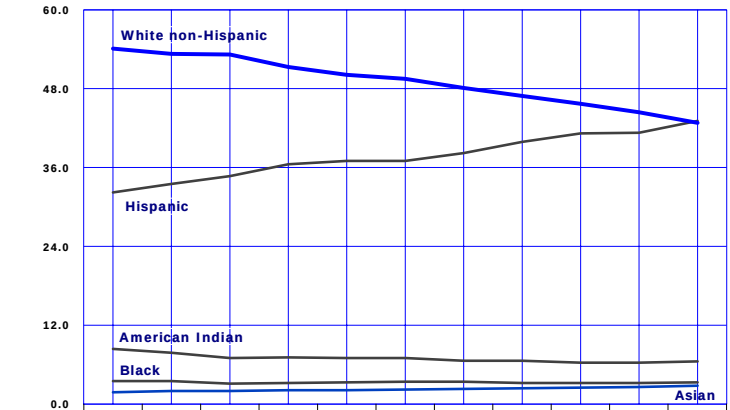
1B.

NATALITY:
MATERNAL CHARACTERISTICS AND NEWBORN'S HEALTH

In 2003 there were 90,783 resident live births registered in Arizona, 21,746 more births than in 1993 (**Table 1B-2**). Births to Hispanic or Latino mothers accounted for 77.5 percent or 16,854 of the 21,746 more resident births in 2003 than in 1993. All other racial/ethnic groups combined – White non-Hispanic, Black or African American, American Indian or Alaska Native and Asian or Pacific Islander - accounted for a mere 22.5 percent of the increase in the number of births to Arizona residents from 1993 to 2003.

Among the 90,783 resident births in 2003, the majority of them (39,101) were to Hispanic or Latino mothers, followed by White non-Hispanics (38,842), American Indian or Alaska Native (5,881), Black or African American (3,022) and Asian or Pacific Islander (2,524). In contrast, in 1993, White non-Hispanic accounted for the majority (54.1 percent) of resident live births in Arizona, followed by (a 32.2 percent share of) Hispanic births (**Table 1B-2, Table 1B-22**).

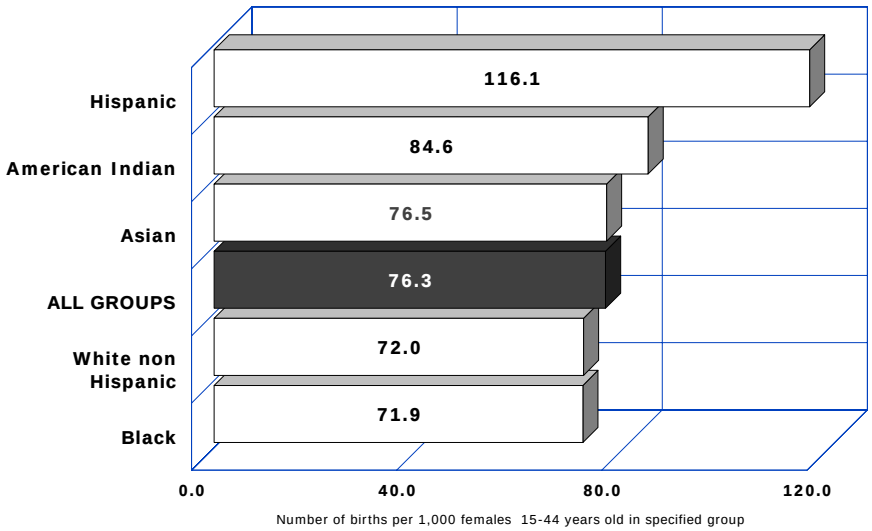
Figure 1B-1
Percent of Resident Live Births by Race/Ethnicity and Year, Arizona, 1993-2003



	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Asian	1.8	2.0	2.0	2.1	2.1	2.2	2.3	2.4	2.5	2.6	2.8
Black	3.5	3.5	3.1	3.2	3.3	3.4	3.4	3.2	3.2	3.2	3.3
American Indian	8.4	7.8	7.0	7.1	7.0	7.0	6.6	6.6	6.3	6.3	6.5
White non-Hispanic	54.1	53.3	53.2	51.3	50.1	49.5	48.1	46.9	45.7	44.4	42.8
Hispanic	32.2	33.5	34.7	36.5	37.0	37.0	38.2	39.9	41.2	41.3	43.1

White non-Hispanic, Black and American Indian mothers each experienced decreased shares of all resident births in 2003 compared to 1993 (**Table 1B-2**). Hispanic women accounted for the largest share of resident births among the race/ethnic groups in Arizona in 2003. Among every 100 babies born in Arizona in 2003, 43 were Hispanics (43.1 percent), 43 White non-Hispanics (42.8 percent), 7 American Indians (6.5 percent), 3 Blacks (3.3 percent), and 3 Asians or Pacific Islanders (2.8 percent). The remaining fraction of 1.5 percent of Arizona mothers giving birth in 2003 chose not to identify themselves with any of those race/ethnic groups.

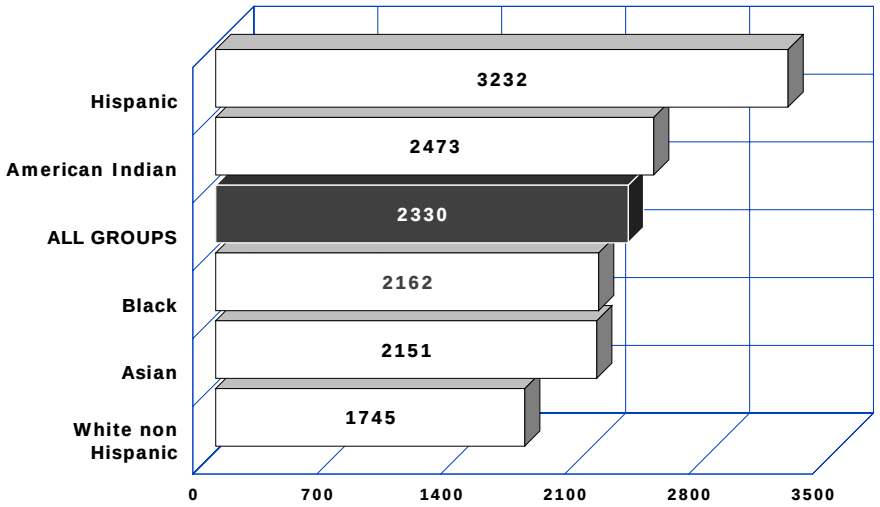
Figure 1B-2
General Fertility Rates by Race/Ethnic Group Among Females of All Ages, Arizona, 2003



From among 1,190,388 women of childbearing age (15-44 years), 7.6 percent gave birth in 2003. The *general fertility rate* (the number of births per 1,000 women 15-44 years old) was the highest for Hispanic women (116.1 births per 1,000 or 11.6 percent) followed by rates for American Indian (84.6 births per 1,000), and Asian women (76.5 births per 1,000). Fertility rates for Black and White non-Hispanic women were lower than the average for all groups (**Figure 1B-1**).

The *total fertility rate* indicates the average number of births to a hypothetical cohort of 1,000 women, if they experienced throughout their childbearing years the age-specific birth rates observed in a given year. From 1993 to 2003, the Arizona total fertility rates always exceeded the rate of "replacement" (2,100 births per 1,000 women, **Table 1B-1**). The "replacement" rate is considered the value at which a given generation can exactly replace itself. In 2003, the total fertility rates differed substantially by race and Hispanic origin (**Figure 1B-3**). The 2003 total fertility rate of 1,745 for White no-Hispanics was the only one below "replacement" among the race/ethnic groups in Arizona.

