South Dakota Pregnancy Survey 2016 Data Report

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Introduction

Quote from a 2016 SD PRAMS mother:

"I'm very thankful to fill out the survey and that I got a chance to tell you about my experience before pregnancy and after pregnancy. I'm very happy to have a baby in South Dakota."

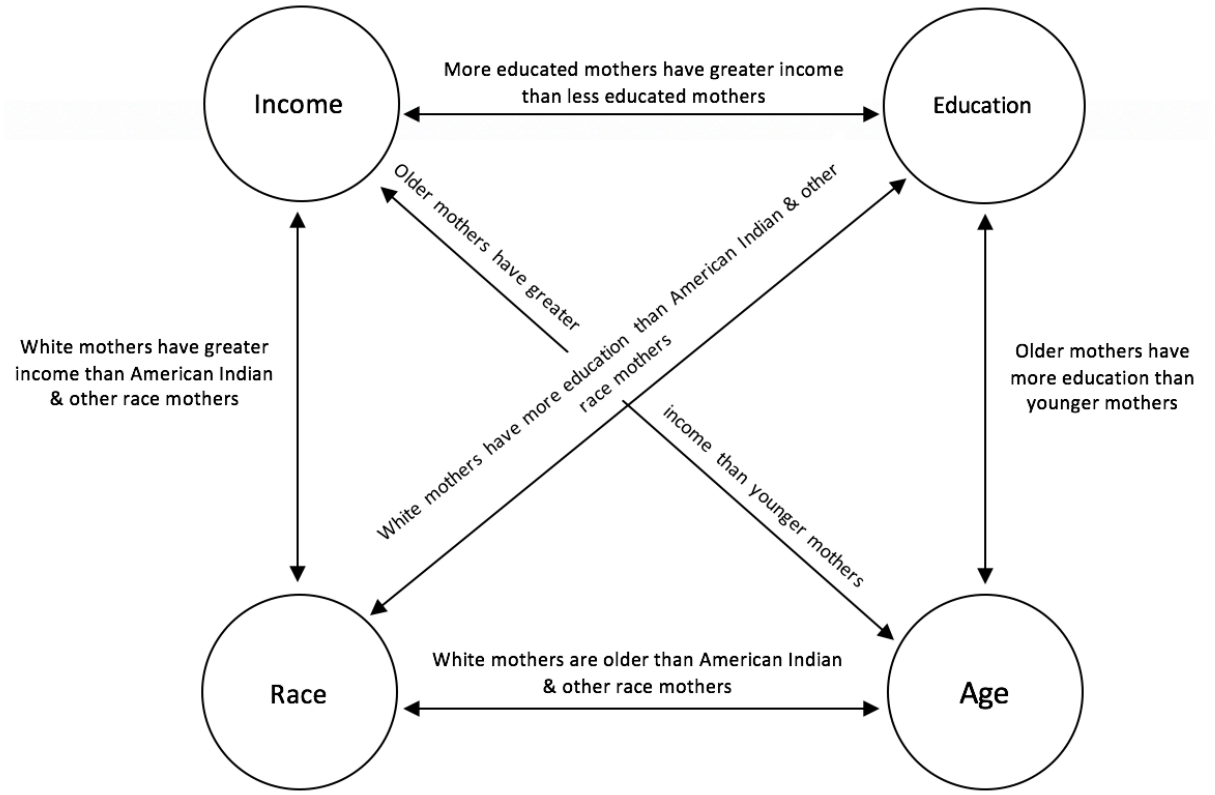
The health status of South Dakotans is commonly reported from public health surveillance surveys. Surveys such as the Behavioral Risk Factor Surveillance System (BRFSS) provide information that is used by policy makers, public health professionals, advocacy groups, health care organizations, and others to develop initiatives to improve the health of the population. South Dakota has one of the highest infant mortality rates in the U.S. yet there are little data available on factors that influence health behaviors and attitudes of mothers that can ultimately influence birth outcomes. The Pregnancy Risk Assessment Monitoring System (PRAMS) survey is a Centers for Disease Control and Prevention (CDC) recommended tool to provide this type of information.

The CDC established the PRAMS in 1987 to obtain information about maternal behavior and experiences that may be associated with adverse birth outcomes. The survey is disseminated to women who have recently given birth to live-born infants. In 2016, 40 states participated in PRAMS and provided data to the CDC. Prior to 2017, South Dakota had not been funded by CDC and in 2013, the South Dakota Department of Health contracted with the Ethel Austin Martin Program at South Dakota State University to conduct a statewide PRAMS-like survey in 2014 and 2016. It was decided that these surveys would follow the CDC PRAMS protocol with some minor modifications.

A random sample of South Dakota residents who delivered a live-born infant in 2016 was selected from birth certificate files to complete the survey through mail, online website or by telephone (CDC does not have an online option). American Indian and other race infants were oversampled to ensure sufficient numbers to obtain reliable estimates. Data were collected on a variety of topics that included: intendedness of pregnancy, access to prenatal care, health insurance, infant sleeping positions, medical problems during pregnancy, delivery of the infant, and health-related behaviors of the mother (e.g., smoking and alcohol use). The majority of the questions came from the CDC PRAMS core and standardized questions. In addition, questions about illicit drug use and adverse childhood experiences (ACEs) were added due to the increasing prevalence of drug use and the recognition of the role of stress in early life on adult behaviors and health.

The 2016 PRAMS-like survey provides information for South Dakota to assess overall pregnancy experiences and maternal health behaviors, and data may be used to develop, modify, or evaluate programs for new mothers and their children. Furthermore, the PRAMS-like surveys and the 2017 CDC-funded South Dakota PRAMS survey will provide useful baseline data to assess future trends in problematic areas. The current report includes data from the 2016 PRAMS-like survey and, where applicable, data from the 2014 survey.

In each chapter a table is provided that describes the ***demographic characteristics*** that are associated with specific attitudes, behaviors, or outcomes. The statistical significance of these characteristics with specific attitudes, behaviors, or outcomes that are presented does not account for relationships with other characteristics. Such interconnected relationships better describe the roles of potential risk factors but the necessary evaluations are complex. The diagram below shows the associations among four of the seven demographic characteristics that are described. Ethnicity, marital status and insurance status also were associated with these four characteristics as well as each other.



In order to determine which demographic characteristics are *independently* associated with a specific outcome, a more complex statistical approach needs to be taken, which is beyond the scope of this report. However, it is important to consider these interrelationships when interpreting associations between outcomes and demographic characteristics. For example, there are racial disparities in factors known to be associated with smoking (young maternal age, lack of education, poverty) and race differences that may be observed in smoking rates may be explained by racial disparities in these other factors. In fact, that is what we found with the South Dakota 2014 PRAMS-like survey (1). Once the influence of maternal age, lack of education, and poverty were controlled for statistically, race differences in cigarette smoking were no longer apparent.

References

1. Specker BL, Wey HE, Minett M, Beare TM. Pregnancy survey of smoking and alcohol use in South Dakota American Indian and white mothers. *American Journal of Preventive Medicine* 55:89-97, 2018.

2016 South Dakota Report Highlights

- 84.2% of South Dakota mothers had health insurance before pregnancy, up from 81.4% in 2014.
- 77.0% of South Dakota mothers did *not* talk to a health care worker about how to prepare for a healthy pregnancy prior to their most recent pregnancy.
- 38.7% of South Dakota mothers intended to become pregnant.
- 19.1% of South Dakota mothers were not doing anything at the time of the survey to prevent pregnancy.
- 73.4% of South Dakota mothers began prenatal care in the first trimester and 84.1% of mothers attended 80% or more of their prenatal visits.
- 34.2% of South Dakota mothers received WIC services during their most recent pregnancy vs. 36.6% in 2014.
- 4.0% of South Dakota mothers reported having a home visitor during their pregnancy to help prepare for their new baby, and 8.3% had a home visitor after their baby was born.
- 58.5% of South Dakota mothers reported having their teeth cleaned by a dentist or hygienist during the year *before* pregnancy and 50.6% of mothers had their teeth cleaned *during* pregnancy.
- 13.3% of South Dakota mothers smoked during the last three months of pregnancy.
- 96.3% of South Dakota mothers did not currently allow smoking anywhere in their home.
- 7.3% of mothers drank during the last three months of pregnancy with less than 1% binge drinking.
- 5.1% of South Dakota mothers reported using marijuana during the three months before pregnancy.
- 53.4% of South Dakota mothers were overweight or obese prior to pregnancy, up from 48.3% in 2014.
- 89.2% of South Dakota mothers breastfed or pumped breast milk for their infant, even for a short period of time.
- 90.8% of South Dakota mothers reported having a postpartum check-up, and 91.6% reported that their baby was seen for a one-week checkup.
- 18.1% of South Dakota mothers were classified as having symptoms of postpartum depression.
- 91.7% of South Dakota mothers placed their infants on their back to sleep.
- 37.2% of South Dakota mothers stated that their infant always sleeps alone in his or her own crib or bed.
- 44.7% of South Dakota mothers reported that their infant sleeps without blankets, toys, cushions, pillows or bumper pads despite recommendations that cribs should be free of these items.
- 71.0% of infants shared a room with their mother as recommended by the AAP.
- 66.0% of South Dakota mothers reported at least one stressful life event, with 26.2% reporting three or more stressors, in the year before pregnancy.
- 3.2% of South Dakota mothers were physically hurt by their husband or partner before pregnancy, and 2.7% were hurt during pregnancy. Domestic abuse was reported more often during pregnancy than after pregnancy.
- About 90% of South Dakota mothers reported having someone to help if they were tired, needed someone to take care of the baby, talk with, or help if they were sick. Family members were the main source of social support.
- 16.0% of South Dakota mothers experienced four or more adverse childhood experiences (ACEs).

Executive Summary

The South Dakota Department of Health, in conjunction with the EA Martin Program at South Dakota State University, conducted a 2016 Pregnancy Risk Assessment Monitoring System (PRAMS)-like surveillance project. The 2016 South Dakota PRAMS-like survey was a statewide population-based survey based on a stratified random sample of women who gave birth to a live-born infant, thereby allowing rates to be estimated for South Dakota mothers giving birth in 2016. The topics included in this survey were selected to enhance our understanding of maternal attitudes and behaviors around the time of pregnancy and the weighted response rate was 67.6%. Key findings by major focus areas include:

Health Insurance

- Percentage of mothers with health insurance before pregnancy increased significantly from 81.4% in 2014 to 84.2% in 2016.
- More than 50% of the mothers had job-based insurance before, during, and after pregnancy; 12.6% received Medicaid before pregnancy, 24.5% during pregnancy and 16.4% after pregnancy; 15.8% were uninsured before pregnancy, 3.7% during pregnancy, and 13.2% after pregnancy; less than 1% of infants were uninsured and 35.5% were on Medicaid.
- Mothers who were uninsured *before* pregnancy had higher rates of low birthweight infants and preterm births than insured mothers (7.7% vs. 3.9% and 9.9% vs. 5.7%, respectively); mothers who were uninsured *during* pregnancy had a higher rate of preterm birth than insured mothers (14.5% vs. 6.2%, respectively).

Preconception Care

- 77.0% of South Dakota mothers (78.5% white, 74.0% American Indian, 70.4% other races) did *not* talk to a health care worker about how to prepare for a healthy pregnancy prior to their most recent pregnancy. This compares to 67.0% in 2014.
- Percent of mothers who did *not* talk to their health care provider was greater in white mothers, non-Hispanic mothers, mothers with a high school education, unmarried mothers, uninsured mothers, and mothers from households with a middle income.

Pregnancy Intendedness and Birth Control Use

- 38.7% of births were intended, 5.9% were unintended, and 37.7% were mistimed. The remaining mothers (17.7%) were unsure about what they wanted when asked about the timing of their pregnancy.
- 43.5% of mothers were not trying to become pregnant; however, 61.1% were not doing anything to keep from getting pregnant. The most common reason given for not doing anything to prevent pregnancy was that they did not mind if they got pregnant (54.9%).
- Not receiving prenatal care as early as the mother wanted was associated with intendedness of pregnancy: a higher percent of women who had an unintended pregnancy did not receive prenatal care as early as they wanted (22.2%) compared to women who had an intended pregnancy (5.6%).
- At the time of the survey, 19.1% of mothers were not doing anything to prevent pregnancy. Among those not doing anything, the main reason stated was that they did not want to use birth control.

Prenatal Care & Immunizations

- 73.4% of mothers began prenatal care in the first trimester and 94.2% began care in the first or second trimester.
- 84.1% of mothers attended 80% or more of their prenatal visits, and this differed by race (88.5%, 63.4% and 80.4% for white, American Indian and other race mothers, respectively).
- 73.6% of mothers received adequate or more than adequate care, and this differed by race (81.1%, 43.4%, and 60.5% for white, American Indian and other race mothers, respectively).
- 89.0% of mothers were able to begin prenatal care as early as they wanted, but this varied by race (93.0%, 70.4%, and 82.9% for white, American Indian and other race mothers, respectively). Among mothers not receiving care as early as they wanted, not knowing they were pregnant was the main reason followed by not being able to get an appointment when they wanted one.
- 95.2% of mothers reported that they were able to attend all of their recommended prenatal visits, but this varied by race (97.0%, 85.4%, and 95.0% for white, American Indian and other race mothers, respectively). The main barrier to attending prenatal visits was not having transportation to get to the clinic or doctor's office.
- 92.0% of mothers were offered a flu shot or told to get a flu shot the year before delivery and 92.5% of mothers received a Tdap vaccine in the perinatal period with the majority receiving it during pregnancy.

Women, Infants & Children (WIC) Services

- 34.2% of mothers received WIC services during their most recent pregnancy vs. 36.6% in 2014.
- In general, WIC Mothers received more information from a health care worker during and after pregnancy than non-WIC mothers.

Home Visiting

- 4.0% of mothers reported having a home visitor during their pregnancy to help prepare for their new baby, and 8.3% had a home visitor after their baby was born.

Oral Health During Pregnancy

- 58.5% of mothers reported having their teeth cleaned by a dentist or hygienist during the year *before* pregnancy (varied by race: 63.9%, 39.3%, and 44.4% for white, American Indian, and other race mothers, respectively).
- 50.6% of mothers had their teeth cleaned by a dentist or hygienist *during* pregnancy (varied by race: 53.9%, 43.6%, and 34.9% for white, American Indian, and other race mothers, respectively).
- 18.7% of mothers needed to see a dentist for a problem and 14.4% went to a dentist or dental clinic about a problem during pregnancy. Among mothers with a dental problem, 21.3% stated it was hard to go because they could not afford it.

Substance Use Before & During Pregnancy: Tobacco, Alcohol, Illicit Drugs

Use of Spit Tobacco & E-Cigarette/Vaping Products

- 1.0% of mothers used spit tobacco (chewing tobacco and/or snuff) and 5.5% used e-cigarettes or vaping products in the three months before pregnancy. Less than 1% used spit tobacco and 1.3% used e-cigarettes/vaping products during the last three months of pregnancy.

Cigarette Smoking

- 25.5% of mothers smoked in the three months before pregnancy, 13.3% smoked during the last three months of pregnancy, and 16.0% smoked at the time of survey completion. American Indian mothers were more likely to smoke cigarettes before pregnancy than white mothers (54.3% vs. 20.4%), but among those who smoked, American Indian mothers were more likely to quit than white mothers when they found out they were pregnant (51.7% vs. 35.5%, respectively).
- Among mothers who smoked in the three months before pregnancy, the top things that made smoking hard to quit were cravings for a cigarette (83.9%) and loss of a way to handle stress (80.6%).
- 96.3% of South Dakota mothers did not currently allow smoking anywhere in their home (varied by race: 97.9%, 88.5%, and 95.4% of white, American Indian, and other race mothers, respectively).

Alcohol Use

- 64.6% of mothers drank alcohol in the three months before pregnancy with 26.8% binge drinking. 7.3% drank during the last three months of pregnancy with less than 1% binge drinking. Consumption of alcohol before pregnancy was highest among white mothers, non-Hispanic mothers, mothers aged 25 to 34 years, more educated mothers, married mothers and mothers from households with higher income levels.

Illicit Drug Use

- 5.1% of mothers reported using marijuana in the three months before pregnancy. Non-prescription drugs, including oxycodone, hydrocodone and oxycontin, were reported to be used by 1.0% of mothers, and methamphetamines were reported to be used by 0.7% of mothers.

Maternal Health During Pregnancy

- 53.4% of mothers were overweight or obese prior to pregnancy, up from 48.3% in 2014.
- American Indian mothers had 2 to 4 times the prevalence of type 1 or type 2 diabetes and hypertension than white mothers and mothers of other races. A higher percentage of diabetes was seen with older mothers, unmarried mothers and low-income mothers. 12.3% of mothers were diagnosed with gestational diabetes (higher among American Indian mothers and mothers of other races than white mothers: 15.7% and 15.6% vs. 11.3%, respectively).
- 11.5% of mothers reported being diagnosed with depression prior to pregnancy, and a higher percent of non-Hispanic mothers reported depression than Hispanic mothers.

Breastfeeding

- 89.2% of mothers breastfed or pumped breast milk for their infant, even for a short period of time (varied by race: 91.6% for white mothers, 77.5% for American Indian mothers, and 86.9% for mothers of other races).

- 9.2% of mothers had someone suggest to them that they should *not* breastfeed. Parents or in-laws were the most common person suggesting not to breastfeed.
- The main reason for not initiating breastfeeding was not wanting to breastfeed (49.6%), and the main reason for stopping breastfeeding was the mother believed she was not producing enough milk (51.2%).

Postpartum Health

- 90.8% of mothers reported having a postpartum check-up, and 91.6% reported that their baby was seen for a one-week checkup.
- 18.1% of mothers were classified as having symptoms of postpartum depression, and the risk of exhibiting symptoms was higher among unmarried mothers and mothers with low annual household incomes.

