



1B.

**NATALITY:
MATERNAL CHARACTERISTICS AND NEWBORN'S HEALTH**

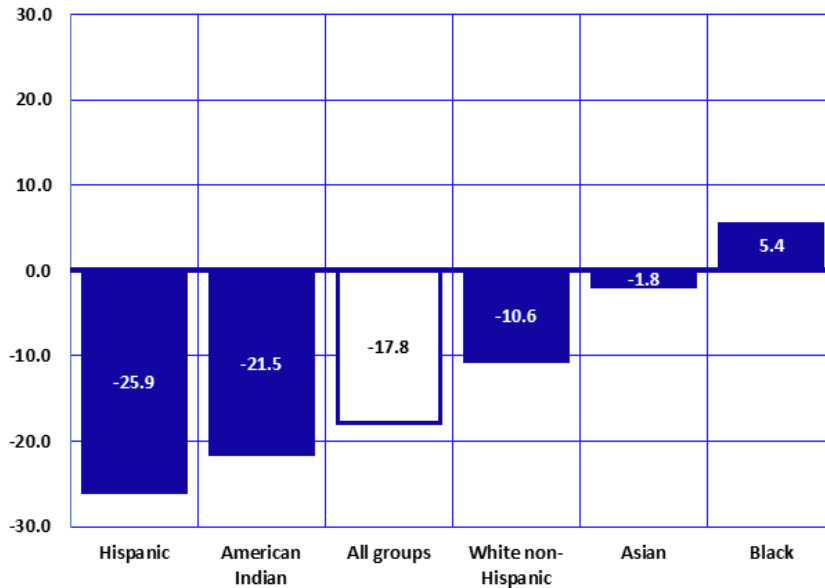
The number of resident births reached its recent peak in 2007 at 102,687 (**Table 1B-2**). In 2008, the number of resident births declined to 99,215; the first annual decline since 1991 (which, like 2008, also was an economic downturn year). Since 2008, the number of births declined until 2013, reaching a low of 84,963 resident births, the lowest number of births recorded in Arizona since 1999 (80,505). In 2016, there were 84,404 resident births, representing a reduction from the 85,024 births that occurred in 2015.

There were striking differences in how the number of births changed from 2007 to 2016 by mother's race/ethnicity. Compared to 2007, the number of births for all combined racial/ethnic groups was 17.8 percent lower in 2016, although the number of births rose by 5.4 percent for Black or African American mothers. Hispanic or Latino women experienced a decrease of 25.9 percent during this period (**Figure 1B-1**).

Since the 2008 edition of this report, we have been pointing out that Hispanics, unlike any other racial/ethnic group in the State were hit the hardest by the recession, which may explain the decline in their birth rate. However, it is important to note that the decline in births to Hispanic or Latino mothers started before the recession, then accelerated during the recession and even as the economy was recovering. Meanwhile, the estimated number of Hispanic women of childbearing age (15–44 years) has increased from 405,306 in 2007 to 487,076 in 2016. Hence, the decrease in Hispanic births may only be attributed in part to the unfavorable economic conditions of this group, and to a large extent to changes in childbearing behaviors, as more Hispanic women are delaying motherhood.

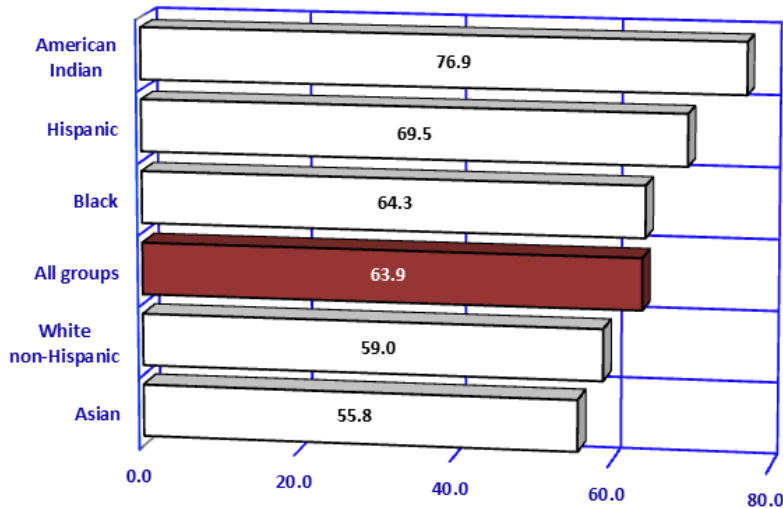
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Figure 1B-1
Percent Change from 2007 to 2016 in the Number of Resident Live Births by
Mother's Race/Ethnicity, Arizona



From 2007 to 2016, the number of resident live births declined by 17.8 percent (**Figure 1B-1**). All racial/ethnic groups experienced a decrease in the number of live births, with the exception of Blacks. The magnitude of the reduction in the number of births was the largest among Hispanics or Latinos (-25.9 percent) and American Indians (-21.5 percent).

Figure 1B-2
General Fertility Rates^a by Race/Ethnicity among Females of all Ages,
Arizona, 2016



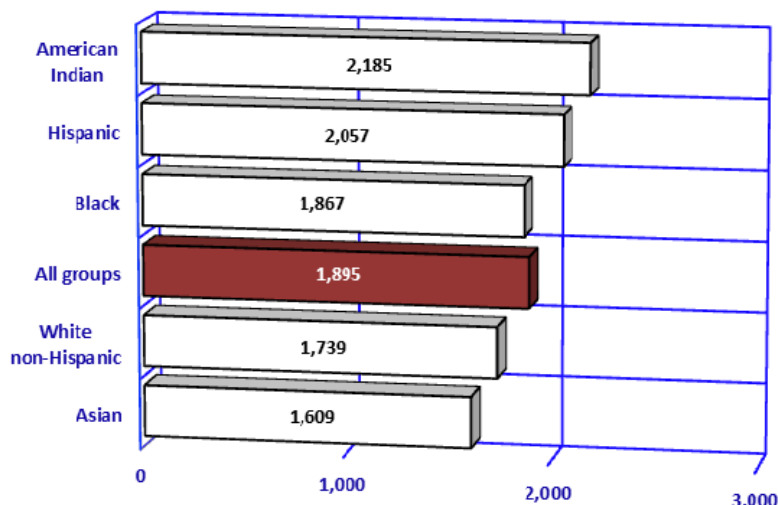
From among 1,320,640 women of childbearing age (15-44 years), 6.4 percent gave birth in 2016. The *general fertility rate* (the number of births per 1,000 women 15-44 years old; GFR) was the highest for American Indian followed by Hispanic females, and Black females. The GFR for Asian females was the lowest of all racial/ethnic groups.

A comparison of fertility rates by county in Arizona is provided in **Table 5A-1**.

Note: ^a Number of births per 1,000 females 15-44 years old in specified group.