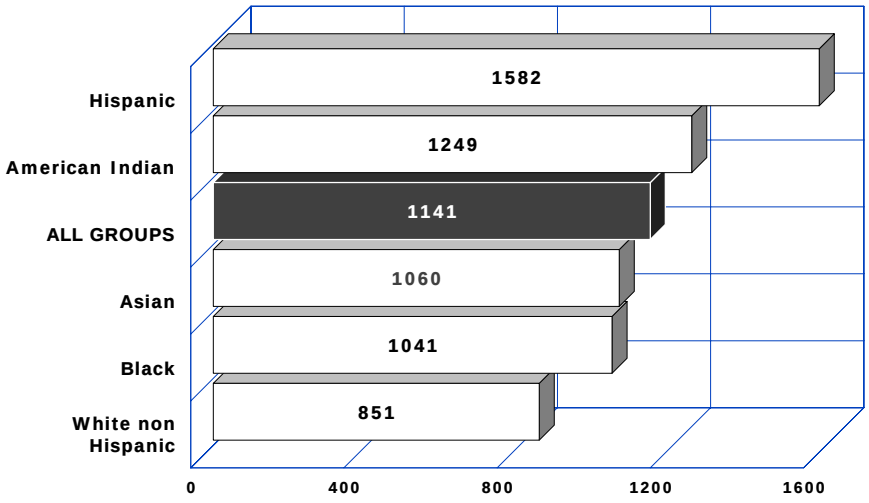
Figure 1B-3
Total Fertility Rates by Race/Ethnicity, Arizona, 2003



The sum of age group-specific birth rates multiplied by five (the number of years in the age group). The rate of 2330 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 2003, they would have a total of 2,330 children 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.

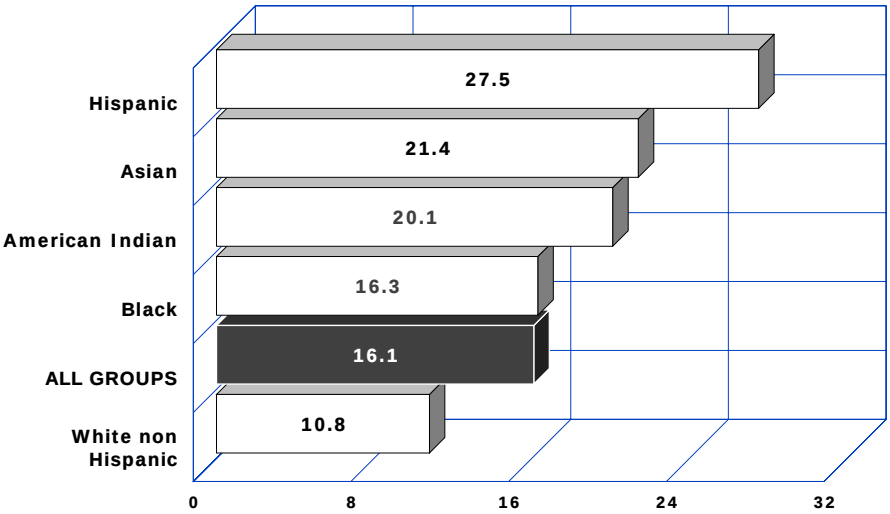
Another measure used to summarize reproduction patterns is the *gross reproduction rate*. It represents the average number of daughters born to a hypothetical cohort of 1,000 women if they experienced the age-specific birth rates observed in a given year throughout their childbearing years. This measure 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 2003 the gross reproduction rates in Arizona ranged from 851 for White non-Hispanic women to 1,582 for Hispanic women (**Figure 1B-4**, **Table 1B-1**).

Figure 1B-4
Gross Reproduction Rates by Race/Ethnicity, Arizona, 2003



The sum of birth rates by 5-year age groups multiplied by the proportion of births that 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 her childbearing years.

Figure 1B-5
Birth Rates per 1,000 Population by Race/Ethnicity, Arizona, 2003

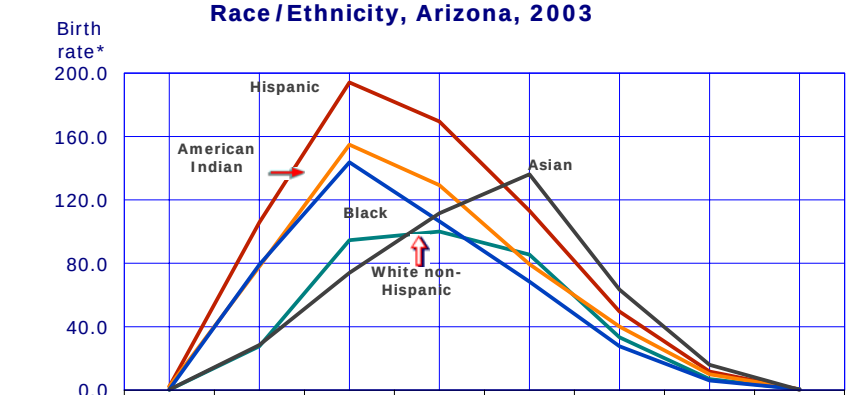


The number of births per 1,000 population in specified group.

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.

In 2003 the crude birth rates by mother's race/ethnicity ranged from 10.8 births per 1,000 White non-Hispanics to 27.5 per 1,000 Hispanic or Latino population (**Figure 1B-5**).

Figure 1B-6
Birth Rates by Mother's Age Group and Race/Ethnicity, Arizona, 2003



	<15	15-19	20-24	25-29	30-34	35-39	40-44	45+
Asian	0.3	28.5	74.0	111.6	136.2	63.4	16.0	0.2
Black	0.4	79.1	143.8	106.5	68.4	27.7	6.0	0.6
American Indian	2.3	77.9	154.9	129.3	79.5	40.1	10.0	0.6
White non-Hispanic	0.2	27.7	94.6	100.1	85.5	33.3	7.0	0.5
Hispanic	2.2	105.8	194.2	169.5	113.2	49.6	11.7	0.4

* Number of births per 1,000 females in specified group.

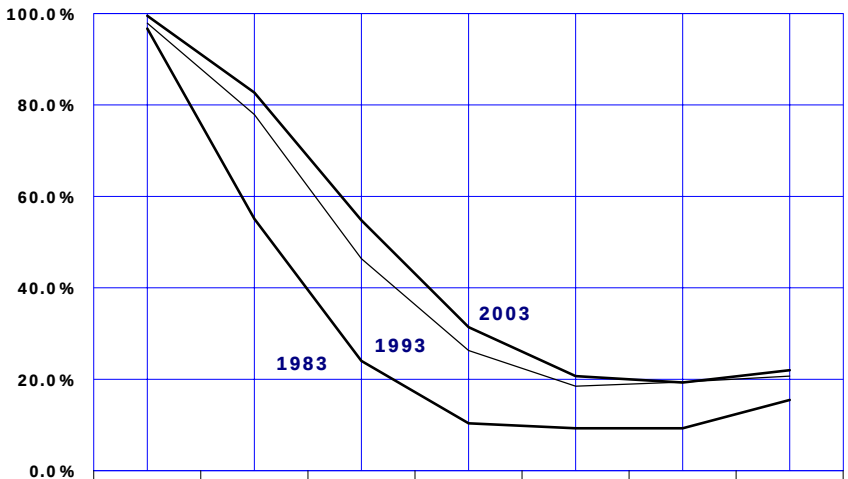
The age-specific birth rates (the number of births to mothers in a particular age group per 1,000 women in that age group) differed substantially by race/ethnicity (**Figure 1B-6**).

