. Impact of Maternal Immunization on Influenza Hospitalizations in Infants. *Am J Obstet Gynecol*. 2011;204(6 Suppl 1): S141-S148.

9. Centers for Disease Control and Prevention. American Indians, Alaska Natives, and the Flu. http://www.cdc.gov/features/aianflu/. Published November 13, 2014. Accessed December 1, 2016.

10. California Department of Public Health. Pertussis (Whooping Cough). https://www.cdph.ca.gov/healthinfo/discond/pages/pertussis.aspx. Accessed December 16, 2016.

11. California Department of Public Health (CDPH). Pertussis Summary Reports. http://www.cdph.ca.gov/programs/immunize/Pages/PertussisSummaryReports.aspx. Updated June 27, 2016. Accessed September 12, 2016.

12. Murphy TV, Syed SB, Holman RC, et al. Pertussis-associated hospitalizations in American Indian and Alaska Native infants. *J Pediatr*. 2008;152(6):839-43. doi: 10.1016/j.jpeds.2007.11.046.

13. Adekoya N, Truman B, Landen M; Centers for Disease Control and Prevention. Incidence of notifiable diseases among American Indians/Alaska Natives - United States, 2007-2011. *MMWR Morb Mortal Wkly Rep*. 2015;64(1):16-9.

14. The Pew Charitable Trusts. Fact Sheet: The Oral Health Crisis Among Native Americans. http://www.pewtrusts.org/en/research-and-analysis/fact-sheets/2015/06/the-oral-health-crisis-among-native-americans. Published July 23, 2015. Accessed December 2, 2016.

15. Demmer RT, Jacobs DR, Jr., Desvarieux M. Periodontal disease and incident type 2 diabetes: results from the First National Health and Nutrition Examination Survey and its epidemiologic follow-up study. *Diabetes Care.* Jul 2008;31(7):1373-1379.

16. Azarpazhooh A, Leake JL. Systematic review of the association between respiratory diseases and oral health. *J Periodontol*. Sep 2006;77(9):1465-1482.

17. Humphrey LL, Fu RW, Buckley DI, Freeman M, Helfand M. Periodontal Disease and Coronary Heart Disease Incidence: A Systematic Review and Meta-analysis. *Journal of General Internal Medicine*. Dec 2008;23(12):2079-2086.

18. Williams RC, Beck JD, Offenbacher SN. The impact of new technologies to diagnose and treat periodontal disease - A look to the future. *Journal of Clinical Periodontology*. Mar 1996;23(3):299-305.

19. Scannapieco FA, Bush RB, Paju S. Associations between periodontal disease and risk for atherosclerosis, cardiovascular disease, and stroke. A systematic review. *Annals of periodontology / the American Academy of Periodontology.* Dec 2003;8(1):38-53.

20. Department of Health and Human Services. Oral Health in America: A Report of the Surgeon General. Rockville, MD: U.S. Department of Health and Human Services, National Institute of Dental and Craniofacial Research, National Institutes of Health; 2000.

21. Chambrone L, Pannuti CM, Guglielmetti MR, Chambrone LA. Evidence grade associating periodontitis with preterm birth and/or low birth weight: II: a systematic review of randomized trials evaluating the effects of periodontal treatment. *J Clin Periodontol*. Oct 2011;38(10):902-914.

22. Clothier B, Stringer M, Jeffcoat MK. Periodontal disease and pregnancy outcomes: exposure, risk and intervention. Best practice & research. *Clinical obstetrics & gynaecology*. Jun 2007;21(3):451-466.

23. Xiong X, Buekens P, Fraser WD, Beck J, Offenbacher S. Periodontal disease and adverse pregnancy outcomes: a systematic review. *BJOG*. Feb 2006;113(2):135-143.

24. Boggess KA, Beck JD, Murtha AP, Moss K, Offenbacher S. Maternal periodontal disease in early pregnancy and risk for a small-for-gestational-age infant. *Am J Obstet Gynecol.* May 2006;194(5):1316-1322.

25. Boggess KA, Berggren EK, Koskenoja V, Urlaub D, Lorenz C. Severe preeclampsia and maternal self-report of oral health, hygiene, and dental care. *J Periodontol*. Feb 2013;84(2):143-151.

26. Berkowitz RJ. Causes, treatment and prevention of early childhood caries: a microbiologic perspective. *J Can Dent Assoc.* May 2003;69(5):304-307.