Infant Safe Sleep

- 91.7% of infants are placed to sleep on their back (varied by race: 92.0%, 93.6% and 86.2% of white, American Indian, and other race mothers, respectively).
- 37.2% of mothers stated that their infant always sleeps alone in his or her own crib or bed (varied by race: 41.5%, 22.0%, and 24.3% of white, American Indian and other race mothers, respectively).
- Only 44.7% of mothers reported that their infant sleeps without blankets, toys, cushions, pillows or bumper pads despite recommendations that cribs should be free of these items.
- Room-sharing, a recent AAP recommendation, occurs with 71.0% of infants (varied by race; 68.1%, 79.0%, and 83.2% of white, American Indian, and other race mothers, respectively).
- Being talked to by their healthcare provider about what should and should not go in an infant's crib and placing the crib in the mother's room were associated with mothers being more likely to do so.

Stress, Domestic Abuse, and Social Supports

Stressful events the year prior to giving birth

- 66.0% of mothers reported at least one stressful life event, with 26.2% reporting three or more stressors, in the year before pregnancy.
- Financial stresses were the most common type of stress (48.3%), followed by emotional stresses (33.6%), partner stresses (23.4%) and traumatic stresses (16.4%).
- Having three or more stressors was associated with the following population characteristics: being American Indian, a young maternal age, less maternal education, being unmarried, having a low household income, and either being uninsured or a Medicaid recipient.

Domestic abuse before, during and after pregnancy

- 3.2% of South Dakota mothers were physically hurt by their husband or partner before pregnancy, and 2.7% were hurt during pregnancy.
- Domestic abuse was reported more often during pregnancy than after pregnancy. The most common abusive event either during, after or both during and after the pregnancy included being controlled by the husband or partner (5.4%).
- 2.8% of mothers reported one abusive event during pregnancy, 3.1% reported 2-3 abusive events, and 0.5% reported four or more abusive events during pregnancy.

Social supports after delivery

- About 90% of the mothers reported having someone to help if they were tired, needed someone to take care of the baby, talk with, or help if they were sick. Family members were the main source of social support.

Adverse Childhood Experiences (ACEs)

- 16.0% of 2016 South Dakota mothers experienced four or more adverse childhood experiences (ACEs). The prevalence of high ACE scores (4+) was higher among American Indian mothers, younger mothers, less educated mothers, unmarried mothers, mothers who were uninsured or on Medicaid, and mothers in households with less income.
- The most frequent ACE was parental divorce or separation with 42.8% of mothers experiencing this as a child, followed by household substance abuse (24.7%). 10-19% of mothers experienced emotional, physical or sexual abuse as a child.
- Mothers with higher ACE scores were more likely to have smoked in the previous two years, used illicit drugs in the three months prior to pregnancy, have lower household income, and have increased prevalence of postpartum depression than mothers with low ACE scores.

Methodology

Chapter 1
Methodology

PRAMS is a population-based surveillance system developed by the CDC that is conducted by surveying mothers with infants between two and six months of age. The 2016 South Dakota PRAMS-like survey sample was derived from birth certificate data (stillbirths and fetal deaths were not included). The following exclusions were used when sampling 2016 births:

- Mothers less than 14 years of age
- Out-of-state births to residents
- In-state births to non-residents
- Missing key information (such as mother's last name or mother's mailing address)
- Delayed processing of birth certificates (>4 months after birth)
- All but one infant from twin and triplet births
- All infants from multiple gestation births with plurality >3
- Adopted infants
- Surrogate births

The sampling was stratified by the mother's race into three categories: white race, American Indian race, and a category for all and mixed-race mothers. Births within the race categories were randomly sampled each month at approximately 8% for white race, 40% for American Indian race, and 45% for the other race category. American Indian and other race births were sampled at higher rates to ensure that adequate precision for prevalence estimates were available in these smaller populations. The total sample size, as recommended by CDC, was targeted to be approximately 1,200 completed surveys over one year (2016). Sampling rates by strata (white, American Indian, other races) were based on the race distribution and numbers of births occurring in 2014 and adjusted for expected participation rates:

Table 1.1. 2016 PRAMS Sampling Rates

	# PRAMS-eligible births in 2014	# Needed[1]	# with 60% Participation Rate	Sampling Fraction
White	8,581	382	637	7.4% = 8% (n=686)
American Indian	1,718	324	648 [2]	37.7% = 40% (n=687)
Other	1,148	297	494	43.0% = 45% (n=517)

[1] Based on finite correction factor per CDC protocol: # needed = n/(1 + (n/N)), where n=desired sample size (400) and N=# of eligible births

[2] Used a 50% participation rate

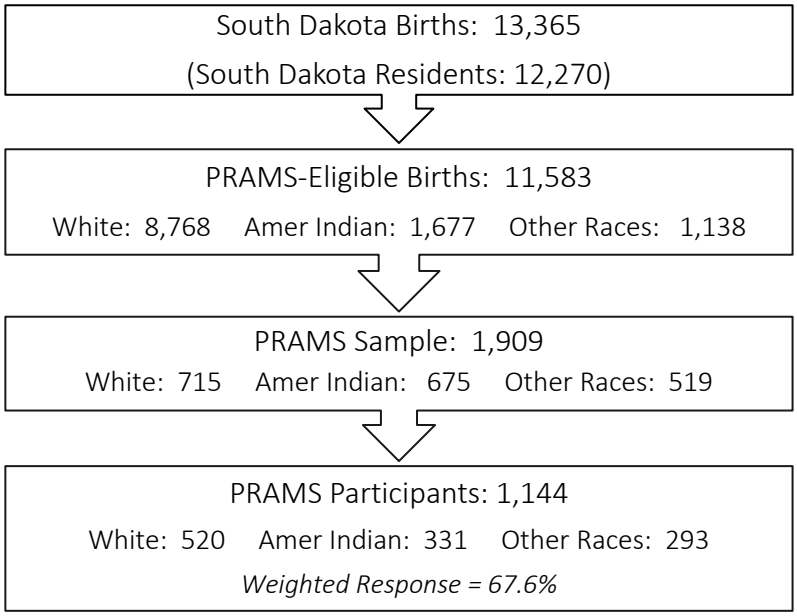
Based on the sampling fractions above and assuming we have the same number of births as in 2014, we expect 1,890 mothers (686 white, 687 AI, 517 Other) to be enrolled in the PRAMS. The final sample included 1,909 births. The total numbers of South Dakota births, PRAMS-eligible births, PRAMS sample, and participants are shown in **Figure 1.1.** The sampling process was conducted using SAS statistical software (version 9.1) on a secure computer.

Multiple communication and collection methods were used to conduct the survey. To maximize the response rates, we used a combination of mailed questionnaires, an online website, and questionnaires completed via telephone. Initially, women received a pre-letter introducing and describing PRAMS to the mother and informing her that the questionnaire would arrive soon. The questionnaire was mailed to mothers seven days after the pre-letter and included a self-addressed, pre-paid return envelope. If the

mother did not respond to the initial questionnaire, a reminder letter was sent to her 10 days after the initial packet. A second questionnaire was mailed to mothers who had not yet responded 10 days after the reminder letter. If the mother did not respond to the two mailings within 14 days after the second mailing, she was then contacted by telephone and had the opportunity to complete the questionnaire over the phone. Also, mothers would receive telephone calls if they returned an incomplete survey (<75% complete) or had undeliverable or returned mail. Questionnaires were available in English and Spanish and attempts were made to complete the survey in all non-English speaking mothers. The majority of questions were based on CDC-approved Phase 7 questions (https://www.cdc.gov/prams/questionnaire.htm).

An online version of the questionnaire created using QuestionPro software was available and information on how to reach the online questionnaire was included in all correspondence. In addition, posters and brochures were placed in all Department of Health county WIC offices and Tribal Health offices throughout the state, and staff encouraged mothers to complete the PRAMS if they received a questionnaire in the mail.

Figure 1.1. Total Number of 2016 South Dakota Births, PRAMS-eligible Births, PRAMS sample, and PRAMS Participants by Race



Other efforts that were made in order to encourage participants to respond to and complete the survey were:

- **Inclusion of an up-front incentive:** All mothers asked to participate received an incentive ($2 bill) along with the initial questionnaire.
- **Inclusion of a PRAMS brochure:** The PRAMS brochure contained frequently asked questions and answers pertaining to the PRAMS project.
- **Providing pre-paid return envelopes**: In order to make this process as easy as possible for our participants and to show our appreciation for the mothers completing the survey, we included a self-addressed return envelope.
- **Providing a thank you:** An infant care package (insulated lunch bag, nail clippers, wipes, nasal suction bulb, book) was given to mothers who completed the questionnaire.

Management of Participants

Each sampled mother was assigned a unique ID number and an Excel worksheet was used to track the sample of mothers and their scheduled mailings and phone calls.

Data Analysis

Data collected from paper surveys were double-entered into a Microsoft Access database. Data from online surveys were downloaded from QuestionPro into Microsoft Excel and processed with R statistical software to a format compatible with merging to the Access survey data. All data were imported into SAS and linked with information listed on birth certificates obtained through the Department of Health Office of Vital Records. The following variables were taken from Vital Statistics: trimester prenatal care began, gestational age, infant birthweight, maternal age, and maternal education. Statistical analyses were performed using SAS 9.4 software (SAS® Institute, Inc. Cary, NC) and Stata (StataCorp, Release 12 (2011), College Station, TX).

Confidence intervals (CI) are included that represent the margin of error around a point estimate (e.g., prevalence estimate). Finite population correction factors were used in the calculation of confidence intervals (see **Technical Appendix**). A confidence interval provides a range for the location of the true population value for a measure of interest, such as prevalence of a birth outcome, with the given level of certainty (e.g., 95%). Narrow confidence intervals indicate less variability in the estimate for that indicator and large confidence intervals indicate more variability. In general, smaller sample sizes result in larger confidence intervals, and prevalence values close to 50% have larger CI's than prevalence values close to 0% or 100%.

Weighting

After all of the data were collected, they were statistically weighted. Weighting allows the PRAMS data to be representative of all PRAMS-eligible live-born births for South Dakota mothers in 2016. Responses were weighted to account for the sampling rates for each race category and survey non-response (surveys not returned). Weights for survey non-response were adjusted for specific characteristics related to non-response (i.e. women who had lower education attainment may be less likely to respond than those with higher education attainment). These non-response variables differed by race and this was taken into account in the weighting (see **Technical Appendix**).

South Dakota's weighted response rate was 67.7%, although this varied significantly among the three races: 72.7% for white race, 49.2% for American Indian race, and 56.5% for other race. Sampling fractions, response rates, reasons for non-response, and method of response are given in **Table 1.2** by race.

Confidentiality & Data Privacy

IRB approval for this survey was obtained through the South Dakota State University Institutional Review Board. Participation in the survey was voluntary. Mothers were informed that they were not obligated to participate in the study, that their answers would be confidential, and there would not be any identifying information when the results of the study were published. All of the data were de-identified and aggregated for analysis.

Limitations

Only live births satisfying the inclusion criteria were used in this study; therefore, results can only be generalized to eligible live births in South Dakota. The study was based on self-report, which indicates there might be some recall bias and reporting bias that cannot be controlled. CDC strongly recommends a weighted response rate of 60% or greater (2016 SD PRAMS-like survey weighted response rate was 67.6%).

Table 1.2. Sampling Fractions (N) and Response Rates by Race

	Strata			
	White	**American Indian**	**Other** [1]	**Totals**
Total Eligible Births	8,768	1,677	1,138	11,583
% of Eligible Births Sampled (N)	8.2% (715)	40.3% (675)	45.6% (519)	1,909
Response Rate [2] (response/sample)	72.7% (520/715)	49.0% (331/675)	56.5% (293/519)	60.0% (1144/1909)
Non-responders	195	344	226	765
Time Expired	72.8% (142)	79.3% (273)	73.0% (165)	75.8% (580)
Refused	23.6% (46)	10.8% (37)	18.1% (41)	16.2% (124)
Could not Locate	2.6% (5)	9.9% (34)	4.0% (9)	6.3% (48)
Language	0.5% (1)	0% (0)	4.9% (11)	1.6% (12)
Other	0.5% (1)	0% (0)	0% (0)	0.1%(1)
Method of Response	520	331	293	1,144
Mail	34.2% (178)	34.4% (114)	35.8% (105)	34.7% (397)
Online	63.3% (329)	44.4% (147)	48.1% (141)	53.9% (617)
Phone	0.6% (3)	7.0% (23)	4.4% (13)	3.4% (39)
WIC	1.9% (10)	14.2% (47)	11.6% (34)	8.0% (91)

[1] 'Other Races' (number sampled) included Asian (114), Black (169), Mixed Race (179), Pacific Islanders (5), and Unknown (52).

[2] Includes partial responses where mother answered at least one question but less than 70% (n=48). Overall weighted response rate was 67.7%.

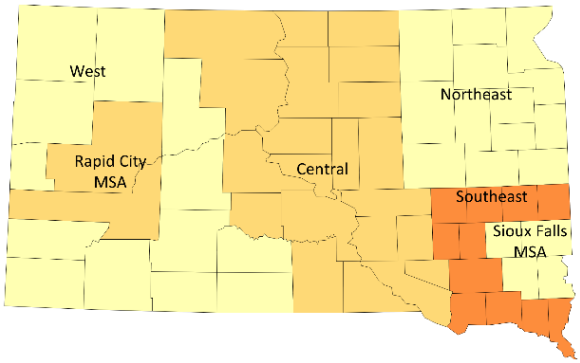
Demographic Characteristics & Infant Mortality

Chapter 2

Demographic Characteristics and Infant Mortality

About one out of every 10 South Dakota mothers who had an eligible birth in 2016 completed a survey. This report is based on 1,141 mothers (520 white, 331 American Indian, 293 other races) who participated in the survey of the 1,909 sampled (weighted response rate of 67.6%). The responses have been weighted to represent 11,583 South Dakota female residents who had a PRAMS-eligible live birth in South Dakota in 2016. Demographics of the original PRAMS sample vs. South Dakota PRAMS-eligible births for 2016 and comparisons between responders and non-responders by maternal race are summarized in the **Technical Appendix**.

The demographic categories shown in **Table 2.1** are used consistently throughout this report after weighting for sampling and non-response rates. Ethnicity, age, education and marital status were obtained from South Dakota Department of Health, Office of Vital Records. Insurance before pregnancy and annual household income were obtained from PRAMS survey. Statistics are provided by region of the state as defined in the map below, where MSA = metropolitan statistical area:



Based on the information in **Table 2.1**, a higher percent of mothers of other races were Hispanic compared to white and American Indian mothers. White mothers were older and had more years of education, were more likely to be married, had a higher percentage with job-based insurance, and had higher household income than American Indian mothers and mothers of other races. The western region of South Dakota had the highest percentage of American Indian mothers and Sioux Falls had the highest percentage of white mothers and mothers of other races.

The overall infant death rates, based on vital records, for all 2016 births and 2016 PRAMS-eligible births were 4.6 and 3.7 per 1,000 live births, respectively*. The lower death rate among PRAMS-eligible births may be due to the inclusion of only one infant of twin and triplet births and exclusion of multiple births of greater than three, all of which have higher death rates than singleton births.

* Note that these were deaths that occurred among infants born in 2016 and do not represent all infant deaths in SD in 2016 since some of those infants were born in 2015. Infant mortality for all 2016-born infants will not be known until 2018 since all infants do not reach one year of age until 2017 is over.

Table 2.1. Demographic Characteristics of 2016 PRAMS Survey Responders

	White (N=520)	American Indian (N=331)	Other Races (N=329)
Ethnicity[1]			
Hispanic	4.9%	3.6%	13.3%
Non-Hispanic	96.1%	96.4%	86.7%
Age (years)[1]			
<20	4.4%	12.7%	7.5%
20-24	17.9%	26.5%	28.0%
25-29	34.8%	34.0%	30.0%
30-34	32.7%	16.6%	22.6%
≥35	10.2%	10.2%	11.9%
Maternal Education[1]			
<High School	7.7%	34.3%	35.3%
High School	16.3%	27.2%	32.8%
>High School	76.0%	38.5%	19.1%
Marital Status[1]			
Married	77.7%	16.0%	59.7%
Not married	22.3%	84.0%	40.3%
Insurance Before Pregnancy [1,2]			
Private (direct purchase)	7.2%	1.5%	4.2%
Job-based	68.4%	11.1%	46.0%
Medicaid	4.7%	41.5%	20.8%
Medicare	2.1%	2.2%	3.1%
Other	8.2%	0.3%	4.1%
Uninsured	9.4%	43.4%	21.8%
Household Income/y[1]			
Less than $15,000	8.9%	68.5%	29.3%
$15,001 - $26K	10.6%	17.5%	25.1%
$26,001 - $44K	18.9%	7.7%	26.6%
$44,001 - $67K	22.7%	2.8%	9.3%
$67,001 or more	38.9%	3.5%	9.7%
Region[1]			
Central	11.5%	18.4%	6.8%
Northeast	22.1%	6.6%	23.2%
Rapid City MSA	14.4%	16.6%	14.7%
Sioux Falls MSA	34.2%	4.5%	41.3%
Southeast	10.8%	4.2%	27.8%
West	6.9%	49.7%	6.5%

[1] Significant race differences.

[2] If more than one type of insurance was selected, a hierarchy was established to report the individual's insurance status. The hierarchy, in order, was: Private; Job-based (includes self or as a dependent); Other (includes military, VA, Champus & TriCare or Other); Medicaid; Medicare; Uninsured (includes IHS). For example, if an individual selected both 'Private' and 'Medicaid', the individual's insurance status was reported as 'Private'.