In 2003, Hispanic or Latino women had the highest birth rates for women in age groups up to 30 years. In contrast, the birth rates for women aged 30-34 and 35-39 were the highest among Asian or Pacific Islander women.

Unmarried mothers have accounted for an increasing annual proportion of births throughout the 1980s and 1990s, with 41.2 percent in 2003 marking a new historical high. Fewer than 12,000 infants were born to unmarried mothers in 1983 compared to 37,394 in 2003.

Two decades ago, the proportion of births among unmarried teenagers aged 15-19 years was slightly over 50 percent (**Figure 1B-7**). This proportion rose to 77.9 percent between 1983 and 1993. In 2003, eighty-three out of 100 (82.7 percent) mothers 15-19 years old were unmarried.

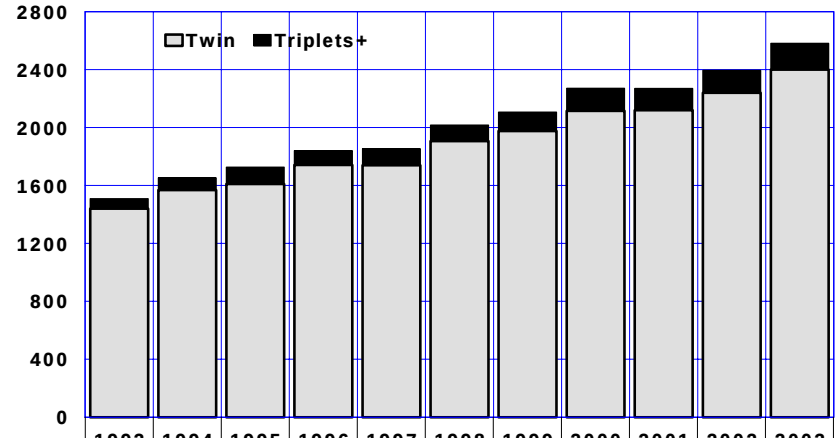
Figure 1B-7
Percent Births to Unmarried Mothers by Age Group, Arizona, 1983, 1993 and 2003



	<15	15-19	20-24	25-29	30-34	35-39	40+
1983	96.7%	55.1%	24.0%	10.4%	9.3%	9.3%	15.5%
1993	97.9%	77.9%	46.4%	26.3%	18.5%	19.4%	20.7%
2003	99.5%	82.7%	54.8%	31.4%	20.7%	19.3%	22.0%

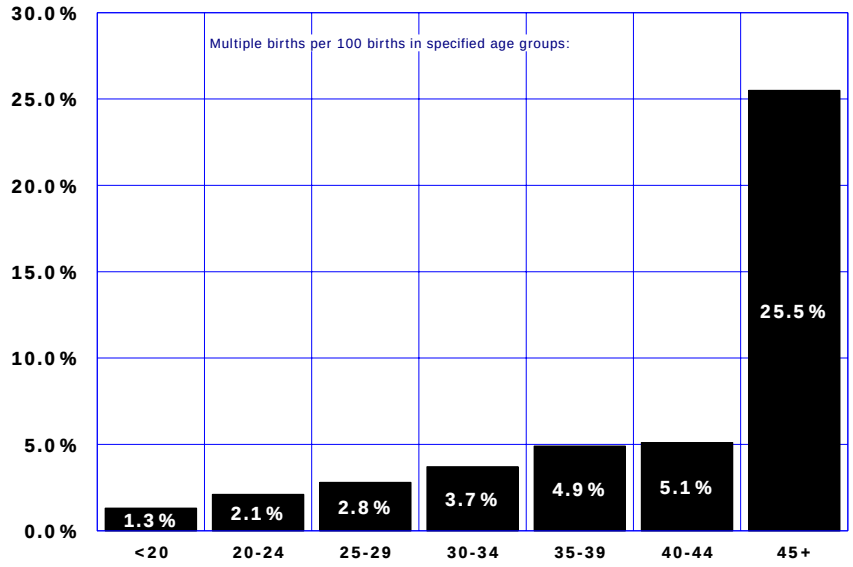
There were 2,581 multiple birth events in Arizona in 2003, the highest number ever recorded in the State. (**Figure 1B-8**). The number of babies born in twin deliveries increased by 66.7 percent from 1,440 in 1993 to 2,400 in 2003 (**Figure 1B-8**). More profound was the 2.6 times (or 162.3 percent) increase in the number of triplet and higher order multiple birth events from 69 in 1993 to 181 in 2003. In contrast, the number of singleton births increased by 32.3 percent over this period, from 66,630 in 1993 to 88,167 in 2003 (**Table 1B-16**). The number of multiple birth events, as a proportion of total births, has increased from 2.2 percent in 1993 to 2.8 percent in 2003 (**Table 1B-2**).

Figure 1B-8
Number of Births in Twin and Triplet+ Deliveries by Year, Arizona, 1993-2003



	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Triplets+	69	84	116	98	113	111	131	156	150	155	181
Twin	1440	1568	1610	1742	1740	1906	1976	2115	2120	2240	2400

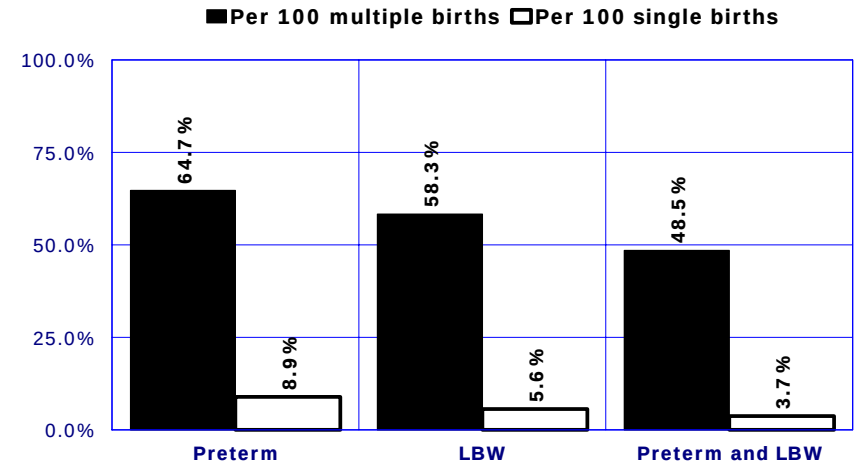
Figure 1B-9
Risk for Multiple Births by Mother's Age Group, Arizona, 2003



The rise in multiple births has been associated with two related trends: 1) advances in, and greater access to, assisted reproductive technology, and 2) the older age of childbearing (women in their thirties are more likely to have a multiple birth than younger women even without the use of fertility therapies).

In 2003, the proportion of multiple births increased with maternal age, with a precipitous rise at age 45 years and over. Among women aged 45 years and over 25.5 percent of all births were twins, triplets or quadruplets (**Figure 1B-9**).