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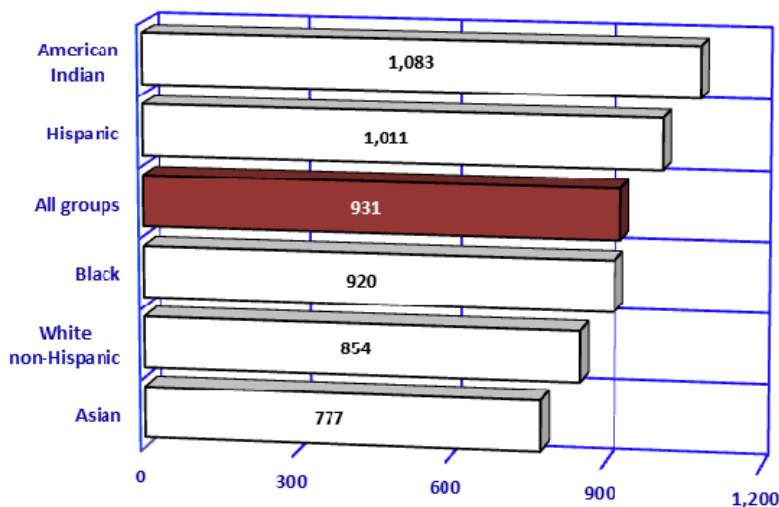
Figure 1B-3
Total Fertility Rates^a by Race/Ethnicity, Arizona, 2016



The *total fertility rate* (TFR) indicates the average number of births to a hypothetical cohort of 1,000 women, if they experienced the age-specific birth rates observed in a given year throughout their childbearing years. From 2003 to 2008, Arizona's TFRs always exceeded the rate of "replacement" (2,110 births per 1,000 women, **Table 1B-1**). The "replacement" rate is considered the value at which a given generation can exactly replace itself. The TFR was 2,058 births per 1,000 women of childbearing age in 2009 and 2010, decreasing to 1,895 in 2016. The 2016 TFR of 2,185 for American Indian women exceeded the generation replacement rate by 3.0 percent. The rate for Asian women (1,609) was 23.7 percent lower than the replacement rate.

Notes: ^a The sum of age group-specific birth rates multiplied by five (the number of years in the age group). The rate of 1,895 above for example, means that if a hypothetical group of 1,000 women were to have the same birth rates in each age group that were observed in the actual childbearing population in 2016, they would have a total of 1,895 children (or 1.9 children each) by the time they reached the end of the reproductive period (taken here as age 50), assuming that all of the women survived to that age.

Figure 1B-4
Gross Reproduction Rates^a by Race/Ethnicity, Arizona, 2016

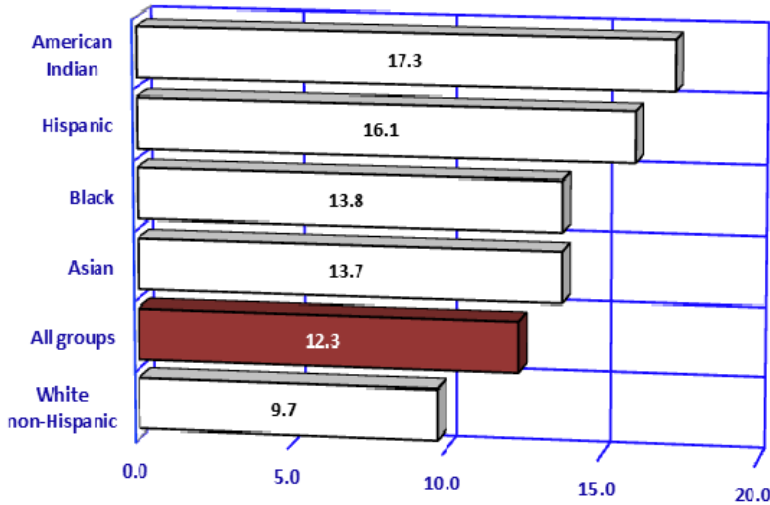


Another measure used to summarize reproduction patterns is the *gross reproduction rate* (GRR). It represents the average number of daughters born to a hypothetical cohort of 1,000 women if they experienced the age-specific birth rates observed in a given year throughout their childbearing years. This measure is similar to the total fertility rate except that it measures only female births, since reproduction is largely dependent on the number of females in a given population. In 2016, the gross reproduction rates in Arizona ranged from 777 for Asian women to 1,083 for American Indian women (**Figure 1B-4, Table 1B-1**).

Notes: ^a The sum of birth rates by 5-year age groups multiplied by the proportion of births which were female. The gross reproduction rate represents the average number of daughters born to a hypothetical cohort of 1,000 women if they experienced the age-specific birth rates observed in a given year throughout their childbearing years, and if none of the cohort was to die during their childbearing years.

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Figure 1B-5
Birth Rates by Race/Ethnicity, Arizona, 2016



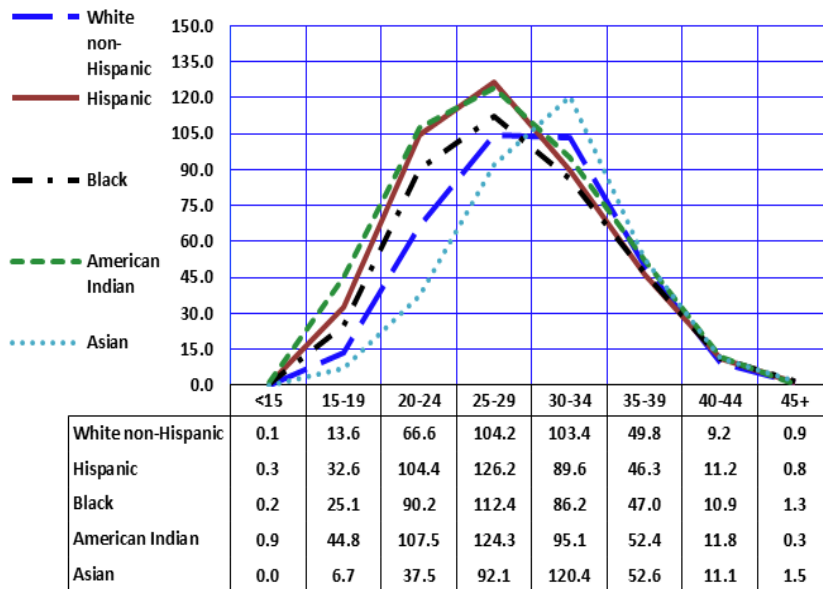
The crude birth rate, often simply called the birth rate, relates the number of births to the total population in a specified group. The birth rate is expressed as the total number of births per 1,000 persons, without regard to the age or sex distribution of the population.

The birth rate for Arizona decreased slightly from 12.6 in 2015 to 12.3 in 2016.

In 2016 the crude birth rates by mother's race/ethnicity ranged from 9.7 births per 1,000 White non-Hispanics to 17.3 per 1,000 American Indians (**Figure 1B-5**).

Note: ^a Number of births per 1,000 population in specified group.

Figure 1B-6
Birth Rates^a by Mother's Age Group and Race/Ethnicity, Arizona, 2016



The age-specific birth rates (the number of births to mothers in a particular age group per 1,000 women in that age group) differed substantially by race/ethnicity (**Figure 1B-6**).

In 2016, American Indian and Hispanic women had the highest birth rates for women under the age of 25 years. The birth rates for women between the ages of 30-34 and 34-39 were the highest among Asian women. In general, Hispanic, Black, and American Indian women tend to give birth at younger ages than Asian and non-Hispanic White women.

Note: ^a Number of births per 1,000 females in specified group.

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Figure 1B-7
Percent of Births to Unmarried Mothers by Age Group, Arizona, 2016

Unmarried mothers have accounted for an increasing annual proportion of births throughout the 1980s and 1990s, with 44.8 percent in 2016 (Table 1B-2). In 2016, 37,843 infants were born to unmarried mothers compared to 44,746 in 2006 (Table 1B-26). It is important to note that beginning 2015, divorced mothers have been included in the proportion of unmarried mothers; therefore caution should be exercised in comparing data for this year to those of the previous years.

A decade ago, the proportion of births among unmarried women aged 20-24 years was 80.8 percent, while in 2016, approximately 67 percent of mothers 20-24 years old were unmarried (Figure 1B-7).

Births and birth ratios by mother's marital status, age group, and race/ethnicity are given in (Table 1B-22). County-level information is provided in (Table 5B-14 and 5B-15).