The infant death rate among the PRAMS sample (regardless of survey completion) was 5.8 per 1,000 live births and although the infant death rate among non-responding mothers was more than twice that of mothers who responded (9.2 vs. 3.5 per 1,000 births), it was not statistically different due to the small

number of deaths (p=0.13).

Means for maternal age and birthweight based on Department of Health Vital Records data for the PRAMS participants and the PRAMS-eligible sample are shown by race in **Table 2.2**, along with the percent female, low birthweight (<2,500 g), and preterm (<37 weeks gestation).

Table 2.2. Birth Characteristics of PRAMS Participants and PRAMS-Eligible Births by Race [1] (unweighted)

	PRAMS Participants	All PRAMS-Eligible Births
Infant Death Rate (per 1,000 live births)	3.49	3.71
White	**N=520**	**N=8,768**
Maternal Age (years)	28.5 ± 5.0	28.6 ± 5.2
Infant Female (%)	50.0%	49.0%
Birthweight (g)	3415 ± 542	3368 ± 542
Low Birthweight (<2500g) (%)	3.7%	5.3%
Preterm (<37 weeks) (%)	5.4%	7.2%
American Indian	**N=331**	**N=1,677**
Maternal Age (years)	26.3 ± 5.0	25.6 ± 5.6
Infant Female (%)	47.4%	48.6%
Birthweight (g)	3404 ± 578	3373 ± 601
Low Birthweight (<2500g) (%)	6.7%	7.2%
Preterm (<37 weeks) (%)	11.5%	11.1%
Other Races	**N=293**	**N=1,138**
Maternal Age (years)	27.4 ± 5.8	27.3 ± 5.9
Infant Female (%)	46.4%	45.6%
Birthweight (g)	3279 ± 604	3227 ± 572
Low Birthweight (<2500g) (%)	8.2%	8.1%
Preterm (<37 weeks) (%)	8.5%	9.3%

[1] Data are mean ± standard deviation; obtained from South Dakota Department of Health, Office of Vital Records. The following variables were used: bth_mage for maternal age; bth_sex for infant sex; bth_egrm for birthweight; and bth_gest for preterm.

The overall infant death rates, based on vital records, for all 2016 births and 2016 PRAMS-eligible births were 4.6 and 3.7 per 1,000 live births, respectively†. The lower death rate among PRAMS-eligible births may be due to the inclusion of only one infant of twin and triplet births and exclusion of multiple births of greater than three, all of which have higher death rates than singleton births. The infant death rate among the PRAMS sample (regardless of survey completion) was 5.8 per 1,000 live births and although the infant death rate among non-responding mothers was more than twice that of mothers who responded (9.2 vs. 3.5 per 1,000 births), it was not statistically different due to the small number of deaths (p=0.13).

† Note that these were deaths that occurred among infants born in 2016 and do not represent all infant deaths in SD in 2016 since some of those infants were born in 2015. Infant mortality for all 2016-born infants will not be known until 2018 since all infants do not reach one year of age until 2017 is over.

Health Insurance

Chapter 3
Health Insurance

Quote from a 2016 SD PRAMS Mother:

"Definitely felt the need for medical financial assistance… I've always been able to pay my bills, my whole life. If I needed more money, I'd just get a second job. With a baby, I can't work a second job because then I'd need to pay for childcare."

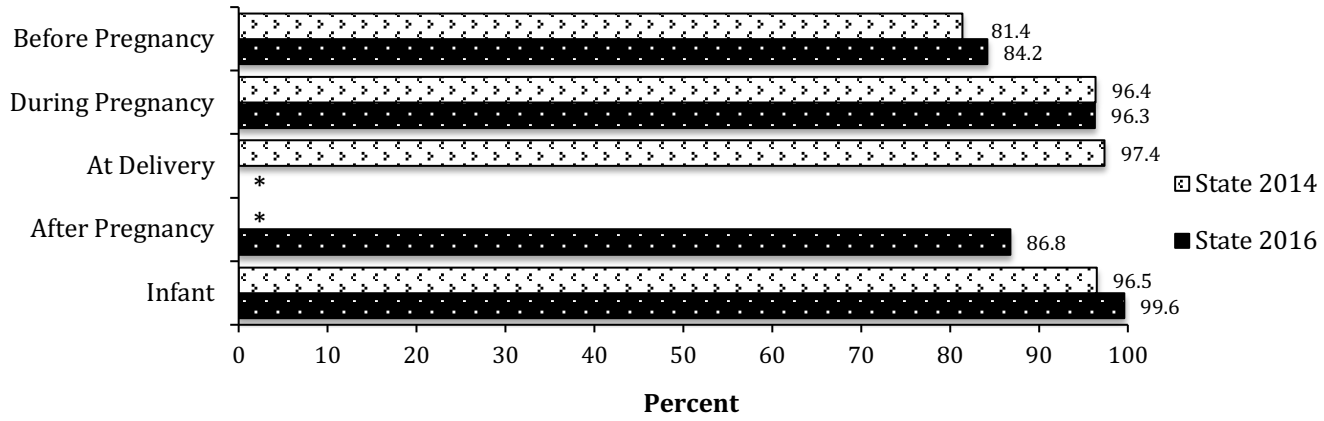
Background & Public Health Significance

Health insurance coverage is important for accessing health care and staying healthy. Nationally, 11% of women aged 19-64 years were not insured in 2015 (1). Lack of health care coverage for pregnant women is directly associated with inadequate prenatal care, which can lead to poor health outcomes (2). In 2008, it was estimated that if pregnant teenagers received prenatal care, it could save between $2,274 and $3,146 per pregnancy depending on the month prenatal care was begun, with costs related primarily to caring for low birth-weight infants (3). In addition, infants and children without health insurance are less likely to have well-child visits and more likely to have unmet medical care and unfilled prescriptions (4).

What's Happening in South Dakota

The U.S. Healthy People 2020 goals are to have 100% of adults and 100% of children covered by health insurance. Changes between 2014 and 2016 in the percentages of South Dakota mothers and infants that were uninsured are shown in **Figure 3.1**. The percentage of mothers who were insured before pregnancy increased significantly between 2014 and 2016 ($p<0.001$).

Figure 3.1. Percent of Mothers and Infants Who Were Insured by Year (weighted)



** Data not available for 2016 insured at time of delivery and for 2014 insured after pregnancy*

Insurance status before pregnancy and insurance status during pregnancy *were* associated with several demographic characteristics. The percentages of uninsured mothers, both before and during pregnancy, were highest among American Indian mothers, Hispanic mothers, unmarried mothers, less educated mothers, mothers with lower household incomes, and mothers from the western region of the state (**Table 3.1**). Higher percentages of younger mothers were uninsured before pregnancy, but maternal age was not associated with being uninsured during pregnancy.

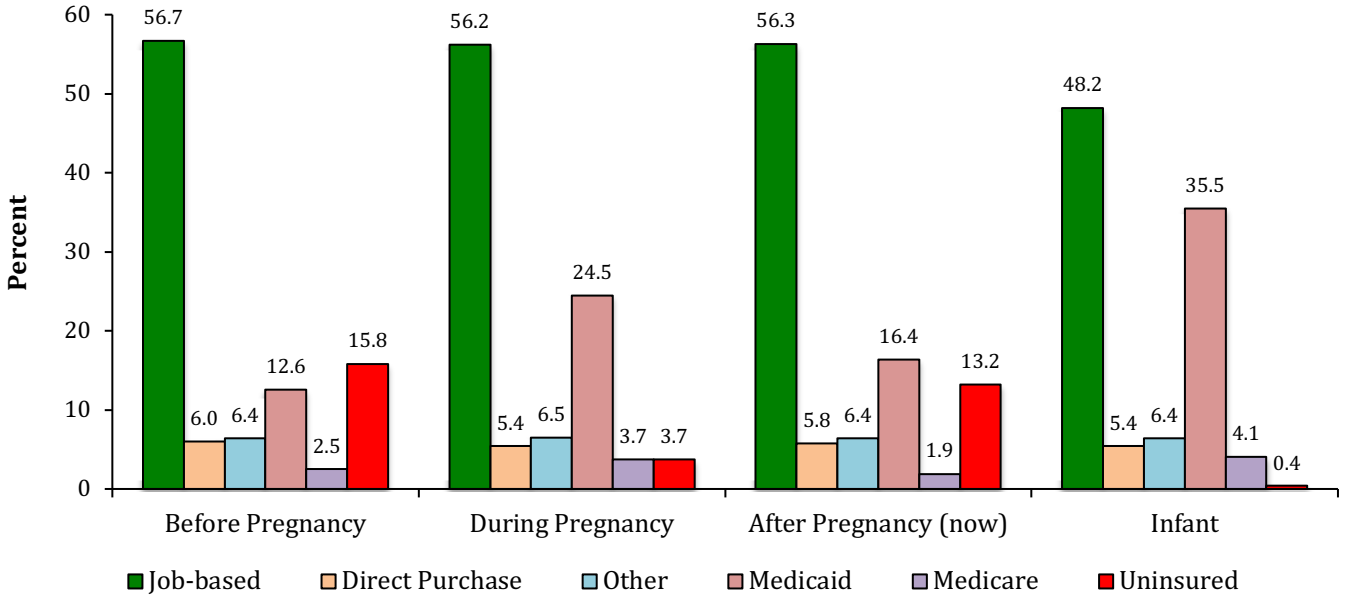
Table 3.1. Percent of Uninsured Mothers Before and During Pregnancy by Demographic Characteristics (weighted)[1]

	% Uninsured	
Demographics	**Before Pregnancy**	**During Pregnancy**
Race	P<0.001[2]	P<0.001
White	9.9% [7.3, 12.5]	1.9% [0.7, 3.1]
American Indian	42.5% [37.6, 47.4]	13.2% [9.8, 16.7]
Other Races	22.4% [18.1, 26.6]	4.1% [2.0, 6.2]
Ethnicity	P<0.001	P=0.004
Hispanic	38.0% [24.0, 52.1]	11.4% [2.7, 20.1]
Non-Hispanic	14.8% [12.7, 16.9]	3.3% [2.3, 4.3]
Age (years)	P<0.001	Not significant
<20	20.8% [11.5, 30.0]	1.7% [0, 3.8]
20-24	22.9% [17.3, 28.4]	4.1% [1.9, 6.4]
25-29	15.9% [12.2, 19.5]	4.6% [2.6, 6.6]
30-34	8.0% [4.9, 11.1]	2.0% [0.8, 3.2]
≥35	19.9% [12.3, 27.5]	6.0% [0.6, 11.3]
Marital Status	P<0.001	P=0.02
Married	9.1% [6.9, 11.2]	2.6% [1.4, 3.8]
Unmarried	27.8% [23.4, 32.2]	5.6% [3.6, 7.6]
Education	P<0.001	P<0.001
Less than High School	25.4% [19.0, 31.8]	8.9% [4.7, 13.0]
High School	27.8% [21.6, 34.0]	3.2% [1.2, 5.2]
More than High School	10.1% [7.8, 12.3]	2.7% [1.5, 3.9]
Region	P=0.002	P<0.001
Central	18.8% [12.4, 25.1]	2.2% [0.6, 3.8]
Northeast	13.3% [8.4, 18.1]	3.9% [1.4, 6.5]
Rapid City MSA	18.3% [12.6, 23.9]	7.1% [2.7, 11.5]
Sioux Falls MSA	10.7% [6.9, 14.5]	0.7% [0, 1.7]
Southeast	15.7% [8.1, 23.2]	0.3% [0, 0.9]
West	26.6% [20.4, 32.7]	10.1% [6.0, 14.2]
Annual Household Income	P<0.001	P<0.001
≤$15,000	38.2% [32.0, 44.4]	8.8% [5.6, 12.0]
$15,001- $26,000	28.0% [19.7, 36.2]	8.3% [3.2, 13.4]
$26,001 - $44,000	13.7% [8.4, 19.1]	2.0% [0.2, 3.9]
$44,001 - $67,000	4.2% [1.2, 7.2]	0.8% [0.1, 1.5]
$67,001 or more	2.6% [0.5, 4.7]	1.0% [0, 2.4]

[1] 95% confidence intervals
[2] P Values are for a chi-square test of association

In 2016, 15.8% of South Dakota mothers were uninsured before pregnancy, 3.7% were uninsured during pregnancy, and 13.2% were uninsured after delivery (**Figure 3.2**). Following birth, 3.1% of the infants were uninsured. Job-based insurance was the most common source of insurance followed by Medicaid.

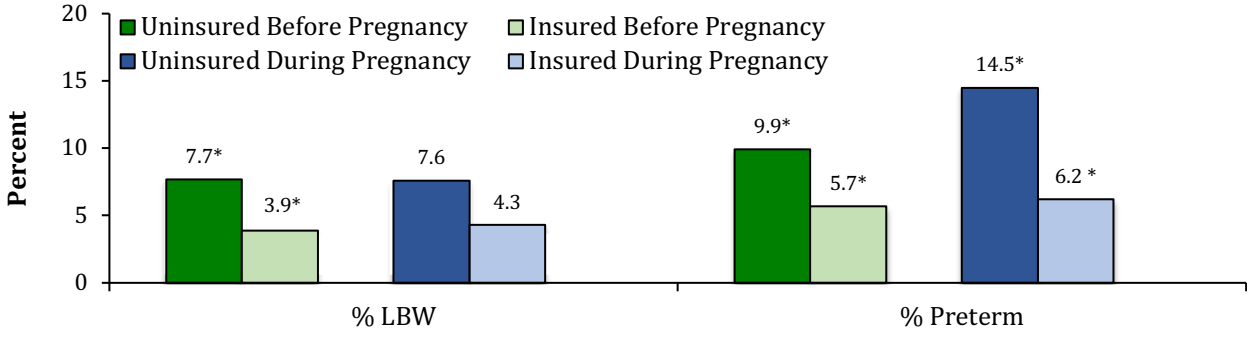
Figure 3.2. Percent of Mothers with Different Types of Insurance Before Pregnancy, During Pregnancy, After Delivery and for the Infant (weighted)[1]



[1] *If more than one type of insurance was selected, a hierarchy was established to report the individual's insurance status. The hierarchy, in order, was: Private; Job-based (includes self or as a dependent); Other (includes military, VA, Champus & TriCare or Other); Medicaid; Medicare; Uninsured (includes IHS). For example, if an individual selected both 'Private' and 'Medicaid', the individual's insurance status was reported as 'Private'.*

Higher percentages of mothers who were uninsured *before* pregnancy had low birthweight (LBW) and preterm infants compared to mothers who were insured, and a higher percentage of mothers who were uninsured *during* pregnancy had preterm infants compared to mothers who were insured (**Figure 3.3**).

Figure 3.3. Percent of Infants Born LBW and Preterm by Insurance Status (weighted)



* *Indicates significant difference between uninsured and insured mothers*

Summary

- The percentage of mothers with health insurance before pregnancy increased significantly from 81.4% in 2014 to 84.2% in 2016.
- Percent of uninsured mothers, both before and during pregnancy, were highest among American Indian mothers, Hispanic mothers, unmarried mothers, less educated mothers, mothers with lower household incomes, and mothers from the western region of the state. Higher percentages of younger mothers were uninsured before pregnancy, but not during pregnancy.
- Sources of health insurance:
    - About 56% of the mothers had job-based insurance before, during, and after pregnancy.
    - 12.6% of mothers received Medicaid before pregnancy, 24.5% during pregnancy and 16.4% after pregnancy.
    - 15.8% of mothers were uninsured before pregnancy, 3.7% during pregnancy, and 13.2% after pregnancy.
    - Less than 1% of infants were uninsured and 35.5% were on Medicaid.
- Mothers who were uninsured *before* pregnancy had significantly higher rates of LBW infants and preterm births than mothers who were insured (7.7% vs. 3.9% and 9.9% vs. 5.7%, respectively).
- Mothers who were uninsured *during* pregnancy had a higher rate of preterm birth than mothers who were insured during pregnancy (14.5% vs. 6.2%, respectively).

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Preconception Care, Topics Discussed & Health-related Actions

Chapter 4

Preconception Care, Topics Discussed Prior to Pregnancy and Health-Related Actions Prior to Pregnancy

Quote from a 2016 SD PRAMS Mother:

"I am thankful that there is a program like this, to help improve the health of mothers and babies all over the globe. For they are the future."

Background & Public Health Significance

Preconception health and care is an important component of Healthy People 2020. Preconception care focuses on management of behavioral risk factors and chronic diseases that can lead to increased risk of adverse birth outcomes such as still births, birth defects, low birthweight, preterm birth, infant death, and sudden infant death syndrome (SIDS) (1,2). Birth defects affect approximately 3% of all infants born and account for almost 20% of infant deaths while preterm birth has been estimated to be related to up to 36.5% of infant deaths (4). The combined annual cost of these, notwithstanding the emotional burden, is estimated at approximately $30 billion dollars in the United States (2).

Recognizing the need for action, the Centers for Disease Control & Prevention (CDC) and an external expert panel introduced a set of goals and recommendations to improve preconception health and health care (1). These recommendations were a result of the availability of evidence-based interventions that may reduce potentially harmful maternal behaviors and chronic conditions that are associated with adverse pregnancy outcomes including tobacco and alcohol use, inadequate folic acid intake, obesity, diabetes, and hypertension. Four goals, 10 recommendations and 40 action steps were developed for improving preconception health and care in the U.S. One of the 10 recommendations in the national plan includes using public health surveillance systems to monitor preconception health domains, of which a majority, but not all, are obtained from the PRAMS. Robbins et al., in 2009, reported both PRAMS and BRFSS data on 39 of the 41 core state preconception health indicators. The two indicators not reported were HIV testing the year prior to pregnancy and heavy drinking the preceding month. The ten health domains are listed below and the ones in italics are obtained from BRFSS.