Figure 1B-10
Infants Born Too Early (Preterm) and Infants Born Too Small (LBW) Among Multiple and Single Births, Arizona, 2003

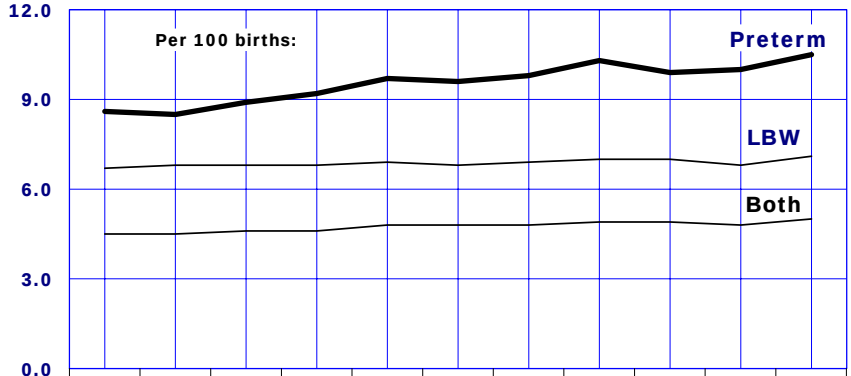


Preterm = < 37 weeks of gestation;
LBW = low birthweight (less than 2,500 grams or 5 pounds 8 ounces)

Infants born in multiple deliveries tend to be born at shorter gestations and smaller than those born in singleton deliveries (**Figure 1B-10**). In 2003, infants born in multiple deliveries were 13.1 times more likely (48.5 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.

The proportion of preterm births increased from 10.0 percent in 2002 to 10.5 percent in 2003. The percent of preterm births (at less than 37 completed weeks of gestation) has risen fairly steadily over the last decade, from 8.6 percent in 1993. The proportion of infants born earlier than expected and smaller (at less than 2,500 grams) increased from 4.9 percent both in 2000 and 2001 to 5.0 percent in 2003 (**Figure 1B-11**). Since 1993, all of the annual proportions of infants born too early and too small substantially exceeded the ratio of 4.2 percent recorded in 1992.

Figure 1B-11
Preterm and Low Birthweight (LBW) Births by Year, Arizona, 1993-2003



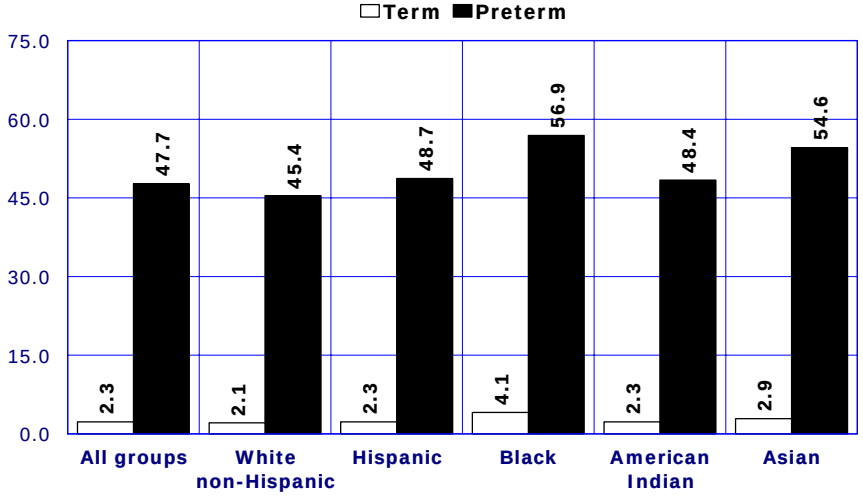
	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
LBW	6.7	6.8	6.8	6.8	6.9	6.8	6.9	7.0	7.0	6.8	7.1
Preterm	8.6	8.5	8.9	9.2	9.7	9.6	9.8	10.3	9.9	10.0	10.5
Both	4.5	4.5	4.6	4.6	4.8	4.8	4.8	4.9	4.9	4.8	5.0

Preterm is less than 37 weeks of gestation;
Low birthweight (LBW) is less than 2,500 grams (less than 5 pounds 8 ounces).

In 2003, 7.1 percent of all babies were born of 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 are nearly 21 times (47.7 vs. 2.3 percent) more likely to be LBW than infants born at term (**Figure 1B-12**).

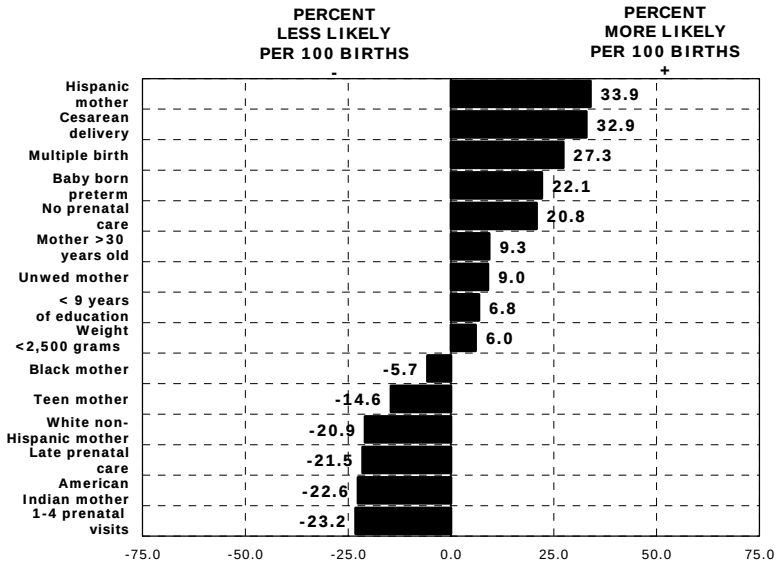
Figure 1B-12
Low-Birthweight (LBW) Births by Length of Gestation and Mother's Race/Ethnicity, Arizona, 2003

Number of LBW babies per100 births in specified group:



Preterm is less than 37 weeks of gestation;
Low birthweight (LBW) is less than 2,500 grams (less than 5 pounds 8 ounces).

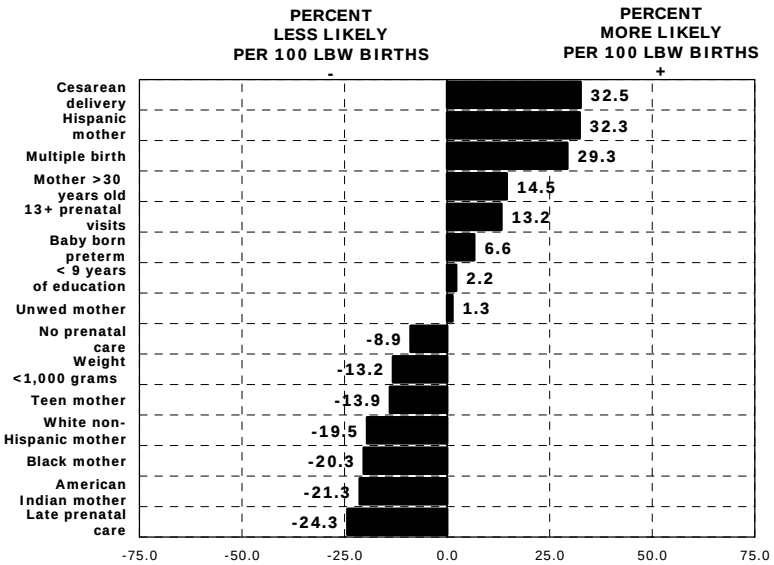
Figure 1B-13
Percent Change from 1993 to 2003 in Birth Ratios* for Selected Characteristics of Arizona Newborns and Mothers



Birth ratio = the occurrence of a specified characteristic per 100 births. See Table 1B-2.