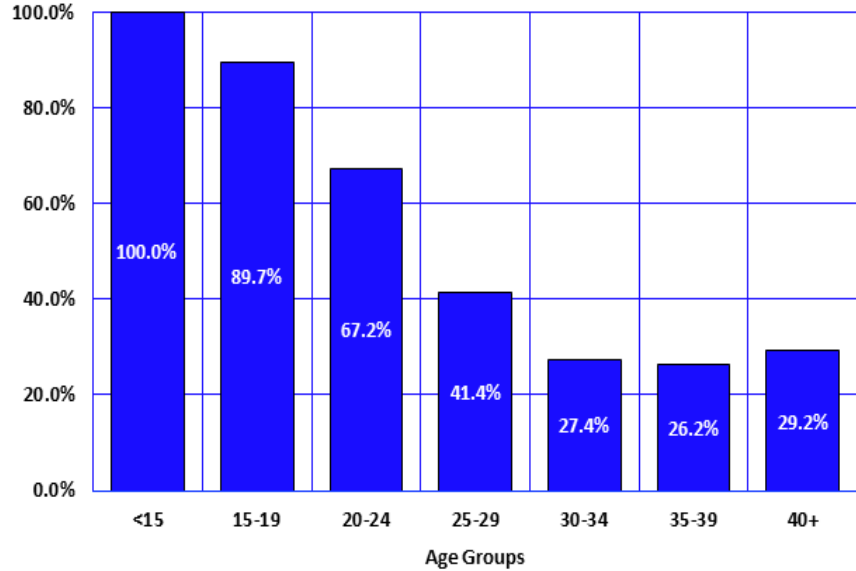
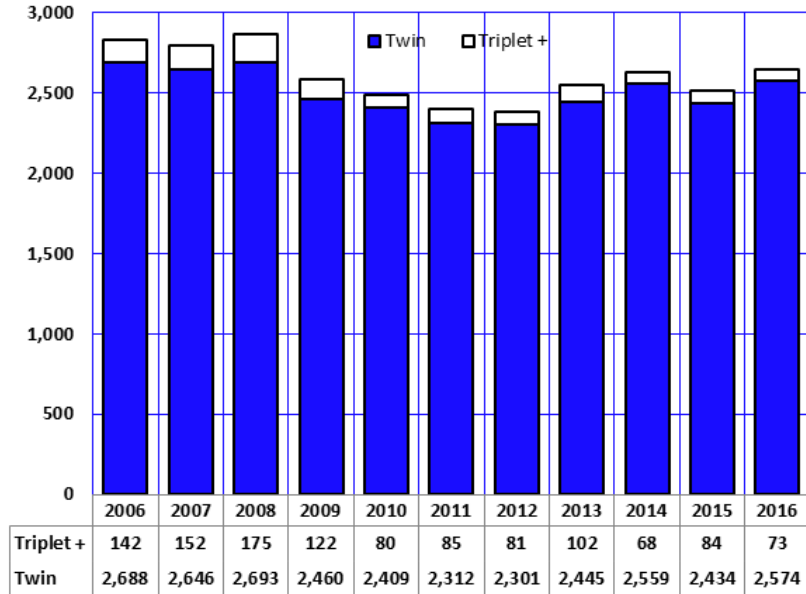


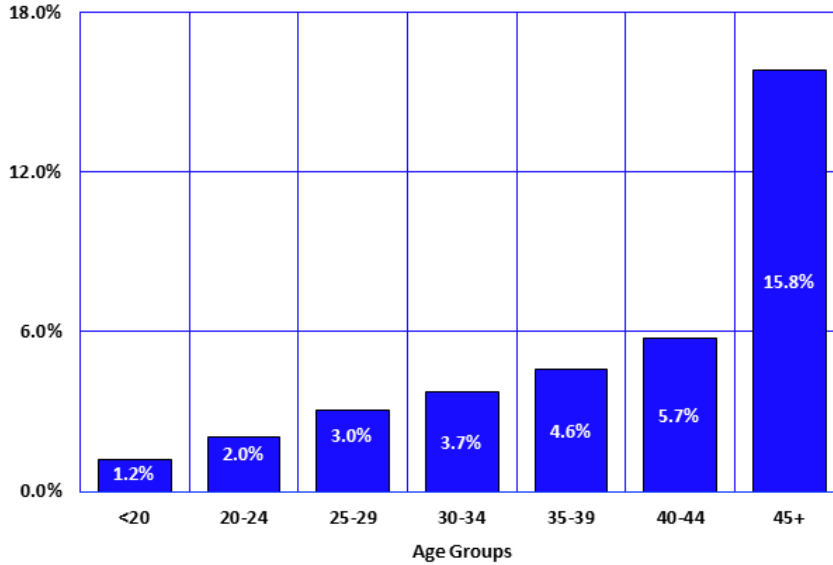
Figure 1B-8
Number of Births in Twin and Triplet+ Deliveries by Year, Arizona, 2006-2016

The number of multiple birth events in Arizona declined from 2,868 in 2008, (the highest number ever recorded) to 2,647 in 2016 (Figure 1B-8). The number of babies born in twin deliveries decreased from 2,693 in 2008 to 2,574 in 2016 (Figure 1B-8). The number of triplets and higher order multiple birth events decreased by 58.3 percent from 175 in 2008 to 73 in 2016.



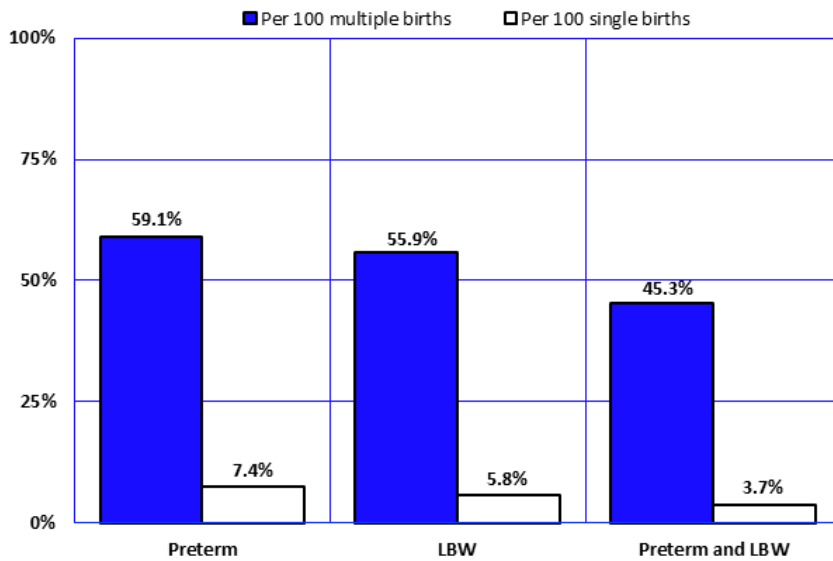
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Figure 1B-9
Multiple Births by Mother's Age Group, Arizona, 2016



In 2016, the proportion of multiple births gradually increased with maternal age among mothers below 45 years of age and sharply increased among mothers age 45 years and older. Among women aged 45 years and older, 15.8 percent of all births were twins, triplets, or quadruplets (**Figure 1B-9**). The percent of all births that were multiple births to women age 45 and over increased from 12.4 percent in 2015 to 15.8 percent in 2016. Ongoing monitoring of multiple births among older mothers will help better understand the recent variation that has been found in this measure.

Figure 1B-10
Infants Born too Early (Preterm)^a and Infants Born too Small (LBW)^b among Multiple and Single Births, Arizona, 2016



Infants born in multiple deliveries tend to be born at shorter gestation age and with low birth weight than those born in singleton deliveries (**Figure 1B-10**). In 2016, infants born in multiple deliveries were 12.2 times more likely (45.3 vs. 3.7 percent) to be born earlier than expected (at less than 37 completed weeks of gestation) and smaller (at less than 2,500 grams) than singleton births.