1. General Health Status and Life Satisfaction
    a. Health Status
2. Social Determinants of Health:
    a. Educational status (Robbins, et al. used education status obtained from BRFSS)
3. Health Care:
    a. Current healthcare coverage
    b. Healthcare coverage the month before pregnancy
    c. *Routine checkup during the past year*
    d. Postpartum checkup
    e. Teeth cleaned during the 12 months before pregnancy
    f. Recent Papanicolaou test
    g. Preconception counseling from a healthcare provider

4. Reproductive Health & Family Planning:
    a. Previous preterm birth among multiparous women
    b. Previous fetal death, miscarriage or stillbirth among multiparous women
    c. Unintended pregnancy
    d. Contraceptive nonuse at time of conception among women not trying to get pregnant
    e. Postpartum contraceptive use
    f. Use of assisted reproductive technology among women trying to get pregnant
5. Tobacco & Alcohol Use:
    a. Current smoking
    b. Smoking before pregnancy
    c. Current secondhand smoke exposure
    d. Current binge drinking
    e. Drinking alcohol before pregnancy
    f. Binge drinking before pregnancy
6. Nutrition & Physical Activity:
    a. Fruit & vegetable intake
    b. Overweight BMI (both BRFSS and PRAMS)
    c. *Obesity (both BRFSS and PRAMS)*
    d. Folic acid supplementation the month before pregnancy
    e. Participation in recommended levels of physical activity
7. Mental Health:
    a. Frequent mental distress
    b. Clinical care for anxiety or depressions during the 12 months before pregnancy
    c. Postpartum depressive symptoms
8. Emotion & Social Support:
    a. Physical abuse during the 12 months before pregnancy
    b. Mental abuse during the 12 months before pregnancy
    c. Adequate emotional and social support
    d. Adequate emotional and social support available to women after delivering their infant
9. Chronic Conditions:
    a. Diabetes
    b. Pre-pregnancy diabetes (type 1 or type 2)
    c. Hypertension
    d. Hypertension during the 3 months before pregnancy
    e. Asthma
10. Infections:
    a. Influenza vaccine within the past 12 months

What's Happening in South Dakota

Findings from the South Dakota 2016 PRAMS-like survey for these domains are summarized below (**Table 4.1**), along with national data from the 2009 PRAMS survey and US and SD data from BRFSS (2). For purposes of comparison to the 2009 national data, the South Dakota 2016 PRAMS-like data were limited to 18-44 year olds. A small number of these domains were updated in 2018 using 2013-2014 BRFSS and PRAMS data (3). US measures, based on either PRAMS or BRFSS results, that were outside the SD 95% confidence intervals are shaded in blue. Findings for many of these topics are described in greater detail in other sections of this report, while findings related to maternal

health and health-related behaviors prior to pregnancy are presented in the current section.

Women of reproductive age may not be receiving the necessary education regarding behavioral risk factors, preventive actions, and chronic diseases prior to conception. Preconception healthcare visits are important for preparing for a healthy pregnancy. In 2016, only 23.0% of South Dakota mothers spoke with a healthcare provider about how to improve their health prior to pregnancy compared to 33.0% in 2014. The percent of women who did *not* talk with a healthcare provider about preparing for a healthy pregnancy by different demographic characteristics is shown in **Table 4.2**. The percent of mothers who were *not* talked to about preparing for a healthy pregnancy was higher among white mothers, non-Hispanic mothers, mothers with a high school education or greater, unmarried mother, uninsured mothers, mothers from households with a middle income, and mothers from the Rapid City area. Additionally, higher percentages of both the youngest and oldest maternal age groups did *not* talk to a healthcare provider about preparing for a healthy pregnancy than the middle-age groups. It is important to identify which populations do not talk with a healthcare provider so that preventive efforts can be focused on these population groups.

Table 4.1. Preconception Health Measures by Domain for Women Aged 18-44 Years Based on 2016 South Dakota PRAMS-like Survey, 2009 U.S. PRAMS & 2009 U.S. and South Dakota BRFSS Data (data weighted)[1]

Health Measure	SD PRAMS 2016	US PRAMS	SD BRFSS 2009	US BRFSS	Notes
General health status & life satisfaction					
Reported good-very good or excellent health			92.5 (89.2, 94.8)	88.9 (88.4, 89.3)[2]	
Social determinants of health					
Reported having a high school education/GED or greater			91.3 (87.7, 93.9)	89.7 (89.2, 90.2)[2]	
Reported having a high school education or greater	87.1 (85.1, 89.0)				SD Vital records of PRAMS
Healthcare					
Reported currently having some type of healthcare coverage			86.9 (83.7, 89.5)	80.1 (79.4, 80.7)[2]	
Reported having had healthcare coverage during the month before pregnancy	84.3 (82.2, 86.4)	74.9 (74.0, 75.7)[2]			U.S.: 29 reporting areas
Reported having a routine checkup in the past year			74.3 (70.0, 78.2)	66.3 (65.7, 67.0)[2]	
Reported having had a postpartum checkup	90.7 (89.0, 92.5)	88.2 (87.4, 89.0)[2]			U.S.: 16 reporting areas
Reported having had their teeth cleaned during the 12 months before pregnancy	58.6 (55.3, 61.8)	51.3 (50.4, 52.1)[2]			U.S.: 29 reporting areas
Reported having had a Papanicolaou test within the past 3 years			85.2 (81.3, 88.4)	84.2 (83.6, 84.8)[2]	
Reported having received preconception counseling about healthy lifestyle behaviors and prevention strategies from a healthcare provider before pregnancy on at least five of 11 healthy lifestyle behaviors and prevention strategies before pregnancy [4]	44.2 (40.0, 48.3)[5]	18.4 (17.1, 19.7)[2]			U.S.: 4 reporting areas.
Reproduction health & family planning					
Reported that their previous live birth was more than 3 weeks before the due date (among multiparous women)	5.1 (3.3, 6.9)	14.4 (13.5, 15.2)[2]			U.S.: 29 reporting areas; SD Vital Records of PRAMS
Reported having had experienced a miscarriage-fetal death or stillbirth in the 12 months before getting pregnant with their most recent live born infant	*Not available*	14.9 (12.3, 18.0)[2]			U.S.: 2 reporting areas
Reported most recent pregnancy resulting in a live birth was unwanted	5.6 (4.1, 7.1)	6.1 (5.8, 6.4)[3]			

Health Measure	SD PRAMS 2016	US PRAMS	SD BRFSS 2009	US BRFSS	Notes
Reproductive health & family planning – cont'd					
Reported that they were not trying to get pregnant at the time of conception & neither they nor their husbands or partners were doing anything to keep from getting pregnant	57.5 (52.6, 62.4)	52.6 (51.3, 53.9) [2]			U.S.: 29 reporting areas
Reported that they or their husbands or partners were currently doing something to keep from getting pregnant	81.0 (78.4, 83.7)	85.1 (84.5, 85.7) [2]			U.S.: 29 reporting areas
Reported that they used fertility drugs or received any medical procedures from a doctor, nurse or other healthcare worker to help them get pregnant (among women who were trying to get pregnant at the time of conception)	*Not available*	11.1 (10.0, 12.2) [2]			U.S.: 8 reporting areas
Tobacco & Alcohol Use					
Reported that they currently smoke every day or some days			22.9 (19.2, 27.0)	18.7 (18.2, 19.3) [2]	
Reported that they smoked cigarettes during the 3 months before pregnancy	25.4 (22.6, 28.3)	25.1 (24.4, 25.9) [2]			U.S.: 29 reporting areas
Reported that smoking is currently allowed in their home (current second hand smoke exposure)	3.4 (2.3, 4.5)	6.4 (6.0, 6.9) [2]			U.S.: 29 reporting areas
Reported that they participated in binge drinking on a least one occasion in the past month			21.9 (18.1, 26.2)	15.2 (14.7, 15.8) [2]	
Reported that they drank any amount of alcohol during the 3 months before pregnancy	65.2 (62.1, 68.3)	54.2 (53.3, 55.1) [2]			U.S.: 29 reporting areas
Reported that they participated in binge drinking the 3 months before pregnancy	27.0 (23.9, 30.0)	24.4 (23.6, 25.1) [2]			U.S.: 29 reporting areas
Nutrition & physical activity					
Reported that they consume fruits & vegetables at least five times per day			14.4 (11.4, 18.0)	25.2 (24.5, 25.8) [2]	
Overweight: Body Mass Index (BMI 25.0-29.9)			29.0 (24.9, 33.5)	26.6 (25.9, 27.2) [2]	
Overweight: percentage of women with a pre-pregnancy BMI 25.0-29.9	25.7 (22.8, 28.6)	24.9 (24.1, 25.7) [2]			U.S.: 29 reporting areas
Obesity: percentage of women with a BMI ≥30			25.2 (21.5, 29.3)	24.7 (24.0, 25.3) [2]	
Obesity: percentage of women with a pre-pregnancy BMI ≥30	28.0 (25.0, 31.1)	22.1 (21.3, 22.9) [2]			U.S.: 29 reporting areas
Reported that they took a multivitamin-prenatal vitamin, or folic acid supplement every day of the week during the month before pregnancy	37.3 (34.1, 40.6)	29.7 (29.0-30.5) [2] 33.6 (33.0, 34.2) [3]			U.S.: 29 reporting areas
Reported that they participate in enough moderate and/or vigorous physical activity in a usual week to meet the recommended levels of physical activity			49.2 (44.5, 54.0)	51.6 (50.9, 52.4) [2] 50.4 (49.9, 50.9) [3]	

Health Measure	SD PRAMS 2016	US PRAMS	SD BRFSS 2009	US BRFSS	Notes
Mental Health					
Reported that their mental health was not good for at least 14 out of the past 30 days			10.2 (7.8, 13.2)	13.2 (12.7, 13.7) [2]	
Reported that they visited a healthcare provider to be checked or treated for anxiety or depression during the 12 months before pregnancy	16.7 (14.2, 19.3)	11.2 (10.7, 11.7) [2]			U.S.: 29 reporting areas
Reported that they experienced depression symptoms after pregnancy (defined using PRAMS 3-D)	17.9 (15.2, 20.5)	11.9 (11.3, 12.5) [2]			U.S.: 29 reporting areas
Emotional & social support					
Reported that they were physically abused by their partner during the 12 months before pregnancy	3.0 (1.9, 4.1)	3.8 (3.4, 4.2) [2]			U.S.: 29 reporting areas
Reported that they were mentally abused by their partner during the 12 months before pregnancy[3]	*Not available*	2.4 (1.6, 3.5) [2]			U.S.: 1 reporting area
Reported that they always or usually get adequate social & emotional support they need			84.6 (80.8, 87.8)	79.9 (79.3, 80.5) [2]	
Reported that they had ≥3 of 5 types of social support available to them after delivering their baby[3]	94.2 (92.7, 95.7)	87.0 (84.6, 89.1) [2]			U.S.: 2 reporting areas
Chronic conditions					
Reported that they had ever been told by a healthcare provider that they had diabetes (not including gestational diabetes)			2.3 (1.4, 3.6)	3.0 (2.7, 3.2) [2] 3.1 (2.9, 3.2) [3]	
Reported that before their most recent pregnancy they had ever been told by a healthcare provider that they had Type I or Type II diabetes	3.0 (1.9, 4.0)	2.1 (1.9, 2.4) [2]			U.S.: 29 reporting areas
Reported that they had ever been told by a healthcare provider that they had hypertension (not including hypertension during pregnancy)			8.1 (6.3, 10.4)	10.2 (9.8, 10.6) [2] 10.9 (10.6, 11.2) [3]	
Reported that before their most recent pregnancy, they had ever been told by a healthcare provider that they had hypertension	3.9 (2.7, 5.2)	3.0 (2.6, 3.4) [2]			U.S.: 29 reporting areas
Reported that they currently have asthma			10.5 (7.8, 14.0)	10.7 (10.2, 11.1) [2]	

Health Measure	SD PRAMS 2016	US PRAMS	SD BRFSS 2009	US BRFSS	Notes
Infections					
Reported that they received an influenza vaccination within the past year			48.7 (44.0, 53.4)	28.2 (27.5, 28.8) [2]	

[1] Data are percentages (95% confidence intervals). US measures, based on either PRAMS or BRFSS results, that were outside the SD 95% confidence intervals are shaded in blue.
[2] Data are from 2009 BRFSS or PRAMS are from Robbins, et al. 2014 reference
[3] Data from 2013-2015 BRFSS and PRAMS are from Robbins, et al., 2018 reference.
[4] Preconception health indicators from https://www.cdc.gov/prams/pramstat/pdfs/about/chart_preconceptionindicators_pramstat-final.pdf
[5] Data given are from the SD 2014 PRAMS (2016 data not available).

Table 4.2. Percent of Women Who Did *Not* Talk to a Healthcare Provider About Preparing for a Healthy Pregnancy *Before* They Got Pregnant by Demographic Characteristics (weighted)

Demographics	% *Not* Talking with Healthcare Provider[1]
Race	**P=0.02[2]**
White	78.5% [75.0, 81.9]
American Indian	74.0% [69.6, 78.4]
Other Races	70.4% [65.8, 75.0]
Ethnicity	**P=0.02**
Hispanic	61.3% [46.8, 75.8]
Non-Hispanic	77.8% [75.1, 80.6]
Age (years)	**Not significant**
<20	86.3% [78.9, 93.6]
20-24	75.3% [69.3, 81.3]
25-29	76.9% [72.1, 81.6]
30-34	75.1% [69.6, 80.6]
≥35	81.2% [73.2, 89.2]
Maternal Education	**P=0.01**
<High School	66.9% [59.8, 74.0]
High School	80.4% [74.9, 86.0]
>High School	78.2% [74.7, 81.7]
Marital Status	**P=0.03**
Married	74.7% [71.0, 78.4]
Unmarried	81.2% [77.3, 85.1]
Health Insurance Before Pregnancy[3]	**P=0.008**
Private (direct purchase)	78.9% [67.6, 90.2]
Job-based	78.0% [74.2, 81.8]
Medicaid	73.2% [66.8, 79.5]
Medicare	42.9% [20.3, 65.6]
Other	79.8% [68.5, 91.1]
Uninsured	80.9% [74.9, 87.0]
Annual Household Income	**P=0.05**
≤$15,000	75.8% [70.3, 81.3]
$15,001- $26,000	79.4% [72.2, 86.7]
$26,001 - $44,000	84.0% [78.2, 89.7]
$44,001 - $67,000	79.8% [72.7, 86.8]
$67,001 or more	70.9% [64.8, 77.0]
Region	**P=0.04**
Central	71.0% [62.5, 79.4]
Northeast	79.5% [73.5, 85.5]
Rapid City MSA	85.0% [78.8, 91.2]
Sioux Falls MSA	76.6% [71.4, 81.8]
Southeast	80.1% [71.0, 89.1]
West	68.6% [61.5, 75.7]

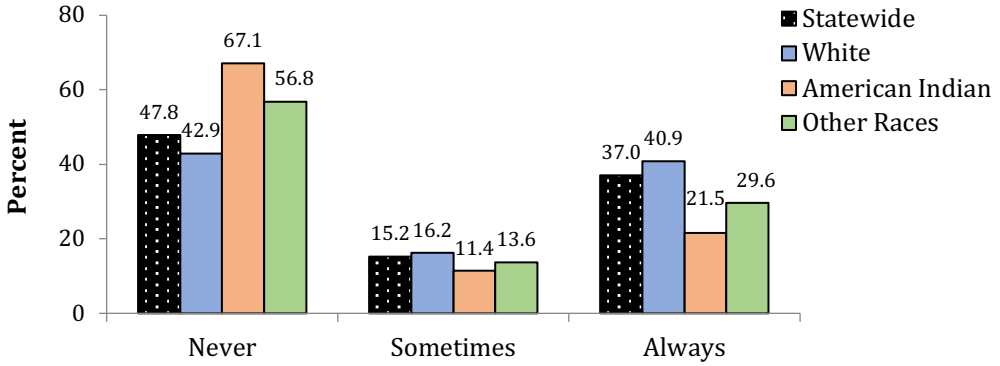
1 95% confidence intervals

2 P values for a chi-square test of association

3 If more than one type of insurance was selected, a hierarchy was established to report the individual's insurance status. The hierarchy, in order, was: Private; Job-based (includes self or as a dependent); Other (includes military, VA, Champus & TriCare or Other); Medicaid; Medicare; Uninsured (includes IHS). For example, if an individual selected both 'Private' and 'Medicaid', the individual's insurance status was reported as 'Private'.