Compared to 1993, the Arizona infants in 2003 were more likely to be born in a cesarean section, at less than 37 weeks of gestation, in a multiple delivery, and to a Hispanic or Latino mother (**Figure 1B-13**). In contrast, the Arizona mothers in 2003 were less likely to be in their teens, and to have received late prenatal care.

Figure 1B-14
Percent Change from 1993 to 2003 in Birth Ratios* for Selected Characteristics of Women Giving Birth to and of Low Birthweight (LBW) Newborns in Arizona

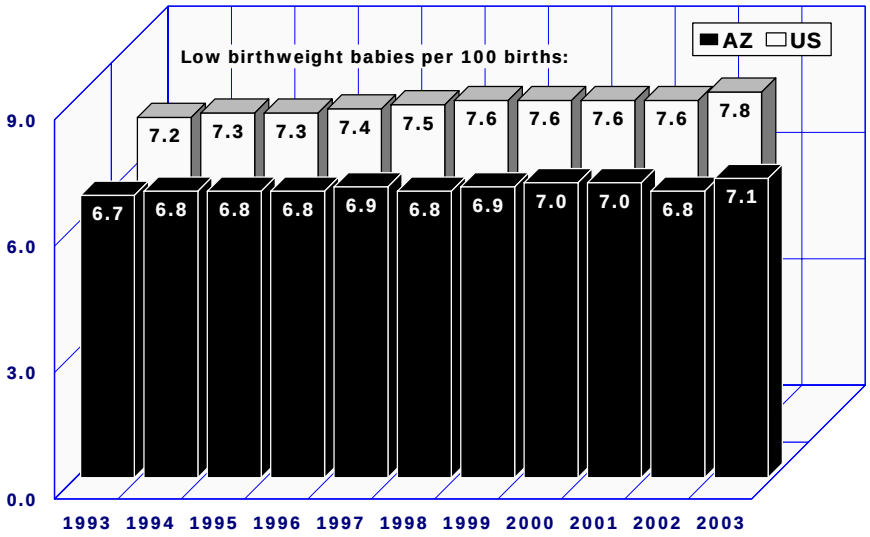


Birth ratio = the occurrence of a specified characteristic per 100 LBW births. See Table 1B-3.

The low birthweight (LBW) infants were 29.3 percent more likely to be born in a multiple delivery in 2003 than in 1993 (**Figure 1B-14**). Compared to 1993, the LBW infants in 2003 were also more likely to be born at less than 37 weeks of gestation, in a cesarean delivery, to older, Hispanic or Latino mothers. The proportion of LBW infants born to mothers who received early prenatal care increased by 12.8 percent from 1993 to 2003 (based on birth ratios in **Table 1B-3**).

In 2003, 7.1 percent of all Arizona infants were born at a low birthweight (LBW), or at less than 2,500 grams (5 pounds 8 ounces), an increase from 6.8 percent in 2002. In each year from 1993 to 2003, the annual incidence of LBW infants was lower in Arizona compared to the nation (**Figure 1B-15**). The 2002 LBW ratio of 7.8 percent of all births nationally was the highest reported in more than three decades.

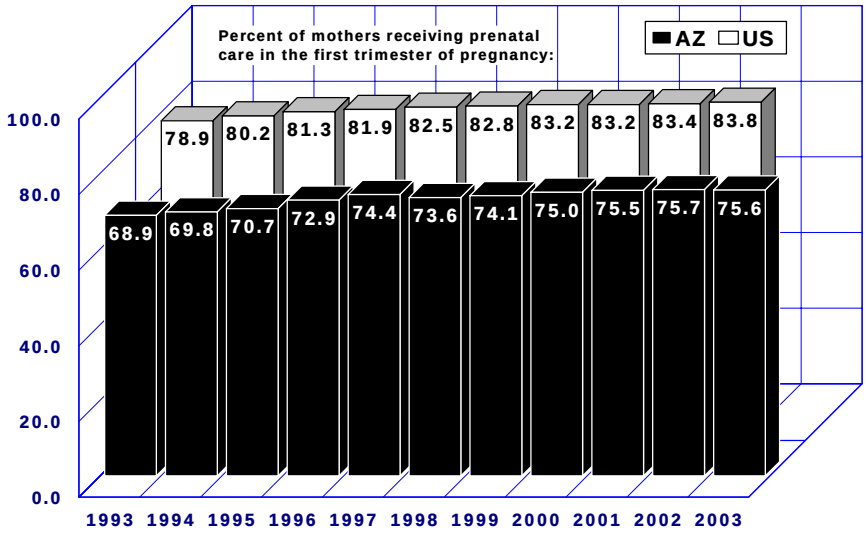
Figure 1B-15
Percent Low Birthweight,* Arizona and United States, 1993-2003



*Low birthweight is less than 2,500 grams (less than 5 pounds 8 ounces).
Note: The latest available U.S. ratio is for 2002.

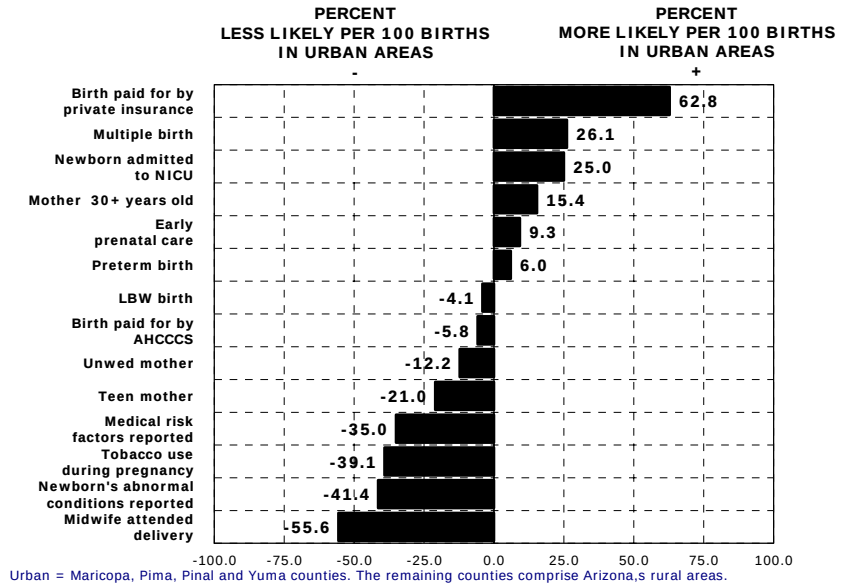
The percent of Arizona mothers giving birth who received early prenatal care (i.e., in the first trimester of pregnancy) increased from 68.9 percent in 1993 to 75.6 percent in 2003. In each year from 1993 to 2003, the percent of women giving birth who received prenatal care in the first trimester was lower in Arizona when compared to the nation (**Figure 1B-16**).

Figure 1B-16
First Trimester Prenatal Care, Arizona and United States, 1993-2003



Note: The latest available U.S. ratio is for 2002.