Preterm birth is a leading cause of infant morbidity and mortality, accounting for 58.9 percent of all infant deaths (only those with matching death records); (**Figure 2C-4** in section 2C on Age-Specific Mortality). The weight of the newborn also is an important predictor of future morbidity and mortality. Infants born at low birth weight (<1,500 grams) account for 48.6 percent of all infant deaths (**Figure 2C-3**).

Notes: ^a Preterm is < 37 weeks of gestation; ^b Low birthweight is less than 2,500 grams or 5 pounds 8 ounces.

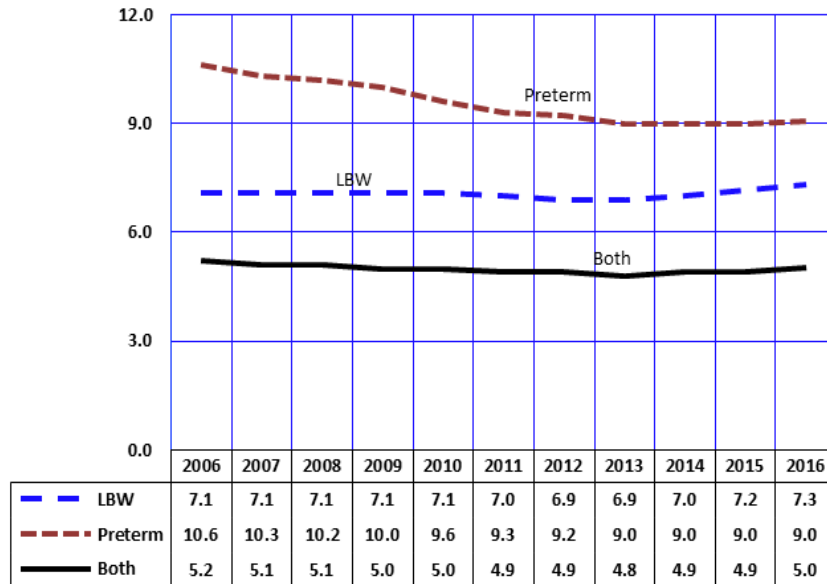
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Figure 1B-11
Preterm^a and Low Birthweight (LBW)^b Births by Year, Arizona, 2006-2016

The proportion of preterm births remained unchanged at 9.0 percent of all births since 2013.

The proportion of infants born prematurely and who were also low birth weight (LBW; at less than 2,500 grams) slightly increased from 4.9/100 births in 2015 to 5.0/100 births in 2016 (Figure 1B-11).

Detailed characteristics of births by birthweight and gestational age are provided in Table 1B-32. Comparative data by county of residence are available in Table 5B-16 – Table 5B-24.

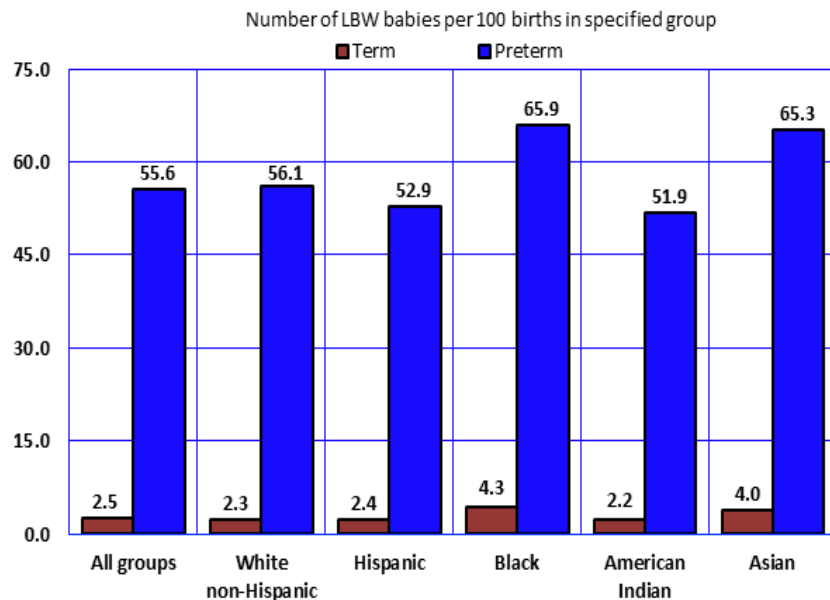


Notes: ^a Preterm: < 37 weeks of gestation; ^b Low birthweight (less than 2,500 grams or 5 pounds 8 ounces); In this report, the primary measure used to determine the gestational age is the clinical estimate of gestation as reported on the birth certificate.

Figure 1B-12
Low-Birthweight (LBW) Births by Length of Gestation and Mother's Race/Ethnicity, Arizona, 2016

From 2006 to 2016, between 7.1 and 7.3 percent of all babies were born at low birthweight (LBW), or at less than 2,500 grams (5 pounds 8 ounces). Preterm delivery is the strongest risk factor for LBW. Infants born at less than 37 completed weeks of gestation were 16.5 times (65.3 vs. 4.0 percent) more likely to be LBW than infants born at term (Figure 1B-12). Seven out of ten (68.7 percent) LBW babies born in 2016 were preterm (Table 1B-3).

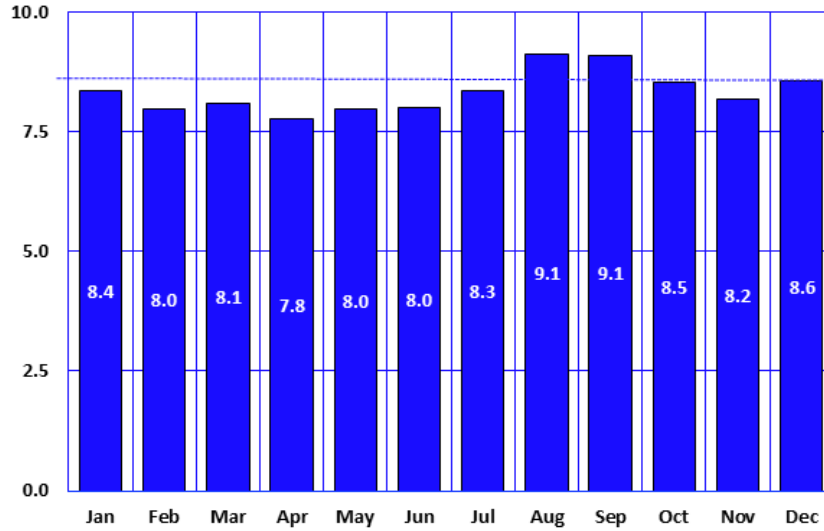
County-level data for LBW newborns are available in Tables 5B-16 – 5B-23. Community-level information is in Table 9A.



Notes: Number of LBW babies per 100 births in specified group; Preterm: < 37 weeks of gestation; Low birthweight (less than 2,500 grams or 5 pounds 8 ounces).