27. Chaffee BW, Gansky SA, Weintraub JA, Featherstone JD, Ramos-Gomez FJ. Maternal oral bacterial levels predict early childhood caries development. *J Dent Res*. Mar 2014;93(3):238-244.

28. ACOG. Committee Opinion No. 569: oral health care during pregnancy and through the lifespan. *Obstet Gynecol.* Aug 2013;122(2 Pt 1):417-422.

29. CDA. Oral health during pregnancy & early childhood: evidence-based guidelines for health professionals. Sacramento, CA: California Dental Association Foundation; 2010.

30. California Department of Public Health. Status of Oral Health in California: Oral Disease Burden and Prevention 2017. Sacramento, CA: California Department of Public Health, Oral Health Program; 2017.

Conclusion

1. California Rural Indian Health Board. Commercial Tobacco Free Policy Guide. Sacramento, CA: California Rural Indian Health Board.

1. Montag A, Clapp JD, Calac D, Gorman JR, Chambers C. A review of evidence-based approaches for reduction of alcohol consumption in native women who are pregnant or of reproductive age. Am J Drug Alc Abuse. Sep 2012;35(5):436-43.

2. Koss MP, Yuan NP, Dightman D, Prince RJ, Polacca M, Sanderson B, Goldman D. Adverse childhood exposures and alcohol dependence among seven Native American tribes. Am J Prev Med. Oct 2003;25(3)238-44.

3. Whitbeck LB, Chen X, Hoyt DR, Adams GW. Discrimination, historical loss and enculturation: culturally specific risk and resiliency factors for alcohol abuse among American Indians. J Stud Alcohol. Jul 2004;65(4):409-18.

4. Whitbeck LB, Hoyt DR, McMorris BJ, Chen X, Stubben JD. Perceived discrimination and early substance abuse among American Indian children. *J Health Soc Behav*. Dec 2001;42(4):405-24.

5. Yoder KA, Whitbeck LB, Hoyt DR, LaFromboise T. Suicidal ideation among American Indian youths. *Arch Suicide Res*. 2006;10(2):177-90.

Technical documentation

1. World Health Organization (WHO). International statistical classification of diseases and related health problems, 10th Revision (ICD-10). 2nd ed. Geneva, Switzerland. 2004.

2. National Center for Health Statistics (NCHS). ICD-10 cause-of-death lists for tabulating mortality statistics, effective 1999. NCHS instruction manual: part 9. Hyattsville, MD: Public Health Service. 1999.

3. Heron M. Deaths: Leading causes for 2014. National vital statistics reports; vol 65 no 5.Hyattsville, MD: National Center for Health Statistics. 2016.

4. Shapiro-Mendoza CK, Tomashek KM, Anderson RN, Wingo J. Recent national trends in sudden, unexpected infant deaths: More evidence supporting a change in classification or reporting. *Am J Epidemiol.* 2006;163(8):762–9.

5. Willinger M, James LS, Catz C. Defining the sudden infant death syndrome (SIDS): deliberations of an expert panel convened by the National Institute of Child Health and Human Development. *Pediatr Pathol*. 1991;11(5):677-684.

6. Danel I, Berg C, Johnson CH, Atrash H. Magnitude of maternal morbidity during labor and delivery: United States, 1993–1997. *Am J Public Health.* 2003;93:631–4.

7. Dennison C, Pokras R. Design and operation of the National Hospital Discharge Survey: 1988 redesign. *Vital Health Stat 1*. 2000;(39):1-42.

8. Berg CJ, MacKay AP, Qin C, Callaghan WM. Overview of Maternal Morbidity During Hospitalization for Labor and Delivery in the United States, 1993-1997 and 2001-2005. *Obstet Gynecol*. 2009;113(5):1075-81.

9. Trends in Maternal Morbidity, California 2007 to 2009. Report of Statewide and County levels of preexisting maternal health conditions, pregnancy complications, severe maternal and neonatal complications. Sacramento: California Department of Public Health, Center for Family Health, Maternal, Child and Adolescent Health Division; 2016.

10. Patrick SW et al. Neonatal Abstinence Syndrome and Associated Health Care Expenditures, United States, 2000-2009. *JAMA*. 2012;307(18):1934-40.

11. Kotelchuck, M. An Evaluation of the Kessner Adequacy of Prenatal Care Index and a Proposed Adequacy of Prenatal Care Utilization Index. *Am J Public Health*. 1994; 84:1414-1420".

California American Indian / Alaska Native Maternal and Infant Health Status Report.
Sacramento: California Department of Public Health, Center for Family Health; 2019.