Figure 1B-17
Percent Difference in Birth Ratios* for Selected Charateristics of Mothers Giving Birth and Newborns in Urban* and Rural Areas, Arizona, 2003

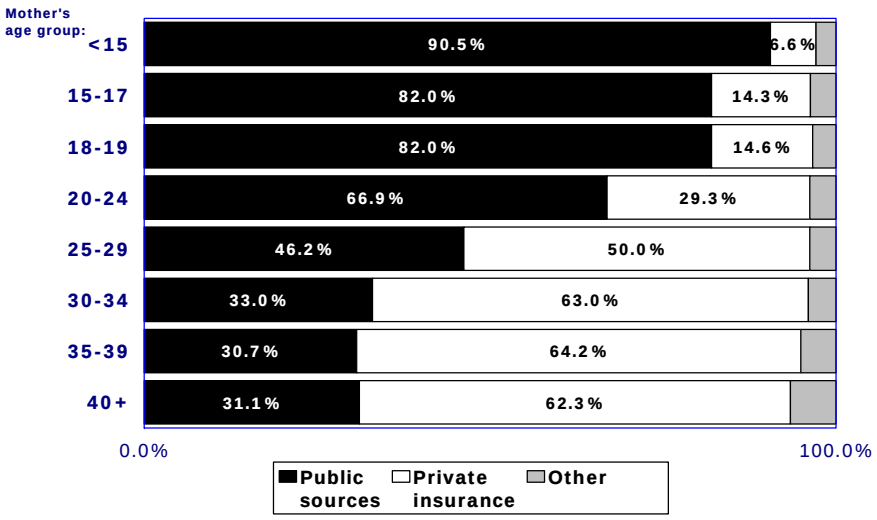


Urban = Maricopa, Pima, Pinal and Yuma counties. The remaining counties comprise Arizona,s rural areas.

Birth ratio = the occurrence of a specified characteristic per 100 births. See Tables 1B-4, 1B-5, 1B-25, and 1B-26.

Compared to infants born in rural Arizona, the deliveries of infants in urban Arizona in 2003 were nearly 63 percent more likely to be paid for by private insurance and less likely to paid for by the Arizona Health Care Cost Containment System (AHCCCS), or the State's Medicaid program (**Figure 1B-17**, based on birth ratios in **Table 1B-4** and **Table 1B-5**).

Figure 1B-18
Payee for Delivery by Mother's Age Group, Arizona, 2003

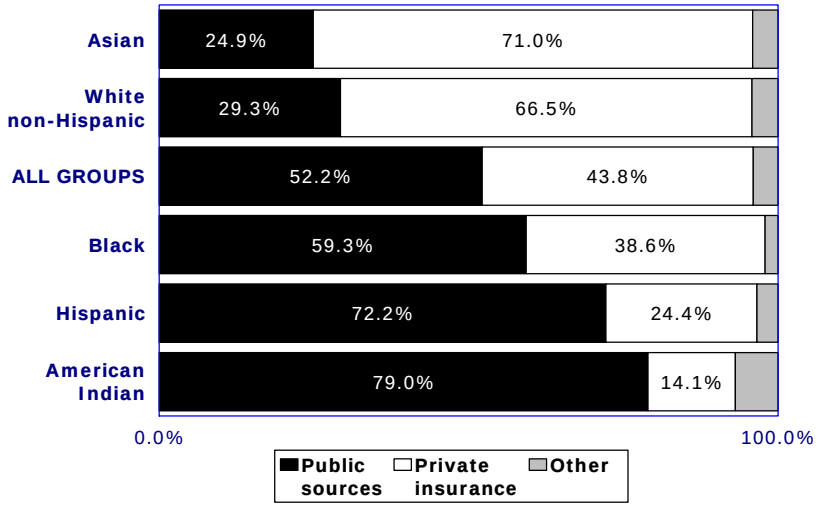


Public sources = AHCCCS or IHS. The Arizona Health Care Cost Containment System (AHCCCS) is the State's Medicaid program. IHS is the Indian Health Service.

In 2003, public sources (the Arizona Health Care Cost Containment System or the Indian Health Service) paid for 50.5 percent of the total deliveries, but 82.0 percent of the deliveries to mothers 15-19 years old (**Figure 1B-18**) and 66.9 percent of the deliveries to mothers 20-24 years of age. In contrast, private insurance was the largest payor (at 64.2 percent) for the deliveries of women giving birth who were 35-39 years old in 2003 (based on data in **Table 1B-28**).

In 2003, private insurance was the largest payor for deliveries of Asian (at 71.0 percent) and White non-Hispanic infants (at 66.5 percent). In contrast, the Arizona Health Care Cost Containment System (AHCCCS) was the largest payor for deliveries of Black or African American and Hispanic or Latino women (59.3 and 72.2 percent respectively). The Indian Health Service or AHCCCS covered the largest share (79.0 percent) of American Indian or Alaska Native births (**Figure 1B-19,** based on data in **Table 1B-28**).

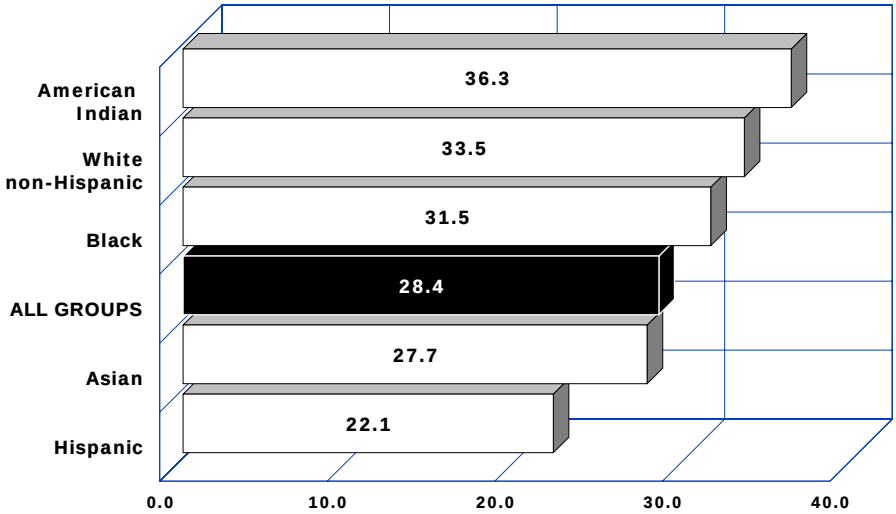
Figure 1B-19
Payee for Delivery by Mother's Race/Ethnicity, Arizona, 2003



Public sources = AHCCCS or IHS. The Arizona Health Care Cost Containment System (AHCCCS) is the State's Medicaid program. IHS is the Indian Health Service.

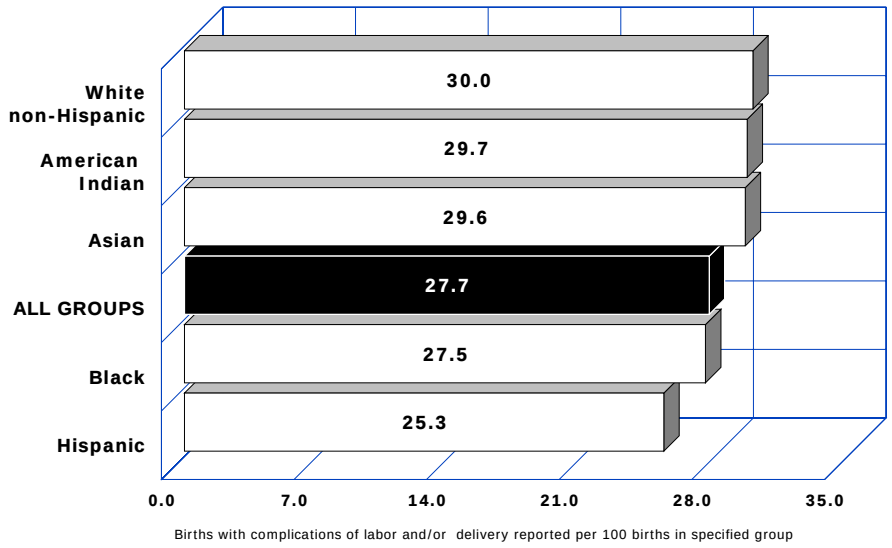
Maternal medical risk factors can contribute to serious pregnancy complications and infant deaths, particularly if not treated properly. In 2003, American Indian or Alaska Native women giving birth had the highest proportion of medical risk factors (36.3 percent, **Figure 1B-20**), followed by White non-Hispanic and Black or African American women.