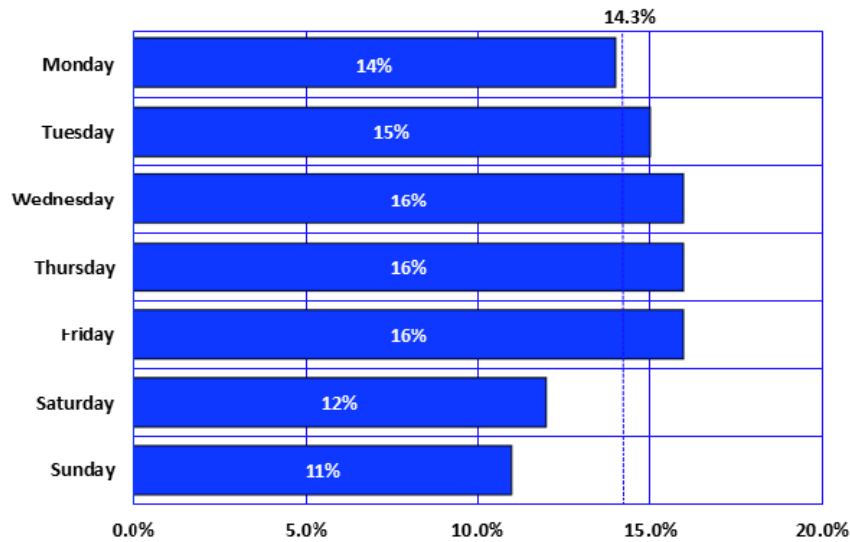
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Figure 1B-13
Percent of Resident Births by Month, Arizona, 2016



Historically, births in Arizona have peaked during August and September, with a monthly average around 8.3 percent. (**Figure 1B-13**). In 2016, the seasonal fluctuation of the frequency of births is marked by peak in August, September, and December.

Figure 1B-14
Percent of Resident Births by Day of the Week, Arizona, 2016

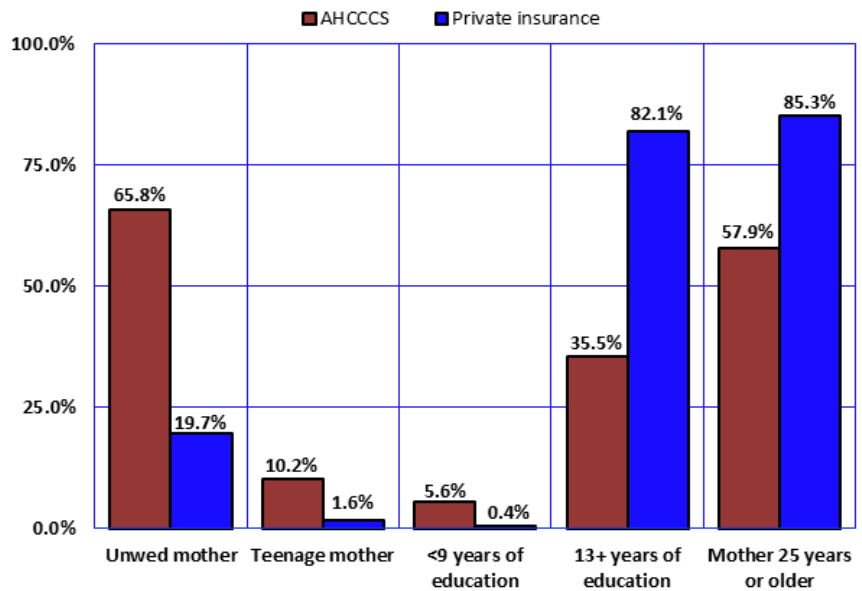


On average 231 infants were born per day in 2016 to Arizona residents. The daily average of resident live births in 2016 was substantially lower on weekends than on weekdays (**Figure 1B-14**). Many studies suggest that weekly, daily, and hourly variations observed in hospitals and clinics are not due to a biological rhythm of labor, but to increased frequency of obstetric interventions in the timing of delivery (induced labors and elective cesarean deliveries), making it more aligned with the work week schedule.

In 2016, only 8.0 percent of cesarean deliveries occurred on Sundays, compared to 16.3 percent on Mondays. The average rate of induction of labor was substantially lower on weekend days (11.1 percent) than it was on week days (15.6 percent).

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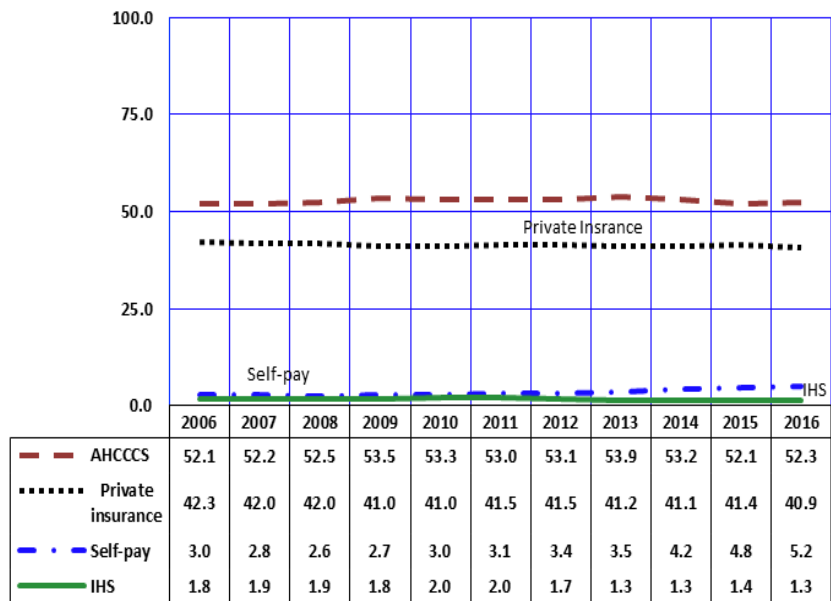
Figure 1B-15
Comparison of Selected Sociodemographic Characteristics by the Payer for Delivery, Arizona, 2016



The number of years of maternal education was the only possible proxy of socioeconomic status (SES) on the birth certificate prior to 1989. Paying party for the delivery became another SES indicator in 1989. The Arizona Health Care Cost Containment System (AHCCCS, the State's Medicaid Program) versus private health insurance (PHI) compares mothers of lower and higher SES respectively. PHI mothers were 2.3 times more likely to have some college education than were AHCCCS mothers (82.1 and 35.5 percent respectively, **Figure 1B-15**). Around 6 percent of AHCCCS mothers had 0-8 years of education, 14.8 times the proportion of PHI mothers. Only 19.7 percent of mothers with PHI were unmarried compared to 65.8 percent of AHCCCS mothers. Eight out of ten mothers with PHI were at least 25 years old compared to 6 out of 10 AHCCCS mothers.

Notes: The Arizona Health Care Cost Containment System (AHCCCS) is the State's Medicaid program.

Figure 1B-16
Births by Payer and Year, Arizona, 2006-2016



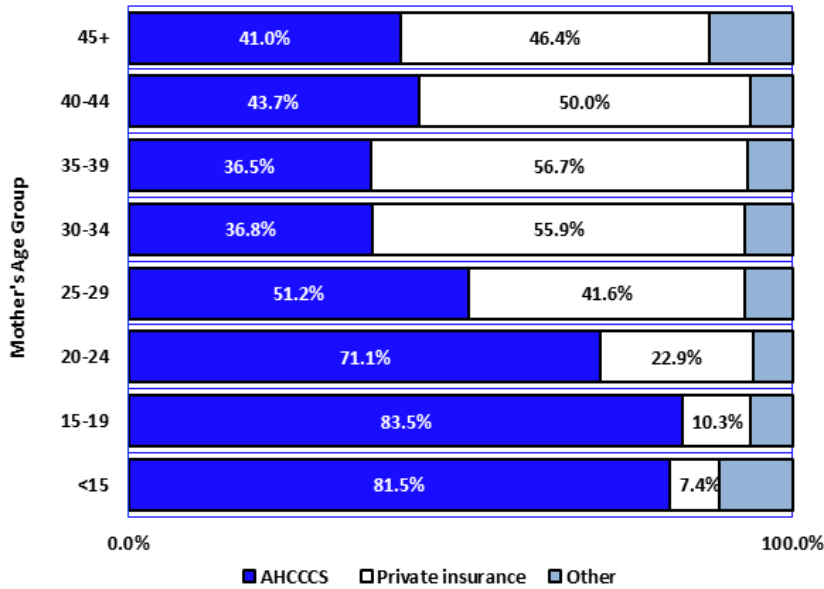
Since 2002, the share of resident births paid for by AHCCCS has exceeded the share paid by private health insurance (**Figure 1B-16**). In 2006, private insurance funded 42.3 percent of births and AHCCCS paid for 52.1 percent of births. Compared to 2006, AHCCCS paid for 0.4 percent fewer births in 2016 and private insurance paid for 3.3 percent fewer births in 2016.