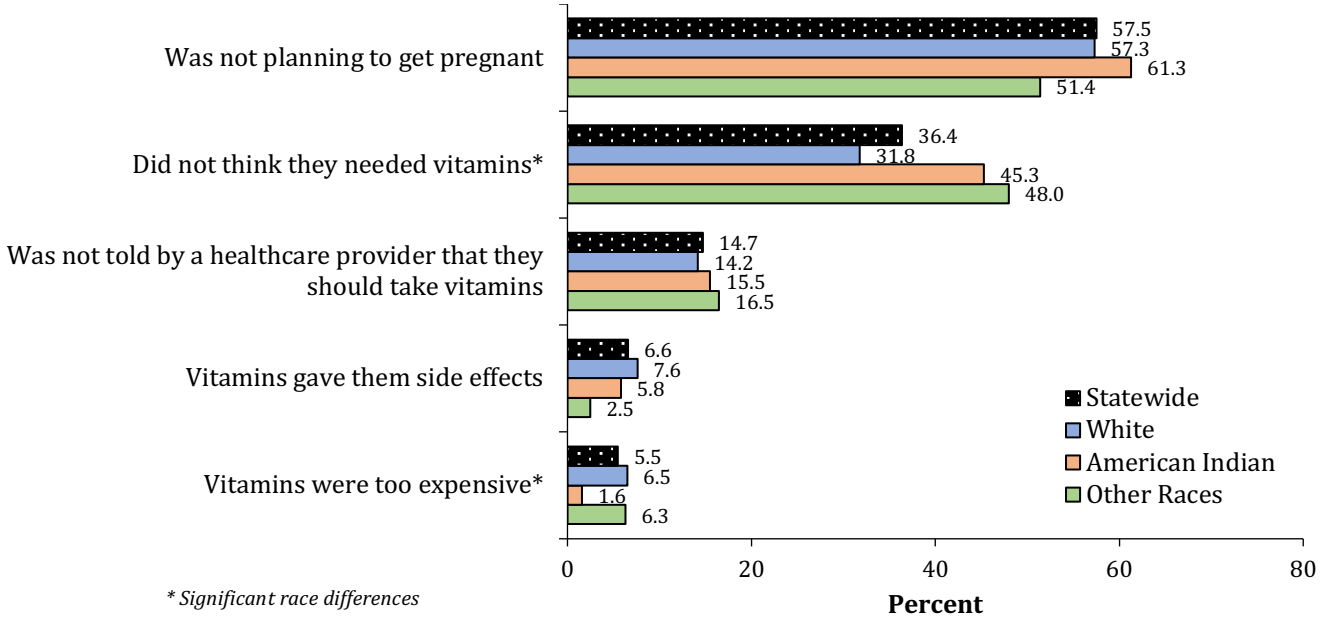
Only 37.0% of mothers reported taking a multivitamin, prenatal vitamin or folic acid vitamin every day of the week the month before pregnancy. Vitamin use differed significantly by race, with white mothers being more likely to always use vitamins than American Indian mothers and mothers of other races (both, $p<0.05$) (**Figure 4.1**). Since approximately half of the pregnancies in the United States are unintended (4), it is important to establish healthy behaviors and improve women's health before conception. Among those mothers who were not taking vitamins the month before pregnancy, the two main reasons stated among all three race categories were that they were not planning to get pregnant and that they did not think they needed to take vitamins (**Figure 4.2**).

Figure 4.1. Percent of Mothers Who Never, Sometimes, or Always* Took a Multivitamin, Prenatal Vitamin or Folic Acid Vitamin During the Month Before Pregnancy by Race (weighted)



** 'Sometimes' category defined as individuals who indicated they took a multivitamin, prenatal vitamin or folic acid vitamin 1-6 times/week in the month before pregnancy. 'Always' category includes individuals who answered 'every day' and 'Never' category includes individuals who answered 'none' to times per week they took a multivitamin, prenatal vitamin or folic acid vitamin.*

Figure 4.2. Percent of Mothers, Among Those Not Taking Vitamins, that Stated These Reasons for Not Taking Vitamins by Race (weighted, could check more than one reason)



** Significant race differences*

The percentages of mothers participating in health-related actions the year prior to pregnancy are shown in **Figure 4.3.** There were significant race differences in having their teeth cleaned, exercising 3 or more days per week, dieting to lose weight, taking prescriptions drugs other than birth control, and being checked or treated for high blood pressure or diabetes.

Figure 4.3. Percent of Mothers Participating in Health-related Actions the Year Prior to Pregnancy by Race (weighted)

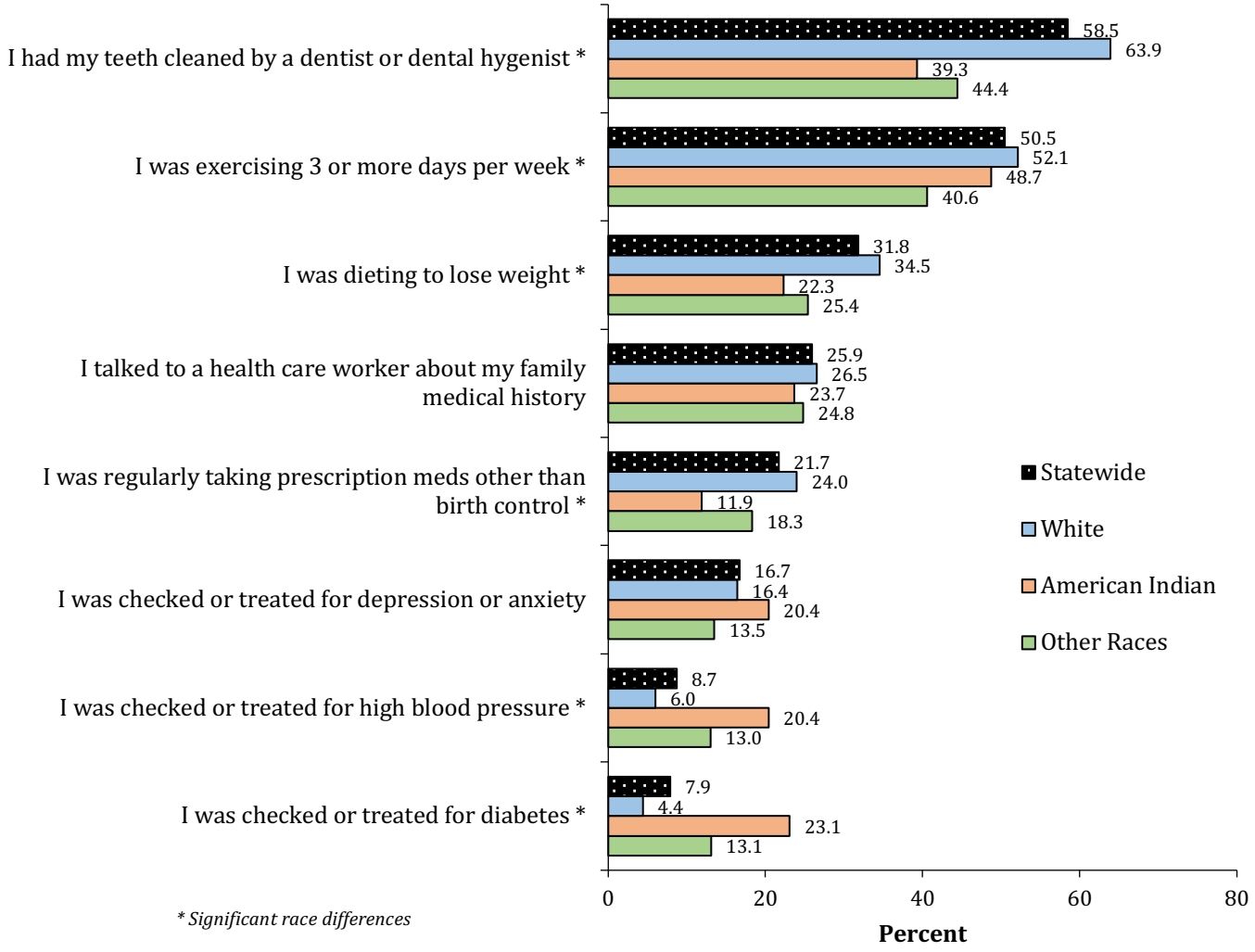
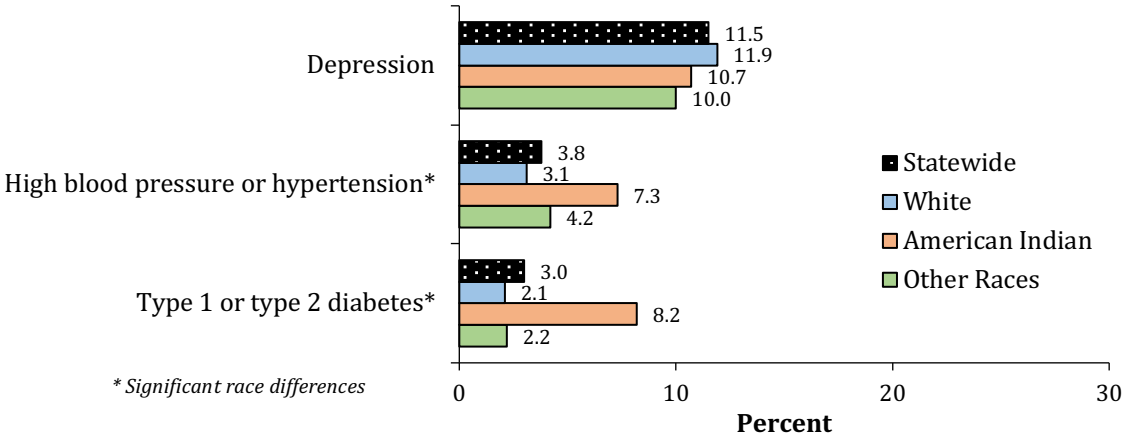


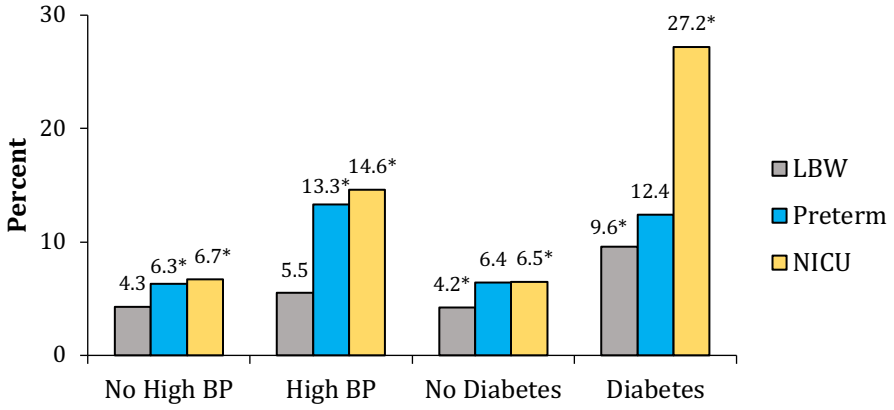
Figure 4.4 summarizes the percentages of South Dakota mothers who reported having been told that they had depression, high blood pressure or diabetes prior to pregnancy. A higher percentage of American Indian mothers had been previously diagnosed with high blood pressure or diabetes prior to pregnancy compared to white mothers or mothers of other races.

Figure 4.4. Percent of Mothers Reporting They had been Told they had Depression, High Blood Pressure or Diabetes Prior to Pregnancy by Race (weighted)



The health of a mother before she becomes pregnant is very important as it can affect the future pregnancy and health of the baby. Prior to pregnancy, 3.8% of South Dakota mothers were told that they had hypertension and 3.0% were told they had pre-pregnancy diabetes (either type 1 or type 2). There is evidence that preconception care can reduce diabetes-related outcomes such as preterm delivery (5). The association between mothers who were told they had either hypertension (high blood pressure) or diabetes and pregnancy outcomes such as low birth weight, preterm birth and NICU admission are presented in **Figure 4.5**.

Figure 4.5. Percent of Infants that were Low Birth Weight (LBW), Born Preterm, or Admitted to Neonatal Intensive Care Unit (NICU) by Whether or Not the Mother had High Blood Pressure (BP) or Diabetes Prior to Pregnancy (weighted)



** Significant difference in LBW, preterm, or NICU admission rates between those with and without high blood pressure and with and without diabetes. Information on NICU admission was obtained from SD Vital Records.*

Mothers having high blood pressure had a higher percentage of infants who were both born preterm and admitted to the NICU (both, $p<0.05$), whereas mothers with diabetes had a higher percentage of low birthweight infants ($p=0.04$) and infants admitted to the NICU ($p<0.001$). The association between maternal diabetes and preterm birth was borderline significant ($p=0.07$).

Summary

- 77.0% of South Dakota mothers (78.5% white, 74.0% American Indian, 70.4% other races) did *not* talk to a health care worker about how to prepare for a healthy pregnancy prior to their most recent pregnancy. This compares to 67.0% in 2014.
- The percent of mothers who were *not* talked to about preparing for a healthy pregnancy was higher among white mothers, non-Hispanic mothers, mothers with a high school education, unmarried mother, uninsured mothers, mothers from households with a middle income, and mothers from the Rapid City area.
- 47.8% of mothers *never* took a multivitamin, prenatal vitamin, or folic acid supplement in the month before conception. The percentage who *never* took a multivitamin was highest among American Indian mothers (67.1%) compared to white mothers (42.9%) and mothers of other races (56.8%).
- The main reasons for not taking vitamins were that the mother was not planning on becoming pregnant and she did not think she needed vitamins.
- About half of South Dakota mothers had their teeth cleaned or were exercising more than 3 days a week the 12 months prior to pregnancy.
- There were race differences in many health-related actions that mothers took the year prior to pregnancy: white mothers had the highest percentages for having their teeth cleaned, exercising 3 or more days a week, dieting to lose weight, and taking prescription medicines other than birth control. American Indian mothers had the highest percentages that were being checked or treated for both hypertension (high blood pressure) and diabetes.
- Having hypertension prior to pregnancy was significantly associated with increased risk of preterm birth and neonatal intensive care admission compared to not having hypertension (13.3% vs. 6.3% and 14.6% vs. 6.7%, respectively).
- Having diabetes prior to pregnancy was significantly associated with increased risk of low birth weight and neonatal intensive care admission, and a borderline significant association with preterm birth (9.6% vs. 4.2%, 27.2% vs. 6.5%, and 12.4% vs. 6.4%, respectively).

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Pregnancy Intendedness & Birth Control Use

Chapter 5

Pregnancy Intendedness and Birth Control Use

Quote from a 2016 SD PRAMS Mother:

"My pregnancy was not planned, but my family has been very supportive. I had a very healthy pregnancy and wonderful delivery at 40 weeks. My son is very healthy and happy!"

Background & Public Health Implications

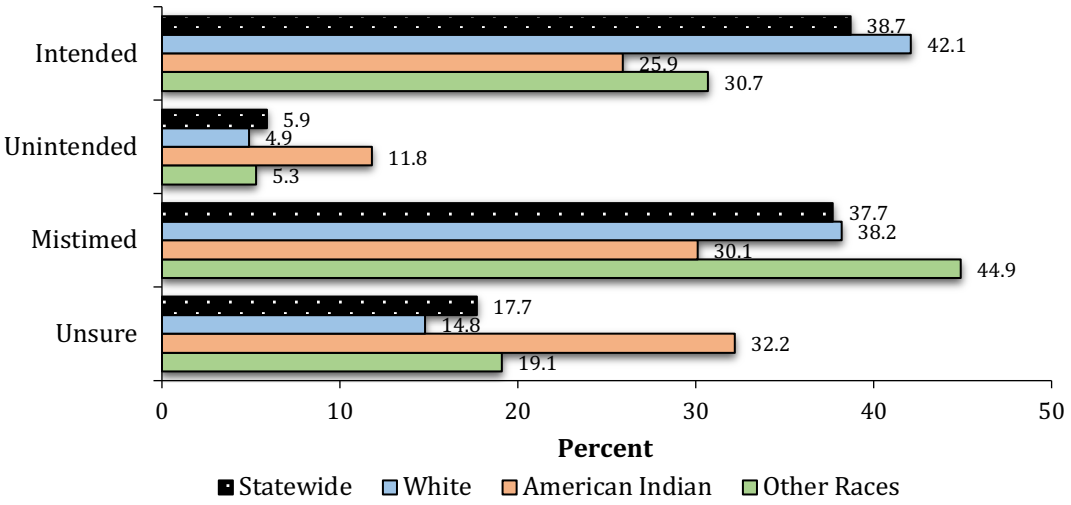
Data on the intendedness of pregnancy is sparse. Researchers at the Guttmacher Institute released an article in 2017 stating that 45% of pregnancies in 2011 among women aged 15-44 years were unintended (1). While the actual definition of unintended pregnancy is debatable, the argument of the adverse public health implications of unintended pregnancies is not. The cost burden for publicly funded pregnancies was estimated to be around $11.1 billion in 2006 (1) and $21.4 billion in 2010 (2). An estimate for South Dakota's total public cost for the estimated 2,400 publicly funded unintended births was $49.4 million in 2010, with $35 million from federal funds and $14.4 million from state funds (2).

The intendedness of pregnancy is largely affected by the use of birth control and other contraceptives. According to a study published in 2016, roughly 29% of women who tried to obtain contraceptives had difficulty doing so. Those who were at a higher risk of having problems obtaining contraceptives were women who were uninsured vs. insured and Spanish-speaking vs. English-speaking (2).