Figure 1B-20
Maternal Medical Risk Factors per 100 Births by Mother's Race/Ethnicity, Arizona, 2003



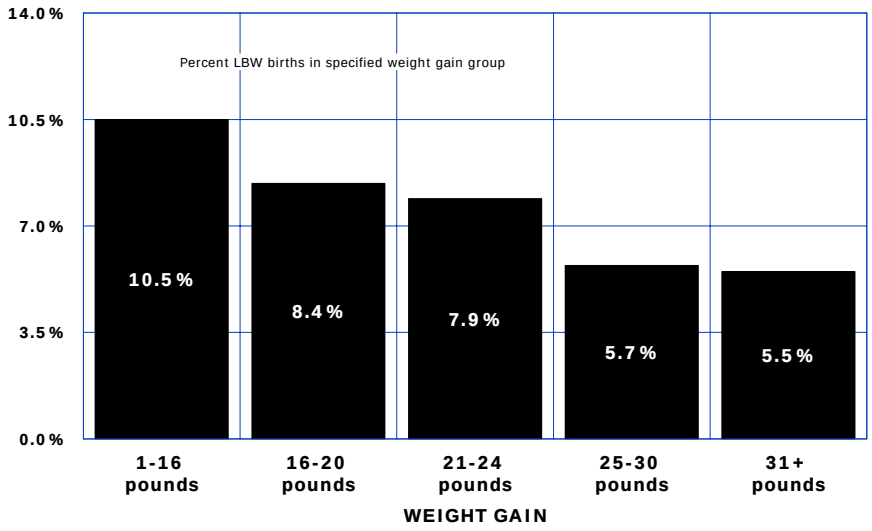
Births with medical risk factors reported per 100 births in specified group

Figure 1B-21
Complications of Labor and/or Delivery per 100 Births by Race/Ethnicity, Arizona, 2003



In 2003, of the 15 complications of labor and delivery reported on the birth certificate, the three most frequently reported were *meconium moderate/ heavy* (3.3 percent), *breech malpresentation* (3.1 percent), and *fetal distress* (2.3 percent). Complications rates vary among racial/ethnic groups, with the highest rates reported for White non-Hispanic, American Indian, and Asian women (**Figure 1B-21**).

Figure 1B-22
Risk for Low-Birthweight by Maternal Weight Gain During Pregnancy, Arizona, 2003

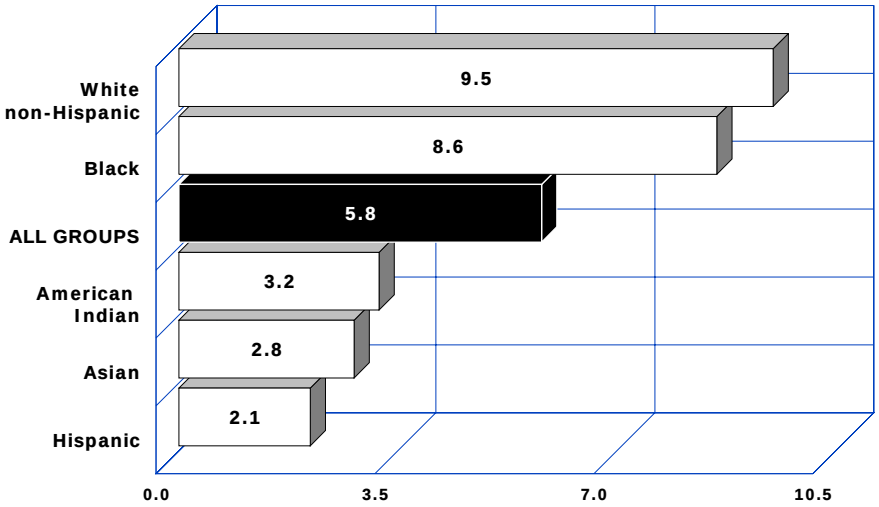


Maternal weight gain during pregnancy is an important determinant of both fetal growth and birthweight. Women who are of normal weight (average body mass index or BMI) should gain 21-35 pounds during a normal pregnancy. Women who are underweight should gain more (28-40 pounds), and women who are overweight should gain less (15 to 25 pounds). Unfortunately, it is not possible to determine whether the weight gain was within the recommendations for the mother's BMI, because information of the mother's pre-pregnancy weight and height is not collected on the birth certificate.

Maternal weight gain has been shown to have a positive correlation with infant birthweight. In 2003, as in previous years, the percent of infants with low birthweight decreased with increasing maternal weight gain (**Figure 1B-22**).

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 5.8 percent of women giving birth in 2003 (**Table 1B-26**, **Table 5B-30**), compared to 12.3 percent in 1993. As in the past, 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 when they use. White non-Hispanic and Black mothers were more likely to report smoking than American Indian, Asian and Hispanic (**Figure 1B-23**).

Figure 1B-23
Self-reported Tobacco Use During Pregnancy by Race/Ethnicity, Arizona, 2003

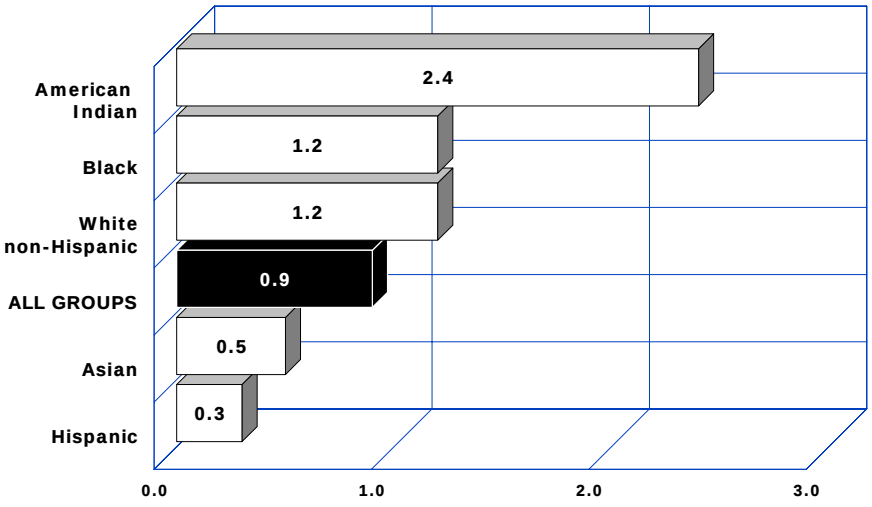


Mothers giving birth who reported tobacco use per 100 births in specified group

In 2003, 0.9 percent of all live births were to mothers who reported alcohol use (**Figure 1B-24**, **Table 1B-26**, **Table 5B-30**). American Indian, Black, and White non-Hispanic mothers were more likely than Hispanic and Asian mothers to report the use of alcohol.