The share of AHCCCS funded births varied little from 2006 to 2016. The share of private health insurance also remained stable during this time period. In 2016, the payment source was the mothers themselves and/or their families (i.e. self-pay) in 4.8 percent of the deliveries. The Indian Health Service (IHS) paid for 1.4 percent of the births in 2015, a proportion that remained unchanged from last year (**Table 1B-25 and Table 1B-27**).

Notes: The Arizona Health Care Cost Containment System (AHCCCS) is the State's Medicaid program; IHS is the Indian Health Service.

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Figure 1B-17
Payer for Delivery by Mother's Age Group, Arizona, 2016



In 2016, the Arizona Health Care Cost Containment System (AHCCCS) paid for the majority of the deliveries to mothers 29 years or younger (**Figure 1B-17**). In contrast, private insurance was the largest payer for the deliveries of women giving birth who were 30 years old or older in 2016 (based on data in **Table 1B-28**).

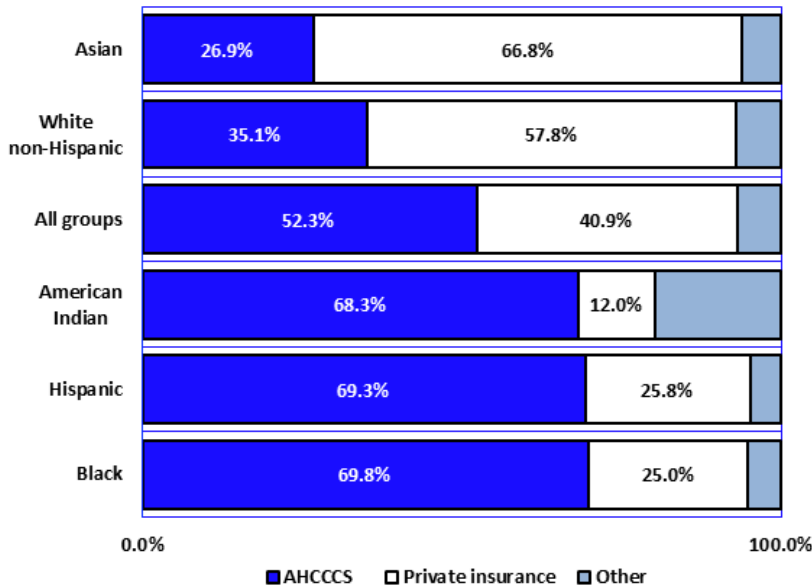
For each of the age groups the AHCCCS share substantially increased since 1989. Below are the proportions of deliveries paid for by AHCCCS in 1989:

- <15 years: 45.3 percent
- 15-19 years: 49.0 percent
- 20-24 years: 34.3 percent
- 25-29 years: 19.4 percent
- 30-34 years: 14.5 percent
- 35-39 years: 13.9 percent
- 40+ years: 14.2 percent.

From 1989 to 2016, the share of births paid for by AHCCCS more than doubled among mothers 20 years old or younger.

Notes: The Arizona Health Care Cost Containment System (AHCCCS) is the State's Medicaid program.

Figure 1B-18
Payer for Delivery by Mother's Race/Ethnicity, Arizona, 2016



In 2016, private insurance was the largest payer for deliveries of Asian (66.8 percent) and White non-Hispanic infants (57.8 percent). In contrast, the Arizona Health Care Cost Containment System was the largest payer for deliveries of Black or African American (69.8 percent), Hispanic or Latino (69.3 percent), and American Indian women (68.3 percent).

The Indian Health Service as a payer accounted for 17.9 percent of deliveries of American Indian or Alaska Native infants in the State (**Figure 1B-18**, based on data in **Table 1B-27**).

Hispanics or Latinos accounted for 53.2 percent of the 44,146 deliveries paid for by AHCCCS. About 30 percent of all AHCCCS births were to White non-Hispanic women (based on data in **Table 1B-27**).

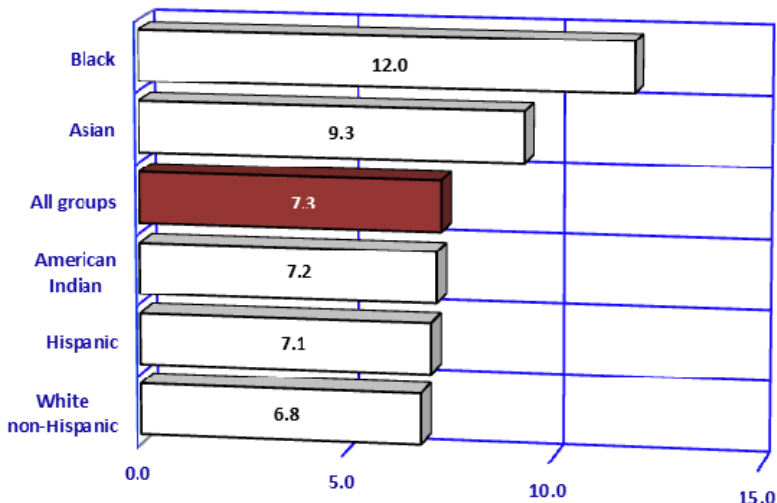
Notes: The Arizona Health Care Cost Containment System (AHCCCS) is the State's Medicaid program; Other includes Indian Health Service, self-pay, or unknown.

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Figure 1B-19
Percent of Low Birthweight^a by Mother's Race/Ethnicity,
Arizona Residents, 2016

In 2016, 7.3 percent of all Arizona infants were born at a low birthweight (LBW), or at less than 2,500 grams (5 pounds 8 ounces).

In Arizona, LBW rates differed by mother's racial/ethnic group. LBW rates were highest for newborns of Black or African American mothers (12.0 percent), Asian or Pacific Islander mothers (9.3 percent), and American Indian mothers (7.2 percent). Newborns of Hispanic and White non-Hispanic had the lowest LBW rates (7.1 and 6.8 percent respectively; based on data in **Table 1B-25**).

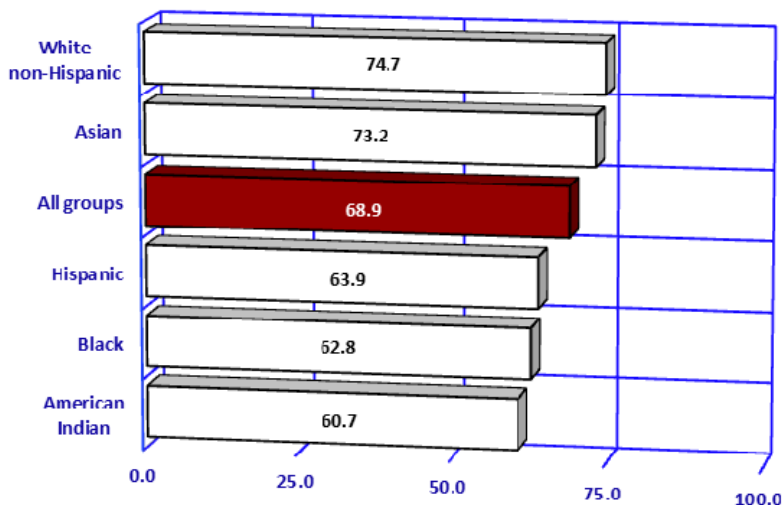


Notes: ^a Low birthweight is less than 2,500 grams (less than 5 pounds 8 ounces).