What's Happening in South Dakota

In the SD 2014 survey, Phase 6 PRAMS questions were used, and one of these questions asked the mothers how they felt about becoming pregnant just before they became pregnant. The options in Phase 6 were: wanted to be pregnant sooner, wanted to be pregnant later, wanted to be pregnant then, or did not want to be pregnant then or at any time in the future. In the 2016 survey, an additional option was added: 'I wasn't sure what I wanted'. CDC has defined these answers in the following manner: the pregnancy was considered mistimed if the mother stated that she had wanted to become pregnant earlier or later, unintended if she stated she did not want to become pregnant then or anytime in the future, intended if she stated she wanted to be pregnant then, and unsure if she stated she was not sure what she wanted. The percent of mothers who gave birth in 2016 that had mistimed, unintended, and intended pregnancies or were unsure as to what they wanted are shown in **Figure 5.1.**

Figure 5.1. Mistimed, Unintended and Intended Pregnancies among South Dakota Mothers by Race (weighted)*



**Significant race differences*

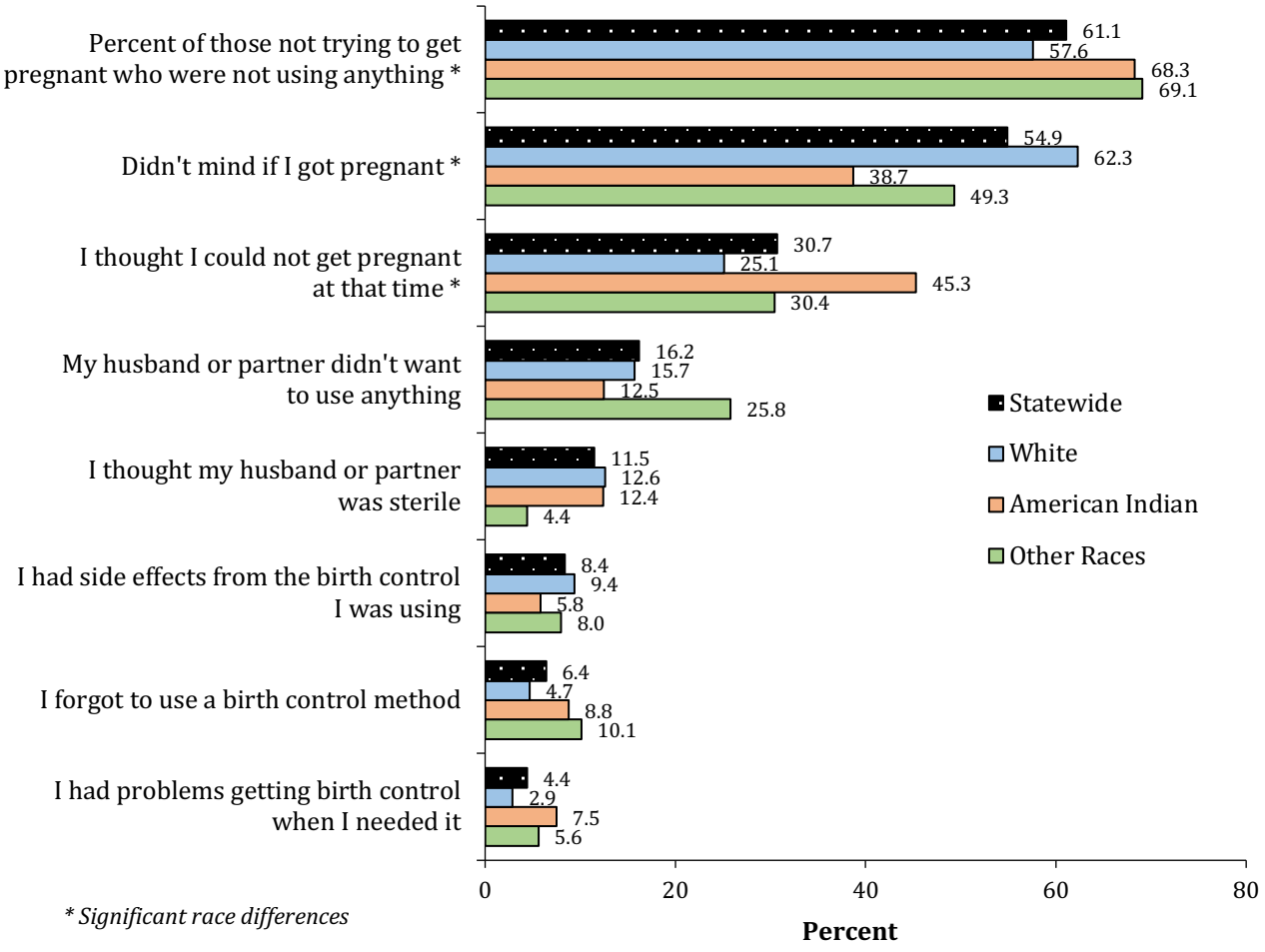
Mistimed and unintended pregnancies may lead to adverse health outcomes for the mother and infant. The mistiming and intendedness of pregnancy may influence the timing of prenatal care, which is important to healthy birth outcomes. Certain populations may be at higher risk for unintended pregnancies than others.

Mistimed and unintended pregnancies were associated with several demographic characteristics (**Table 5.1**) including maternal race, age, education, marital status and annual household income. Unintended pregnancies were more common among American Indian mothers, less educated mothers, unmarried mothers, mothers with lower household income and among both the youngest and oldest age groups.

Although it is not possible to compare intendedness of pregnancy with data from 2014 due to changes in the response options available, it is possible to compare the response as to whether or not the mothers were trying to get pregnant at the time they became pregnant. Among South Dakotan mothers delivering an infant in 2016, 43.5% of the mothers were not trying to become pregnant compared to 46.1% in 2014. There were race differences: 38.6% of white mothers, 66.7% of American Indian mothers, and 47.9% of mothers of other races were not trying to become pregnant at the time they became pregnant.

Of those mothers not trying to get pregnant in 2016, 61.1% were not doing anything to keep from getting pregnant. The reasons for not trying to prevent the pregnancy are listed in **Figure 5.2**.

Figure 5.2. Reasons for Not Doing Anything to Prevent Pregnancy Among Mothers Not Trying to Become Pregnant by Race (weighted, more than one answer could be checked)



** Significant race differences*

Table 5.1. Percent of Mothers with Unintended, Mistimed & Intended Pregnancies by Demographic Characteristics (weighted; remaining were unsure)

	% Unintended[1]	% Mistimed	% Intended
Race	**P<0.001[2]**		
White	4.9% [3.0, 6.8]	38.2% [34.1, 42.3]	42.1% [37.9, 46.3]
American Indian	11.8% [8.5, 15.2]	30.1% [25.4, 34.7]	25.9% [21.6, 30.3]
Other Races	5.3% [3.0, 7.7]	44.9% [39.8, 49.9]	30.7% [26.0, 35.3]
Ethnicity	**Not significant**		
Hispanic	2.8% [0.3, 5.3]	43.7% [29.1, 58.3]	36.6% [23.0, 50.1]
Non-Hispanic	6.1% [4.5, 7.7]	37.4% [34.1, 40.8]	38.8% [35.5, 42.2]
Age (years)	**P<0.001**		
<20	10.4% [3.2, 17.5]	31.4% [20.8, 42.0]	22.6% [12.2, 33.1]
20-24	7.5% [4.0, 11.0]	47.0% [39.9, 54.2]	25.7% [19.5, 31.9]
25-29	3.9% [1.8, 6.0]	36.3% [30.7, 41.8]	44.6% [38.8, 50.3]
30-34	2.7% [0.7, 4.8]	39.5% [33.1, 45.8]	42.6% [36.2, 49.0]
≥35	15.8% [7.8, 23.9]	21.3% [12.9, 29.8]	45.2% [34.7, 55.8]
Maternal Education	**P<0.001**		
<High School	8.4% [4.1, 12.8]	36.4% [28.8, 44.1]	27.4% [20.3, 34.5]
High School	8.4% [4.7, 12.2]	43.9% [36.6, 51.3]	25.7% [19.3, 32.2]
>High School	4.5% [2.8, 6.3]	36.2% [32.1, 40.3]	44.8% [40.6, 49.1]
Marital Status	**P<0.001**		
Married	3.9% [2.2, 5.5]	38.6% [34.4, 42.8]	46.2% [41.9, 50.5]
Not married	9.6% [6.6, 12.6]	36.0% [30.9, 41.2]	25.2% [20.5, 29.9]
Health Insurance Before Pregnancy [3]			
Private (direct purchase)	LNE	31.1% [17.9, 44.2]	56.9% [42.8, 71.0]
Job-based	5.7% [3.5, 7.9]	36.0% [31.5, 40.4]	43.2% [38.5, 47.8]
Medicaid	6.9% [3.5, 10.4]	38.7% [30.7, 46.8]	25.8% [18.8, 32.7]
Medicare	LNE	44.3% [22.2, 66.5]	33.8% [11.4, 56.2]
Other	7.4% [0.1, 14.7]	52.6% [38.7, 66.5]	34.0% [21.0, 47.1]
Uninsured	7.9% [4.3, 11.6]	38.8% [31.3, 46.3]	26.7% [20.2, 33.2]
Annual Household Income			
<$15,000	9.5% [6.0, 12.9]	43.1% [36.5, 49.7]	18.7% [13.9, 23.5]
$15,001- $26,000	7.0% [2.3, 11.7]	39.8% [30.5, 49.0]	26.0% [18.1, 33.9]
$26,001 - $44,000	5.2% [1.2, 9.3]	34.3% [26.3, 42.2]	43.0% [34.6, 51.4]
$44,001 - $67,000	5.8% [1.5, 10.0]	38.5% [30.0, 47.0]	42.2% [33.6, 50.9]
$67,001 or more	3.9% [1.3, 6.5]	35.7% [29.3, 42.1]	52.4% [45.7, 59.1]
Region	**Not significant**		
Central	7.3% [2.9, 11.7]	36.7% [27.5, 45.8]	40.7% [31.3, 50.1]
Northeast	6.4% [2.4, 10.3]	38.7% [31.1, 46.3]	34.6% [27.2, 41.9]
Rapid City MSA	8.2% [3.3, 13.1]	37.8% [29.3, 46.2]	38.0% [29.6, 46.5]
Sioux Falls MSA	3.9% [1.5, 6.4]	42.3% [36.2, 48.5]	38.3% [32.2, 44.4]
Southeast	4.4% [0.1, 8.8]	30.5% [20.2, 40.9]	51.3% [40.1, 62.6]
West	7.4% [4.4, 10.3]	30.8% [23.6, 38.0]	35.4% [27.7, 43.0]

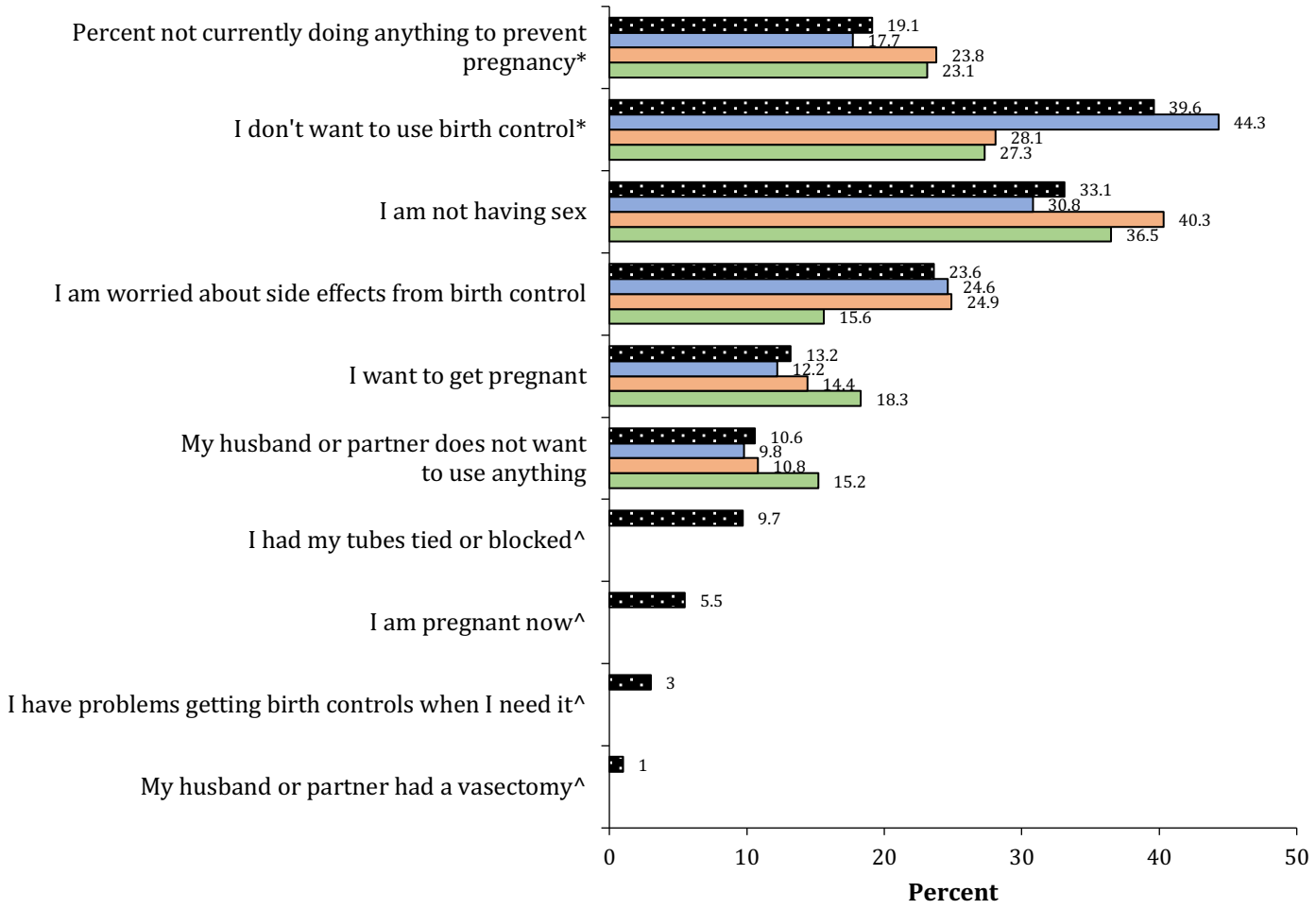
1 95% confidence intervals; LNE = low number event (n<3)

2 P values for a chi-square test of association

3 If more than one type of insurance was selected, a hierarchy was established to report the individual's insurance status. The hierarchy, in order, was: Private; Job-based (includes self or as a dependent); Other (includes military, VA, Champus & TriCare or Other); Medicaid; Medicare; Uninsured (includes IHS). For example, if an individual selected both 'Private' and 'Medicaid', the individual's insurance status was reported as 'Private'. Significance could not be determined due to LNE.

When asked about whether they were *currently* doing anything to prevent pregnancies, 19.1% mothers stated they were not. Among those *not currently* doing anything to prevent pregnancies, the main reason stated was that they did not want to use birth control (**Figure 5.3**). The only race difference was in not wanting to use birth control. The main reason given among white mothers as not wanting to use birth control while the main reason among American Indian mothers and mothers of other races was that they were not having sex.

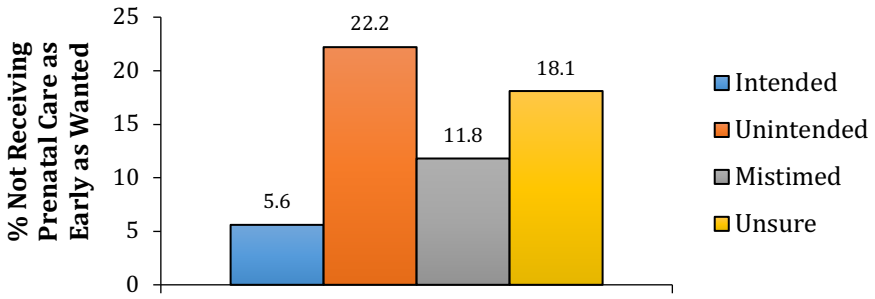
Figure 5.3. Reasons for Not Currently Doing Anything to Prevent a Pregnancy by Race (weighted, more than one answer could be checked)



** Significant race differences; ^ Numbers too small to present by race.*

Intendedness of pregnancy was associated with receiving early prenatal care: a higher percent of women who had an unintended pregnancy did not receive prenatal care as early as they wanted compared to women who had an intended pregnancy (**Figure 5.4**, p<0.001).

Figure 5.4. Percent of Mothers Not Receiving Prenatal Care as Early as They Wanted by Intendedness of Pregnancy (weighted)



** Significant differences*

Summary

- 38.7% of South Dakota births in 2016 were intended, 5.9% were unintended, and 37.7% were mistimed. The remaining mothers (17.7%) were unsure about what they wanted.
- Unintended pregnancies were more common among American Indian mothers, less educated mothers, unmarried mothers, mothers with lower household income and among both the youngest and oldest maternal age groups.
- 43.5% of mothers were not trying to become pregnant, and of those, 61.1% were not doing anything to keep from getting pregnant. The most common reasons given for not doing anything to prevent pregnancy was that they did not mind if they got pregnant (54.9%), and they thought they could not get pregnant at that time (30.7%).
- Not receiving prenatal care as early as the mother wanted was associated with intendedness of pregnancy: a higher percent of women who had an unintended pregnancy did not receive prenatal care as early as they wanted (22.2%) compared to women who had an intended pregnancy (5.6%).
- At the time of survey completion, 19.1% of South Dakota mothers were not doing anything to avoid pregnancies. The top three reasons stated were: 1.) they did not want to use birth control, 2.) they were not having sex, and 3.) they were worried about side effects from birth control.

References

1. Guttmacher Institute, State Facts About Unintended Pregnancy: South Dakota, 2017. https://www.guttmacher.org/fact-sheet/state-facts-about-unintended-pregnancy-south-dakota, accessed September 29, 2017.
2. Grindlay K, Grossman D. Prescription birth control access among U.S. women at risk of unintended pregnancy. *Journal of Women's Health* 25(3): 249-254, 2016.

Prenatal Care & Immunizations

Chapter 6
Prenatal Care & Immunizations

Quotes from 2016 SD PRAMS Mothers:

"They took very good care of me during my pregnancy. My doctor resolved all my doubts and my nurses were very attentive with my care."

"The best experience for me was to take a pregnancy class and I learned a lot from other pregnant women. We all share our experiences and what we do to take care of ourselves when we are pregnant."

Background & Public Health Significance

Prenatal care, beginning in the first trimester, is essential for detecting problems early in fetal development. Women who receive no prenatal care are more likely to have stillbirths, preterm births, and low birthweight infants (1). For this reason, the U.S. Healthy People 2020 has set a target rate for the percent of infants born to women who begin receiving prenatal care in the first trimester at 77.9% (2). In 2016, approximately 77.2% of U.S. women received prenatal care beginning in the first trimester (3).