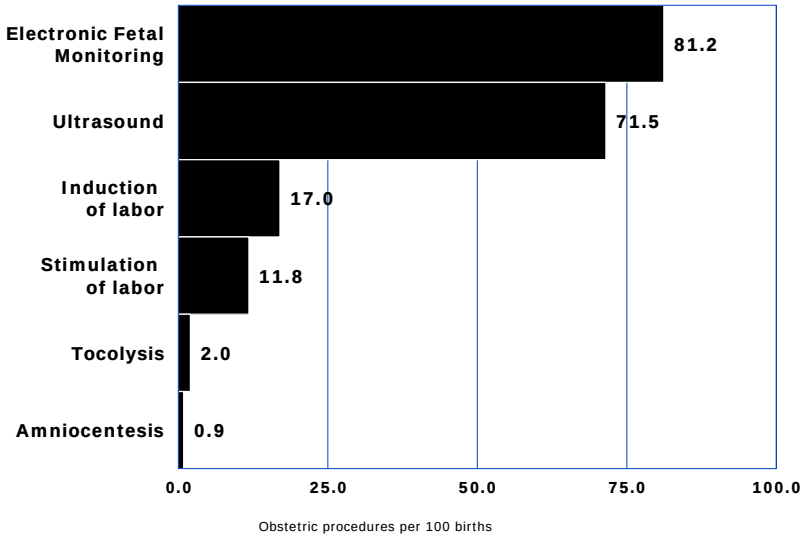
The stigma of maternal alcohol use likely contributes to the underreporting of this behavior. There is little chance improvement and self-reported information about maternal alcohol use won't be collected on the proposed Arizona and national birth certificates.

Figure 1B-24
Self-reported Alcohol Use During Pregnancy by Race/Ethnicity, Arizona, 2003



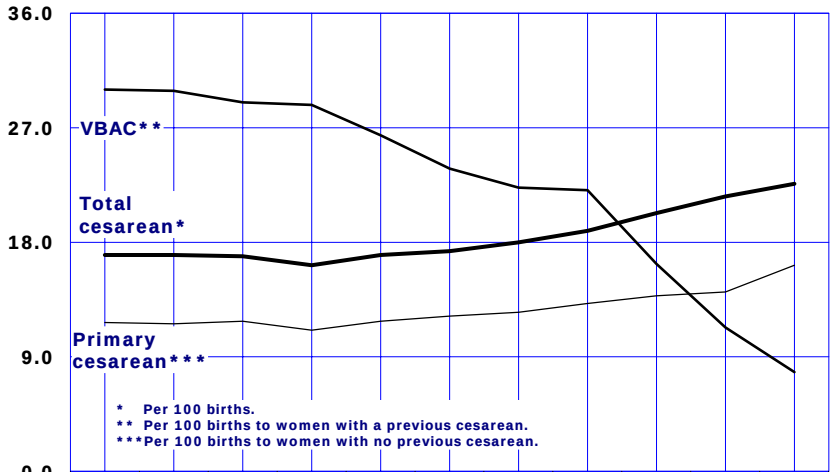
Mothers giving birth who reported alcohol use per 100 births in specified group

Figure 1B-25
Obstetric Procedures Reported per 100 Births, Arizona, 2003



Of the six specific obstetric procedures listed on the birth certificate, *electronic fetal monitoring* and *ultrasound* are most frequently reported (**Figure 1B-25**). In 2003, *electronic fetal monitoring* was the most prevalent procedure, reported for 81.2 percent of all births to Arizona residents. The overall rate of *amniocentesis* decreased to less than one percent of births in 2003, from 2.7 percent in 1993. *Ultrasound* and other less invasive screening may be replacing the use of *amniocentesis*.

Figure 1B-26
Total and Primary Cesarean Deliveries and Vaginal Births After Previous Cesarean (VBAC), Arizona, 1993-2003

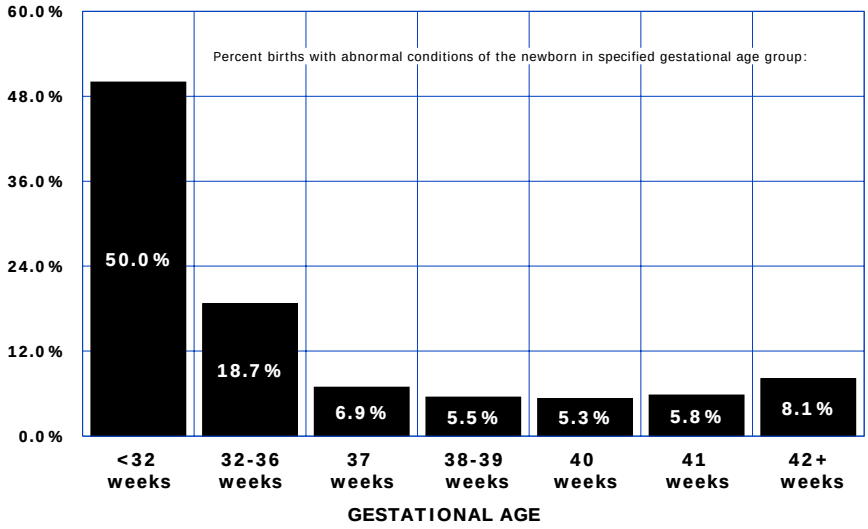


	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
VBAC**	30.0	29.9	29.0	28.8	26.4	23.8	22.3	22.1	16.3	11.3	7.8
Primary***	11.7	11.6	11.8	11.1	11.8	12.2	12.5	13.2	13.8	14.1	16.2
Total*	17.0	17.0	16.9	16.2	17.0	17.3	18.0	18.9	20.3	21.6	22.6

The rate of cesarean delivery increased to an all time high of 22.6 percent of all births (**Figure 1B-26**, **Table 1B-2**). The rise in the total rate is due to both an increase in the primary cesarean rate and a decrease in the rate of vaginal birth after cesarean delivery (VBAC). The primary cesarean rate in 2003 (16.2 per 100 live births to women who had no previous cesarean) was 14.5 percent higher than in 2001 (14.1), and 38.5 percent higher than in 1993 (11.7). The rate of vaginal birth after previous cesarean delivery (VBAC) declined 74.0 percent from a high of 30.0 in 1993 to 7.8 in 2003.

Since the first year these data were collected, three of the eight specific abnormal conditions listed on the birth certificate have been reported most frequently: *assisted ventilation less than 30 minutes*, *assisted ventilation of 30 minutes or longer*, and *hyaline membrane disease/ respiratory distress syndrome (RDS)*. *Hyaline membrane disease/RDS* is a common cause of morbidity in preterm infants. The rates of abnormal conditions are the highest among very preterm (less than 32 weeks of gestation) and moderately preterm (32-36 weeks of gestation) infants (**Figure 1B-27**).

Figure 1B-27
Abnormal Conditions of the Newborn by Gestational Age, Arizona, 2003



Congenital anomalies (birth defects) are the leading cause of infant deaths in Arizona and nationally. They are also cause of physical defects and metabolic diseases. Many of the congenital anomalies tracked on birth certificates occur rarely and are not very well reported.

For various anomalies, rates vary widely with maternal age. For example, in 2003 as in prior years, the rate of Down's syndrome, the most frequently recognized cause of mental retardation, was substantially higher for births to mothers aged 30 years and over.

Figure 1B-28
The Incidence of Down's Syndrome by Mother's Age Group, Arizona, 2003