Figure 1B-20
First Trimester Prenatal Care by Mother's Race/Ethnicity,
Arizona Residents, 2016

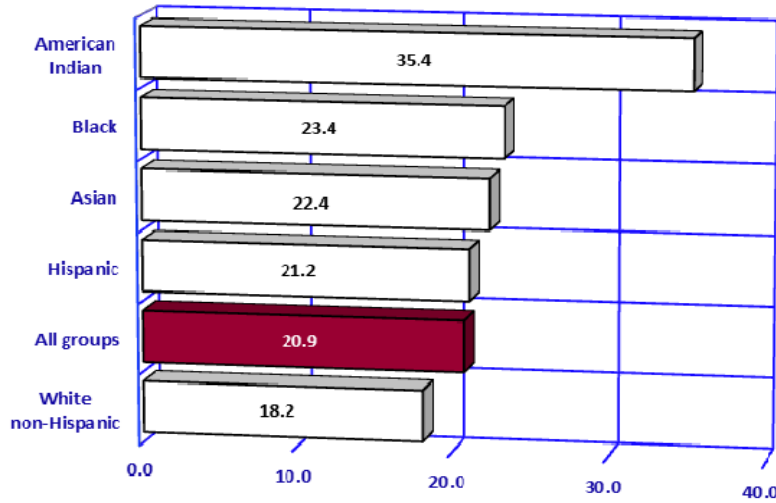
The percent of Arizona mothers giving birth who received early prenatal care (i.e., in the first trimester) has remained relatively stable from 2008 (79.4 percent) to 2013 (81.3 percent; **Table 1B-2**). In 2016, 68.9 percent of Arizona mothers initiated prenatal care during the first trimester. It should be noted that with the adoption of the 2003 revised U.S. birth certificate in 2014, trend analysis of the timing of prenatal care is compromised by significant changes in reporting of prenatal care initiation. Hence, the low proportion of women with timely entry to prenatal care in 2016 may be attributable for the most part to differences in reporting.

In Arizona, American Indian, Black or African American, and Hispanic or Latino mothers were least likely to begin prenatal care in the first trimester (**Figure 1B-20**). Timely entry to prenatal care was essentially reported among White non-Hispanic and Asian or Pacific Islander mothers based on data in (**Table 1B-25**).



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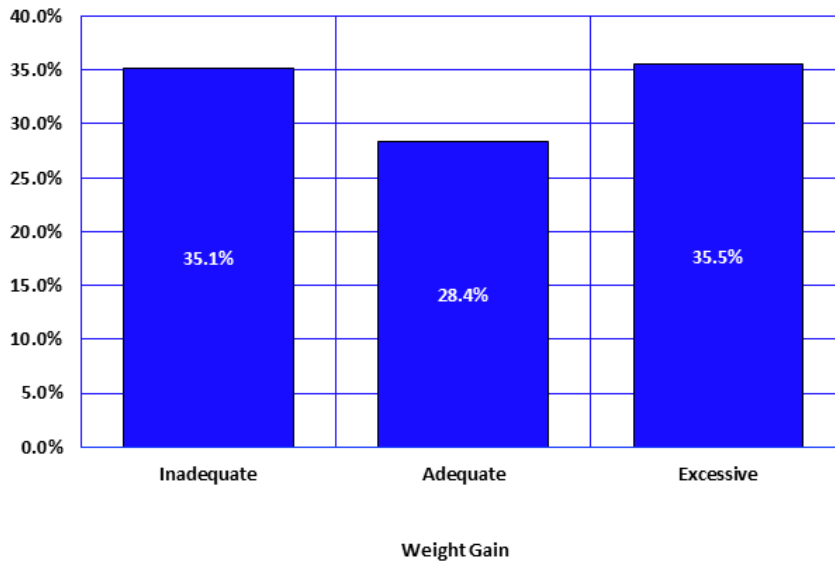
Figure 1B-21
Maternal Medical Risk Factors^a by Mother's Race/Ethnicity, Arizona, 2016



Maternal medical risk factors (such as, diabetes, hypertension, eclampsia, or sexually transmissible diseases) can contribute to serious pregnancy complications and infant deaths, if not treated properly. In 2016, with exception to White non-Hispanic mothers, all the mothers from the remaining race/ethnic groups recorded highest proportions of medical risk factors (**Figure 1B-21**).

Notes: ^a Births with medical risk factors reported per 100 births in specified group.

Figure 1B-22
Low-Birthweight by Maternal Weight Gain during Pregnancy, Arizona, 2016



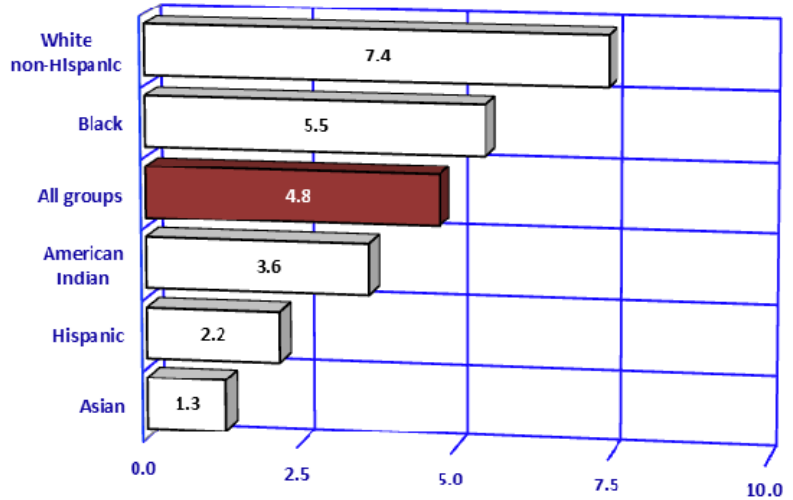
Maternal weight gain during pregnancy is a determinant of both fetal growth and birthweight. Insufficient or excessive weight gain during pregnancy can negatively influence outcomes of both mother and infant. Based on the Institute of Medicine guidelines, women who are of normal weight (body mass index or BMI 18.5-24.9) should gain 25-35 pounds during pregnancy. Underweight women (BMI <18.5) should aim to gain 28-40 pounds, while overweight women (BMI 25.0-29.9), and obese women (BMI ≥30.0) should gain 15-25 pounds and 11-20 pounds, respectively. Prior to the adoption of the 2003 revised birth certificate in 2014, it was not possible to analyze gestational weight gain in relation to mother's pre-pregnancy BMI. The revised birth certificate includes new fields (mother's height, pre-pregnancy weight, and weight at delivery) providing the opportunity to assess whether pregnancy weight gain is within the recommended range for the mother's BMI.

In 2016, the proportion of newborns with low birthweight was the lowest among mothers who gained the recommended amount of weight during pregnancy (**Figure 1B-22**).