Studies have shown that women who did not receive prenatal care have worse birth outcomes than women who received prenatal care (1). Access to prenatal care is a major factor in whether or not mothers receive it. There are many women who do not have the same access to prenatal care as others. Some reasons why women do not receive prenatal care include lack of insurance, not knowing they are pregnant, or they simply do not have a provider that is close enough to where they live (4). Differences in access to care can lead to disparities in birth outcomes such as increased occurrence of low birth weight, preterm births, and even neonatal death.

Prenatal Care – What's Happening in South Dakota

The percent of South Dakota women receiving prenatal care beginning in the first trimester increased from 65.7% in 2009 to 70.6% in 2013 based on South Dakota vital records. In 2016, 73.4% of South Dakota mothers began prenatal care during the first trimester, 20.8% during the second, and 5.4% during the third (**Figure 6.1**). Less than 1% of mothers received no prenatal care. There were race differences, with 79.5% of white mothers, 50.8% of American Indian mothers, and 59.5% of other race mothers beginning prenatal care during the first trimester (**Table 6.1**).

Figure 6.1. Percent Obtaining Prenatal Care by Trimester (weighted, based on vital records of participants)

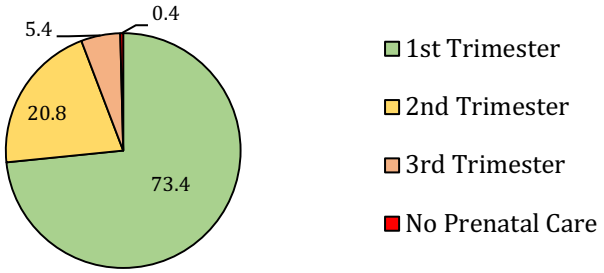


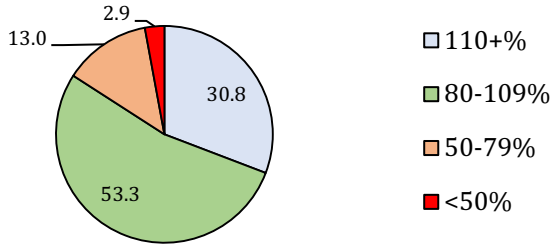
Table 6.1. Percent of Mothers Obtaining Early and Adequate Prenatal Care by Demographic Characteristics [1] (weighted)

	% Obtaining Care in 1st Trimester[2]	% Going to 80% or More of Their Prenatal Visits
Race	**P<0.001[3]**	**P<0.001**
White	79.5% [76.1, 82.9]	88.5% [85.8, 91.2]
American Indian	50.8% [45.8, 55.7]	63.4% [58.6, 68.2]
Other Races	59.5% [54.6, 64.4]	80.4% [76.4, 84.4]
Ethnicity	**Not significant**	**Not significant**
Hispanic	67.1% [53.7, 80.5]	76.3% [63.6, 88.9]
Non-Hispanic	73.7% [70.9, 76.5]	84.5% [82.3, 86.7]
Age (years)	**P=0.004**	**P=0.06**
<20	59.% [47.6, 70.5]	76.7% [67.6, 85.7]
20-24	66.7% [60.3, 73.1]	80.2% [75.1, 85.2]
25-29	76.7% [72.2, 81.2]	84.3% [80.4, 88.1]
30-34	78.6% [73.6, 83.6]	88.7% [84.9, 92.5]
≥35	70.8% [61.7, 80.0]	83.3% [76.0, 90.6]
Maternal Education	**P<0.001**	**P<0.001**
Less than High School	49.4% [41.8, 57.0]	72.3% [66.1, 78.6]
High School	63.7% [56.8, 70.5]	82.1% [77.3, 86.9]
More than High School	81.6% [78.5, 84.7]	87.3% [84.6, 90.0]
Marital Status	**P<0.001**	**P=0.003**
Married	78.0% [74.6, 81.4]	86.7% [83.9, 89.5]
Not Married	65.4% [60.7, 70.0]	79.5% [76.0, 83.0]
Insurance Before Pregnancy[4]	**P<0.001**	**P<0.001**
Private (direct purchase)	68.8% [55.4, 82.1]	86.8% [77.2, 96.5]
Job-based	82.6% [79.3, 86.0]	87.4% [84.4, 90.4]
Medicaid	59.6% [52.2, 66.9]	75.3% [68.8, 80.3]
Medicare	38.5% [16.6, 60.3]	76.4% [58.3, 94.5]
Other	74.1% [62.0, 86.2]	96.1% [91.6, 100]
Uninsured	60.5% [53.4, 67.6]	73.8% [67.6, 79.9]
Annual Household Income	**P<0.001**	**P<0.001**
<$15,000	58.2% [52.0, 64.3]	71.1% [65.6, 76.6]
$15,000- $26,000	71.6% [63.4, 79.9]	84.5% [78.7, 90.3]
$26,001 - $44,000	71.2% [63.9, 78.5]	86.0% [80.6, 91.3]
$44,001 - $67,000	79.8% [73.0, 86.6]	89.2% [83.9, 94.5]
$67,001 or more	88.1% [83.7, 92.4]	89.6% [85.4, 93.7]
Region	**P<0.001**	**P<0.001**
Central	61.5% [52.6, 70.3]	86.1% [80.3, 91.9]
Northeast	64.8% [57.6, 72.1]	83.9% [78.3, 89.4]
Rapid City MSA	76.5% [69.5, 83.5]	87.0% [82.1, 92.0]
Sioux Falls MSA	82.9% [78.6, 87.2]	90.3% [87.0, 93.4]
Southeast	86.4% [79.2, 93.7]	76.1% [66.9, 85.4]
West	62.2% [55.2, 69.2]	70.3% [64.1, 76.4]

[1] Adequacy of initiation (first trimester) & adequacy of prenatal care utilization based on Kotelchuck variables using vital records data
[2] 95% confidence intervals
[3] P-values are for a chi-square test of association
[4] If more than one type of insurance was selected, a hierarchy was established to report the individual's insurance status. The hierarchy, in order, was: Private; Job-based (includes self or as a dependent); Other (includes military, VA, Champus & TriCare or Other); Medicaid; Medicare; Uninsured (includes IHS). For example, if an individual selected both 'Private' and 'Medicaid', the individual's insurance status was reported as 'Private'.

In addition to early initiation of prenatal care, attending scheduled prenatal visits is important for improved birth outcomes for both the mother and infant. Adequacy of received services is based on the Kotelchuck index and is defined as the percent of expected visits that were attended (5).[1] According to this definition, 84.1% of South Dakota mothers attended 80% or more of expected visits, 13.0% attended 50-79% of expected visits, and 2.9% attended less than 50% of expected visits (**Figure 6.2**). White mothers, older mothers, more educated mothers, married mothers, mothers with job-based insurance, and mothers from households with greater income were more likely to have begun prenatal care in the first trimester (adequacy of initiation) and attended more than 80% of their prenatal visits (adequacy of received services) (**Table 6.1**).

Figure 6.2. Percent of Expected Visits that were Attended (weighted, based on vital records of participants and calculated based on adequacy of received services [Kotelchuck]; missing data excluded)



The adequacy of prenatal care utilization level is defined by a combination of the adequacy of initiation of prenatal care and the adequacy of received services. Women who receive adequate plus care are often identified with prenatal issues that need additional monitoring. **Table 6.2** summarizes the different levels of utilization as defined by Kotelchuck. Based on these calculations, 25.3% of mothers received adequate plus care, 48.3% received adequate care, 11.0% received intermediate care, and 15.4% received inadequate care. Only 43.4% of American Indian mothers had adequate or more than adequate care, compared to 81.1% of white mothers and 60.5% of mothers of other races.

Table 6.2. Adequacy of Prenatal Care Utilization Levels based on Adequacy of Initiation of Prenatal Care and the Adequacy of Received Services *

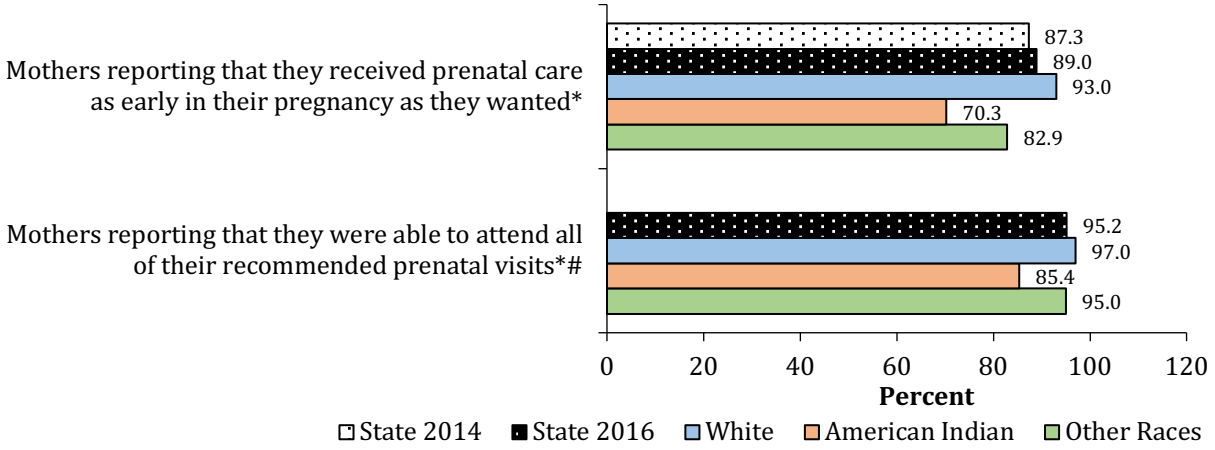
	Adequacy of Received Services			
Adequacy of Initiation	**Under 50%**	**50-79%**	**80-109%**	**110%+**
1-2 Month	0.2%	3.1%	20.0%	10.2%
3-4 Month	1.3%	7.9%	28.3%	15.1%
5-6 Month	0.5%	1.6%	2.9%	3.0%
7-9 Month	0.9%	0.5%	2.0%	2.5%

* Adequacy of received services = # of prenatal visits attended/# of prenatal visits expected based on ACOG recommendations. Orange = inadequate; gray = intermediate; green = adequate; white = adequate plus.

1 The expected number of visits is based on the American College of Obstetricians and Gynecologists prenatal care standards for uncomplicated pregnancies and is adjusted for the gestational age when care began and for the gestational age at delivery.

In order to improve early initiation of prenatal care for pregnant women, it is important to understand what factors influence access to early prenatal care in South Dakota (6). Insight was gained from the 2016 PRAMS-like survey as to the reasons for the delay in seeking prenatal care among South Dakota mothers. Statewide, 89.0% of mothers stated that they received prenatal care as early in their pregnancy as they wanted and 95.2% stated they were able to attend all of their recommended prenatal visits (**Figure 6.3**). Both of these varied by race, with fewer American Indian mothers reporting that they obtained prenatal care as early as they wanted and attended all of their recommended visits. Although 93.0% of white mothers, 70.3% of American Indian mothers, and 82.9% of mothers of other races received prenatal care as early as they wanted, only 79.5%, 50.8%, and 59.5% of white, American Indian and mothers of other races actually began prenatal care during the first trimester.

Figure 6.3. Percent of Mothers Receiving Prenatal Care as Early as They Wanted and Were Able to Attend All Prenatal Visits by Race and Year (weighted)

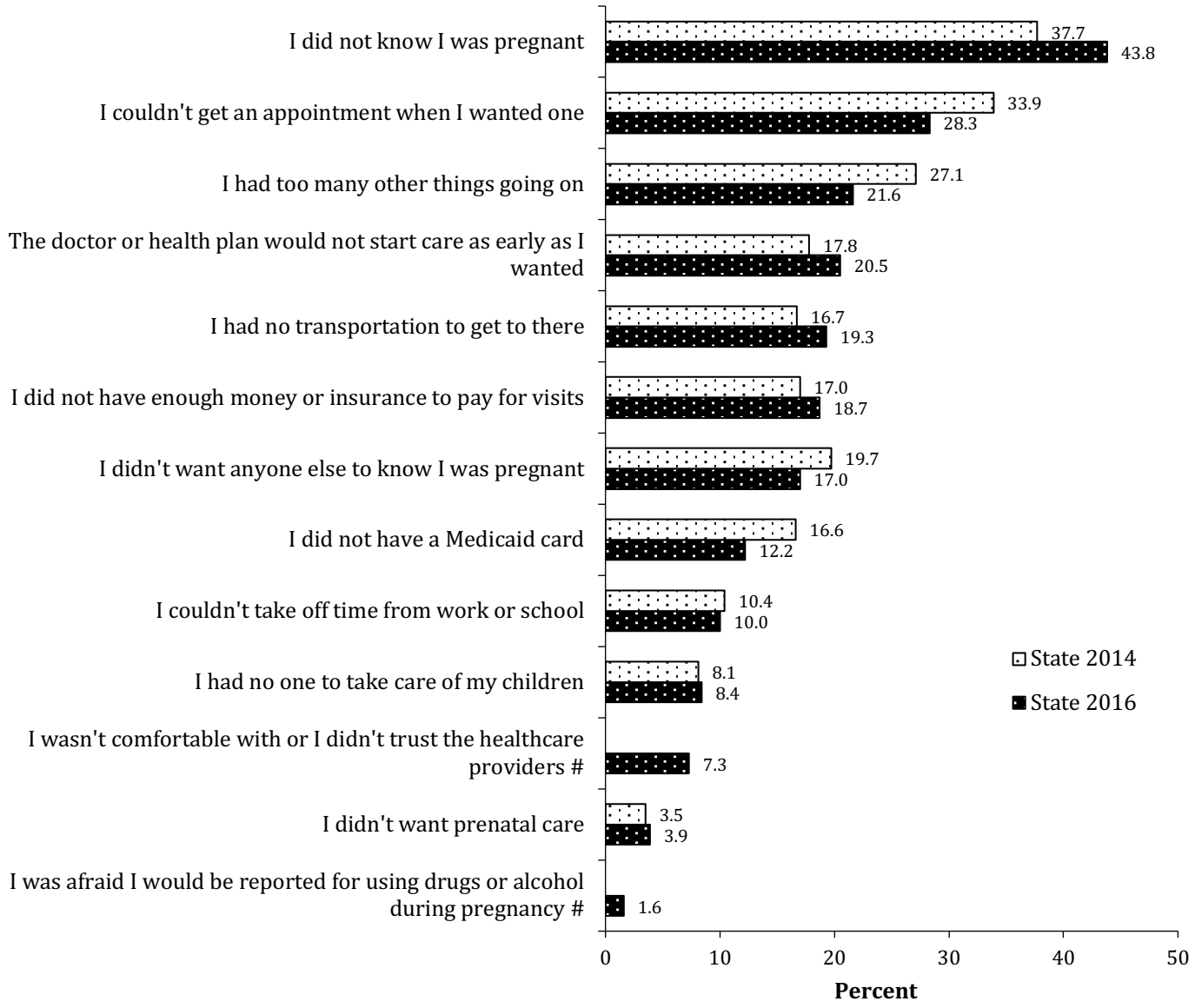


** Significant race differences; # was not included in 2014 survey*

The barriers that prevented 11.0% of mothers from receiving prenatal care as early as they wanted are shown in **Figure 6.4**. Not knowing they were pregnant was the main reason for not getting early care, while the second most commonly stated was that they could not get an appointment when they wanted one.

The reasons for not being able to attend all their prenatal care visits are shown in **Figure 6.5**. Top reasons were that the mothers did not have transportation to get to the clinic and they had too many other things going on.