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Figure 1B-23
Self-reported Tobacco Use during Pregnancy^a by Race/Ethnicity, Arizona, 2016

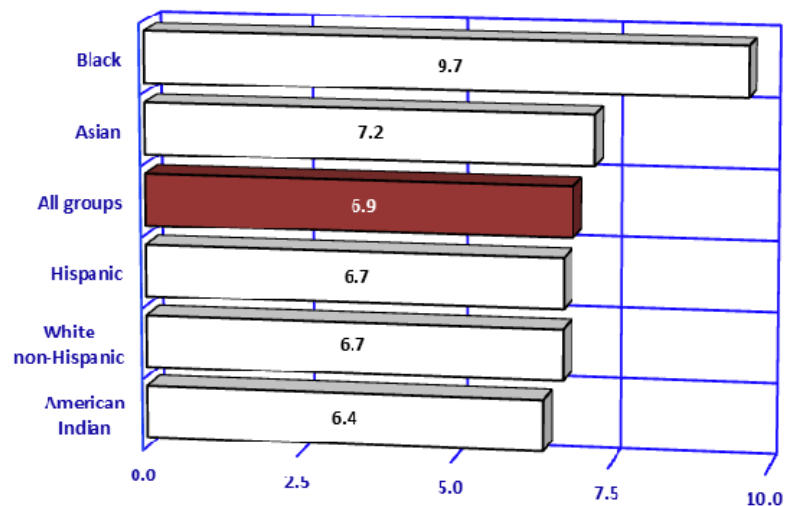
Cigarette smoking during pregnancy has been associated with reduced infant weight at birth, intrauterine growth retardation, and preterm births. Smoking during pregnancy was reported by 4.8 percent of women giving birth in 2016 (**Table 1B-25, Table 5B-30**), compared to 10.5 percent in 1989, when this information was first reported on Arizona birth certificates. It is unclear whether this decline means that women giving birth in Arizona are less likely to use tobacco during pregnancy or, perhaps, less likely to report it if they use. White non-Hispanic and Black mothers continued to be more likely to report smoking than American Indian, Hispanic, and Asian mothers (**Figure 1B-23**).



Notes: ^a Mothers giving birth who reported tobacco use per 100 births in specified group.

Figure 1B-24
Rates of Admission to Newborn Intensive Care Units^a by Mother's Race/Ethnicity, Arizona, 2016

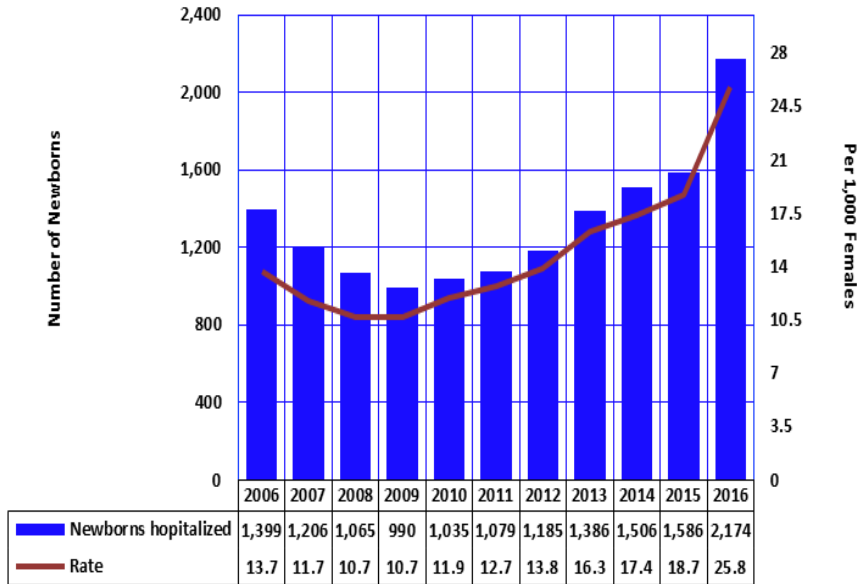
In 2016, 5,814, or 6.9 percent of newborns were admitted to newborn intensive care units (NICUs). Around 46.0 percent of the NICU admissions were low birthweight (LBW) babies. Prematurity, i.e., gestational age before 37 weeks captured more NICU admissions than did LBW, with 53.7 percent of NICU admissions being premature (based on data in **Table 1B-32**). The proportion of NICU admissions differed among racial/ethnic groups. In 2016 the rate of NICU admissions for Black or African American births was the highest among racial/ethnic groups (9.7 percent; **Table 1B-25**).



Notes: ^a The number of newborns admitted to Intensive Care Units per 100 births in specified group.

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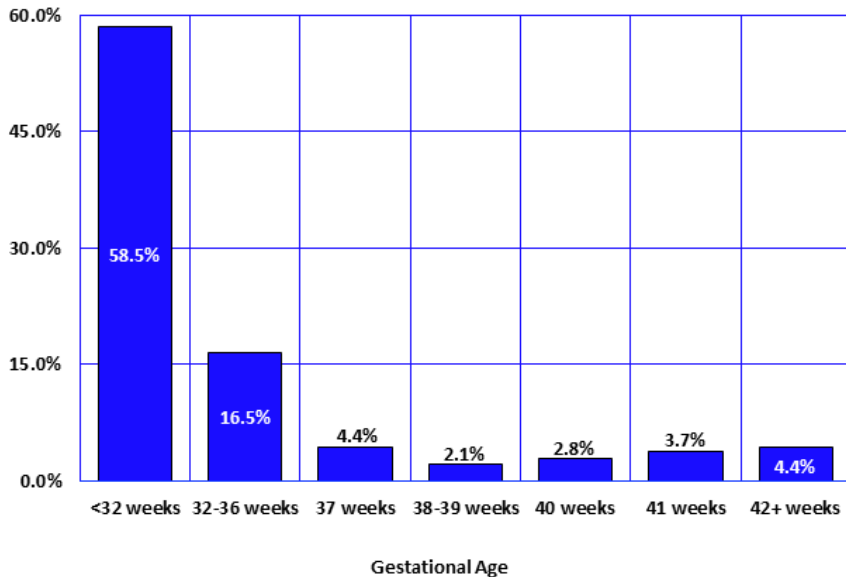
Figure 1B-25
Newborns Who Were Hospitalized after Birth because They Were Affected
by Maternal Use of Drugs during Pregnancy, Arizona, 2006-2016



Notes: ^a Rate is the number of newborns admitted to Intensive Care Units per 100 births in specified group.

Information about maternal drug use during pregnancy is not reported on Arizona birth certificates. However, it can be obtained from the hospital discharge database. There are several diagnostic codes which identify exposure of fetus or newborn to specific noxious substances (such as narcotics, hallucinogenic agents, or cocaine) transmitted via placenta or breast milk. Following the 4 year-period of decline (2006-2009) in the number of newborns hospitalized after birth due to maternal drug use during pregnancy, the rate increased from 10.7/1,000 in 2009 to 25.8/1,000 in 2016; the highest proportion recorded during this decade.

Figure 1B-26
Abnormal Conditions of the Newborn by Gestational Age, Arizona, 2016



With the implementation of the revised birth certificate, three of the six specific abnormal conditions listed on the birth certificate have been reported most frequently: *assisted ventilation immediately after delivery, assisted ventilation for more than six hours, and suspected neonatal sepsis*. The rates of abnormal conditions are the highest among the very preterm (less than 32 weeks of gestation) and moderately preterm babies (32-36 weeks of gestation); **Figure 1B-26**.

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Figure 1B-27
The Incidence of Down Syndrome by Mother's Age Group, Arizona, 2016

Congenital anomalies (birth defects) are the leading cause of infant death in Arizona and nationally. They are also the cause of physical defects and metabolic diseases.

For various anomalies, rates vary widely with maternal age. For example, in 2015 as in prior years, the rate of Down's Syndrome, the most frequently recognized cause of intellectual disability, was substantially higher for births to mothers aged 35 years and older (**Figure 1B-27, Table 1B-33**). The incidence rate of 199.7 cases of Down's Syndrome per 100,000 births to women 35 years or older was 5.6 times greater than the incidence rate of 35.8 for women aged 24 years or younger.