Figure 6.4. Barriers that Prevented Mothers from Receiving Prenatal Care as Early as They Wanted by Year (weighted, more than one reason could be given)



 # was not included in 2014 survey

Figure 6.5. Barriers that Prevented Mothers from Attending All of Their Prenatal Care Visits (weighted, more than one reason could be given)

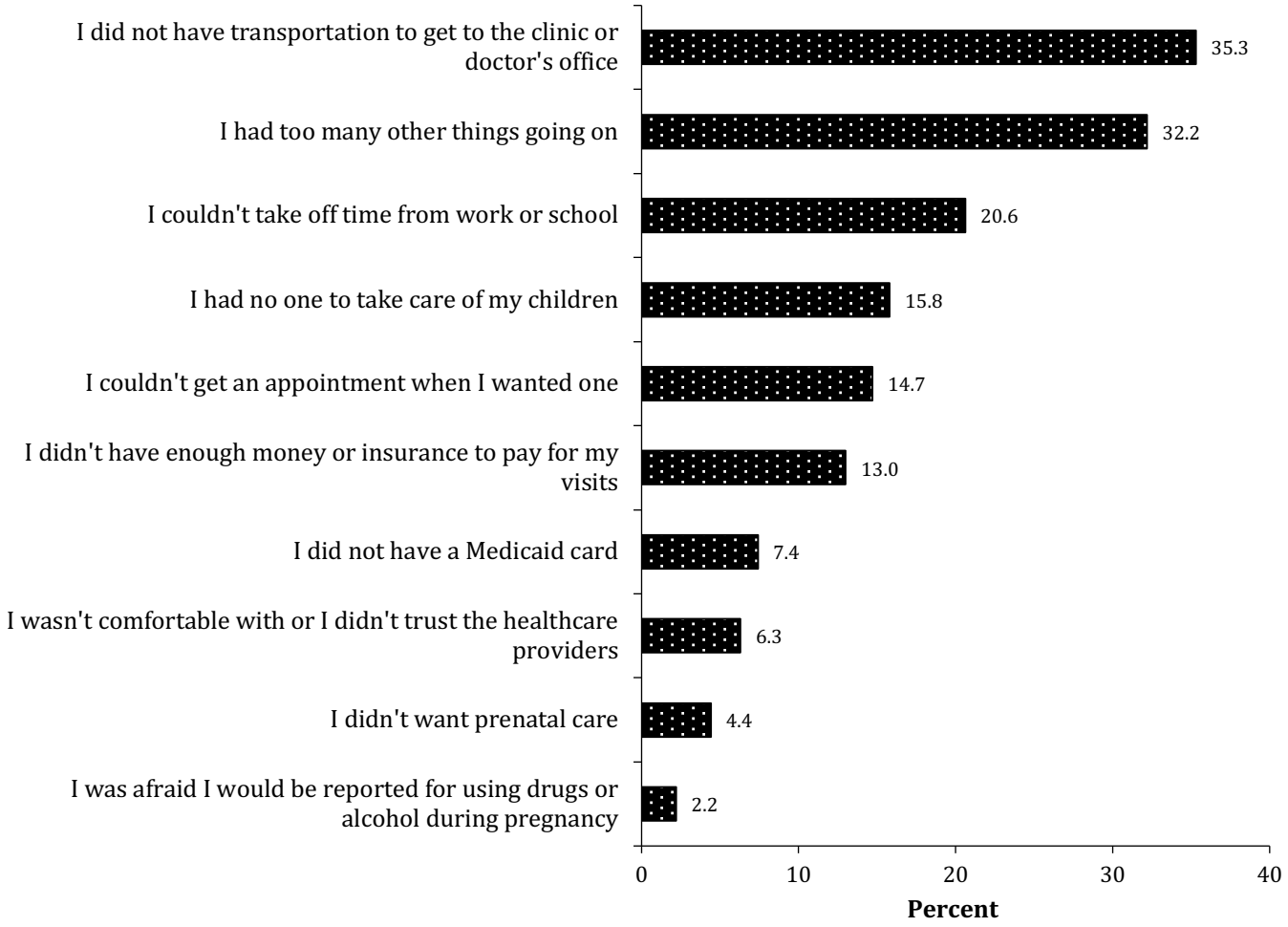
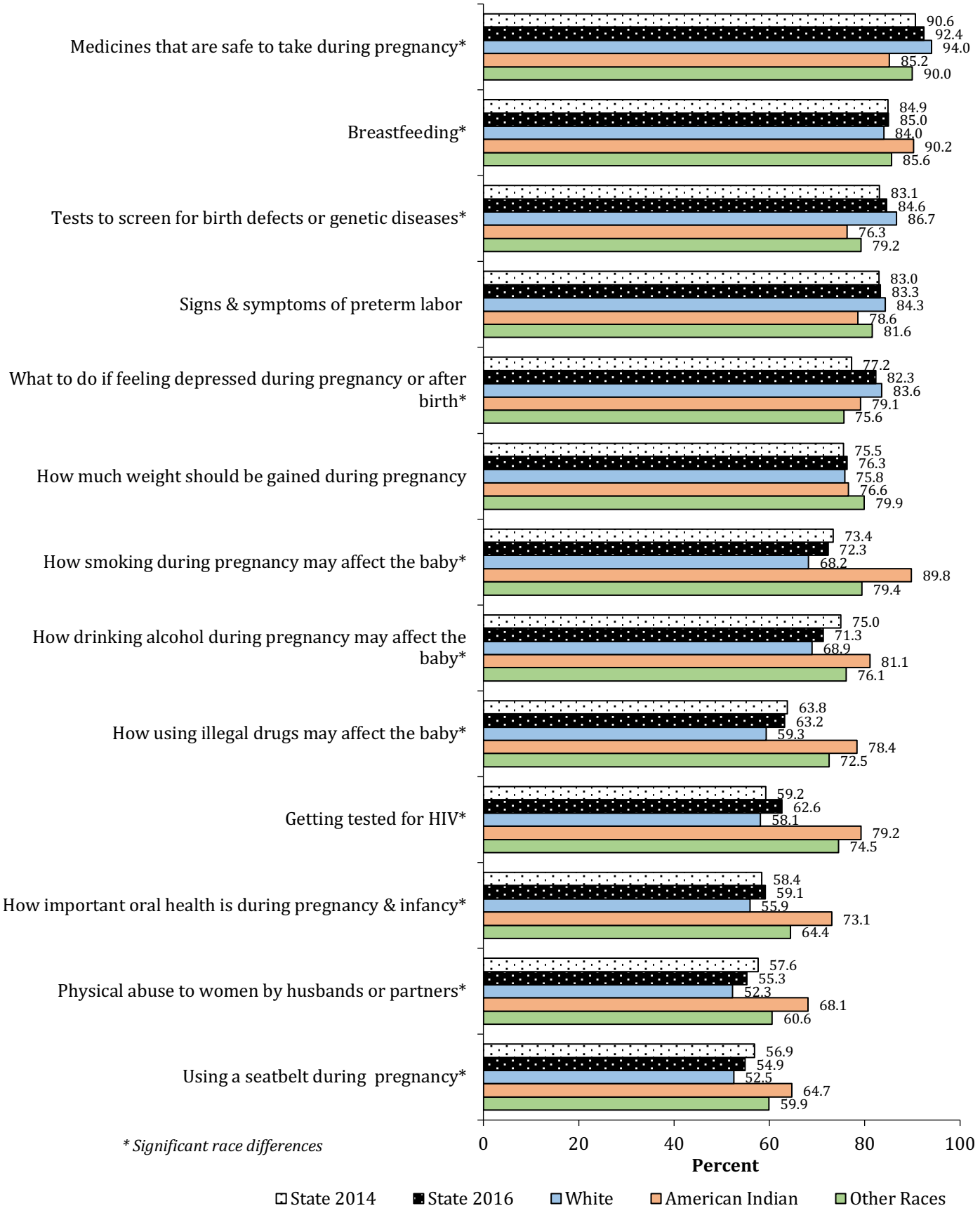


Figure 6.6 summarizes the topics that were discussed with the mothers by their healthcare provider during any of their prenatal care visits. More than 50% of the mothers reported that the topics listed in **Figure 6.6** were discussed with them. There were significant race differences for all topics except how much weight to gain during pregnancy and the signs and symptoms of preterm labor. Safe medicines and breastfeeding were the top two topics discussed, whereas physical abuse to women by their husbands or partners and the use of a seat belt during pregnancy were discussed the least often. Demographic characteristics associated with whether or not these two topics were discussed is shown in **Table 6.3**. Mothers who were not talked to by their healthcare provider about physical abuse to women by their husbands or partners were more likely to be white mothers, married mothers, and mothers from households with higher annual income. Mothers who were not talked to by their healthcare provider about the use of a seat belt during pregnancy were more likely to be white mothers, mothers with more than a high school education, married mothers, mothers with private or job-based insurance, and mothers from households with higher annual income. Identification of populations that are not talked to about these topics while allow for discussion of where efforts should be made to ensure that all women know about these issues.

Figure 6.6. Topics Discussed During Prenatal Care Visits by Race and Year (weighted, more than one reason could be given)



** Significant race differences*

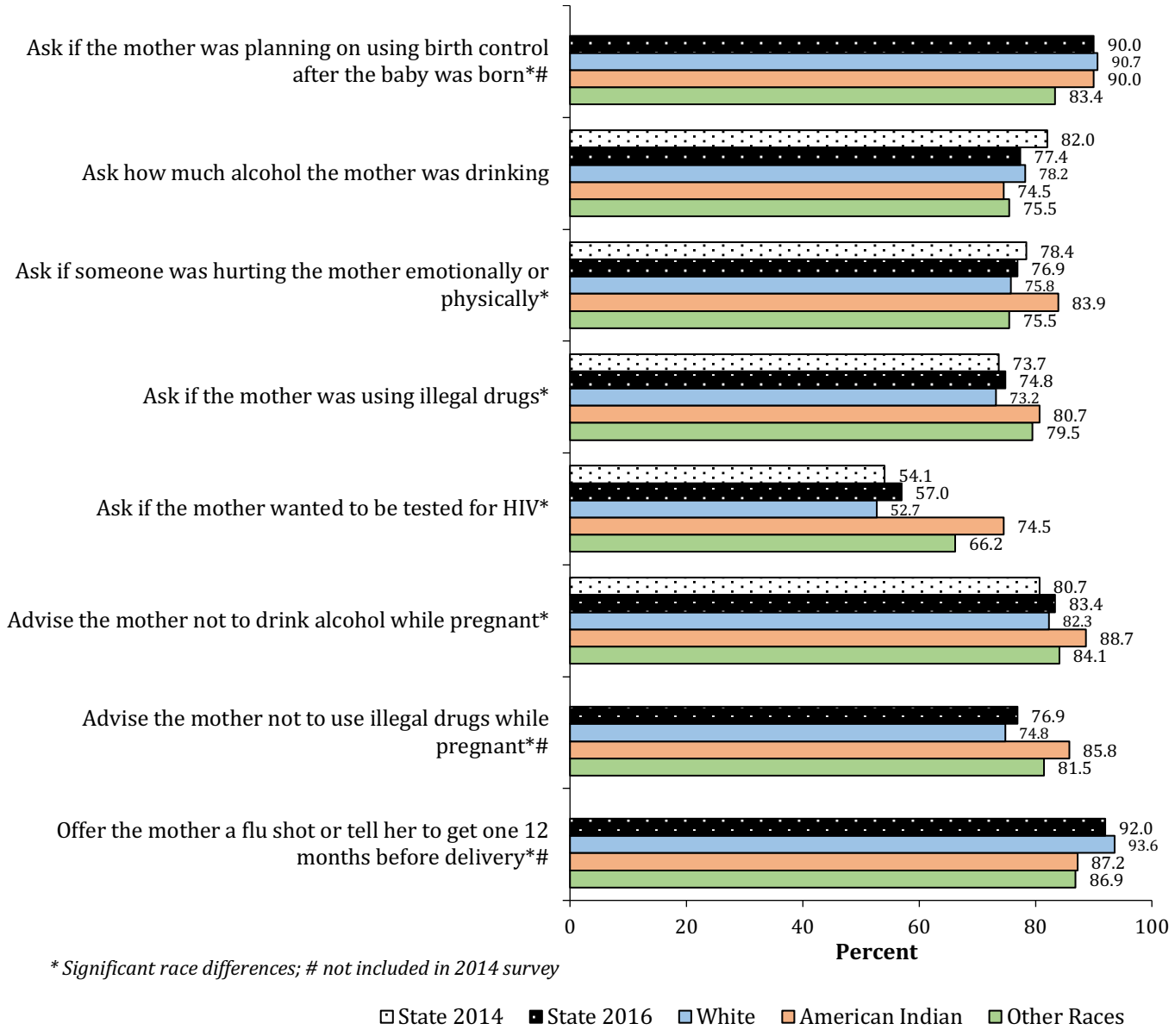
Table 6.3. Percent of Mothers Not Talked to by Their Healthcare Provider About Physical Abuse or Wearing a Seat Belt during Pregnancy by Demographic Characteristics (weighted)

	% *Not* Talked to About Physical Abuse[1]	% *Not* Talked to About Using a Seat Belt
Race	**P<0.001[2]**	**P<0.001**
White	47.7% [43.4, 52.0]	47.5% [43.2, 51.8]
American Indian	31.9% [27.1, 36.7]	35.3% [30.4, 40.2]
Other Races	39.4% [34.2, 44.6]	40.1% [34.8, 45.3]
Ethnicity	**Not significant**	**Not significant**
Hispanic	40.0% [25.4, 54.5]	42.8% [28.2, 57.4]
Non-Hispanic	45.0% [41.5, 48.5]	45.3% [41.8, 48.8]
Age (years)	**Not significant**	**Not significant**
<20	48.1% [36.1, 60.1]	39.3% [27.7, 50.8]
20-24	37.3% [30.2, 44.5]	37.9% [30.8, 45.1]
25-29	45.2% [39.2, 51.2]	45.1% [39.1, 51.0]
30-34	46.7% [40.1, 53.2]	50.4% [43.9, 56.9]
≥35	50.6% [40.0, 61.2]	49.1% [38.4, 59.8]
Maternal Education	**Not significant**	**P=0.008**
Less than High School	37.2% [29.2, 45.3]	37.3% [29.2, 45.3]
High School	42.4% [34.7, 50.0]	37.5% [30.0, 44.9]
More than High School	46.8% [42.6, 51.1]	48.9% [44.6, 53.2]
Marital Status	**P<0.001**	**P<0.001**
Married	49.4% [45.0, 53.7]	50.3% [45.9, 54.7]
Not Married	36.2% [30.9, 41.6]	35.8% [30.6, 41.1]
Insurance Before Pregnancy[3]	**Not significant**	**P=0.02**
Private (direct purchase)	50.0% [34.9, 65.1]	55.0% [39.9, 70.1]
Job-based	47.8% [43.1, 52.5]	48.5% [43.8, 53.3]
Medicaid	35.5% [27.4, 43.5]	34.7% [26.8, 42.6]
Medicare	38.2% [14.8, 61.6]	29.9% [7.3, 52.5]
Other	51.0% [37.0, 64.9]	53.5% [39.7, 67.4]
Uninsured	38.0% [30.5, 45.5]	37.9% [30.4, 45.4]
Annual Household Income	**P=0.001**	**P=0.006**
<$15,000	31.8% [25.5, 38.0]	33.5% [27.2, 39.9]
$15,000- $26,000	40.2% [30.8, 49.6]	40.4% [31.0, 49.8]
$26,001 - $44,000	43.0% [34.6, 51.5]	45.3% [36.8, 53.8]
$44,001 - $67,000	54.1% [45.3, 62.8]	51.8% [43.0, 60.5]
$67,001 or more	51.7% [44.9, 58.5]	52.2% [42.4, 59.0]
Region	**Not significant**	**Not significant**
Central	43.2% [33.7, 52.4]	50.5% [41.1, 60.0]
Northeast	43.4% [35.5, 51.3]	36.1% [28.6, 43.7]
Rapid City MSA	54.3% [45.5, 63.2]	47.8% [38.8, 56.8]
Sioux Falls MSA	40.0% [33.7, 46.4]	49.9% [43.5, 56.4]
Southeast	45.6% [34.2, 57.0]	45.8% [34.3, 57.2]
West	47.9% [40.1, 55.6]	39.8% [32.1, 47.5]

[1] 95% confidence intervals
[2] P-values are for a chi-square test of association
[3] If more than one type of insurance was selected, a hierarchy was established to report the individual's insurance status. The hierarchy, in order, was: Private; Job-based (includes self or as a dependent); Other (includes military, VA, Champus & TriCare or Other); Medicaid; Medicare; Uninsured (includes IHS). For example, if an individual selected both 'Private' and 'Medicaid', the individual's insurance status was reported as 'Private'.

Figure 6.7 summarizes the percent of mothers who reported that specific questions were asked by healthcare workers or specific advice was given to her during a prenatal visit. There were significant race differences for all topics except asking the mother how much alcohol she was drinking. Statewide, 90% of mothers were asked about plans to use birth control and about 75% of the mothers were questioned specifically about use of alcohol and illegal drugs and being abused either emotionally or physically. In addition, 83.4% and 76.9% of mothers stated that a doctor, nurse, or other healthcare provider advised them not to drink alcohol or use illegal drugs while they were pregnant, respectively.

Figure 6.7. Percent of Mothers Who Reported that These Questions Were Asked or Advice Was Given by Their Healthcare Provider During a Prenatal Visit by Race and Year (weighted)



Among mothers who knew whether or not they were tested for HIV, 56.8% of South Dakota mothers stated they were tested, which differed by race with 51.6% of white mothers, 76.3% of American Indian mothers, and 68.6% of mothers of other races stating they were tested. About 27% of South Dakota mothers did not know if they were tested for HIV.

Immunizations– What's Happening in South Dakota

The CDC has developed specific immunization guidelines for pregnant women (7). Generally, vaccines that include an inactive form of the virus are allowable during pregnancy such as inactive influenza vaccines and the tetanus, diphtheria, and pertussis (Tdap) vaccine. Vaccines that carry a live virus or bacteria are contraindicated. Influenza vaccines are important for pregnant women because of suppression of the immune system during pregnancy. It has also been shown that if the mother is vaccinated for influenza, it may also protect the baby from the influenza virus after birth. The Tdap vaccine is also recommended for pregnant women because the antibodies made, in response to the vaccine, will transfer to the fetus as well which will help to protect the baby from pertussis (whooping cough) during the first two months of life.

As shown in **Figure 6.7**, 92.0% of South Dakota mothers reported that their healthcare provider offered them a flu shot or told them to get a flu shot 12 months before the delivery. This recommendation differed significantly by race, with 93.6% of white mothers, 87.2% of American Indian mothers, and 86.9% of mothers of other races being recommended to have a flu vaccine.

In addition to information about the flu vaccine, information on the Tdap vaccine also was obtained. The status of South Dakota mothers with regard to the Tdap vaccine and the timing of when it was administered is summarized in **Table 6.4**.

Table 6.4. Tdap Vaccine Status of South Dakota Mothers by Race (weighted).

Response	White	American Indian	Other	Statewide
No	6.3%	11.8%	11.7%	7.5%
Received Tdap *before* pregnancy	5.2%	15.0%	9.4%	6.8%
Received Tdap *during* pregnancy	86.0%	61.2%	74.5%	81.8%
Received Tdap *after* pregnancy	2.5%	12.0%	4.4%	3.9%
I don't know ^	5.2%	17.5%	18.2%	12.0%

Significant race differences; ^ #not knowing/(total number-blanks); "I don't know" responses were not included in the denominators for receipt of Tdap

Table 6.5 summarizes the demographic characteristics that are associated with having a Tdap vaccine during the perinatal period (before, during, or after pregnancy): 92.5% of South Dakota mothers received a Tdap vaccine either before, during or after pregnancy, and this varied by race (93.7% of white mothers, 88.2% of American Indian mothers, and 88.3% of other race mothers). The lowest Tdap coverage was seen among American Indian mothers and mothers of other races, older mothers, less educated mothers, uninsured mothers or mothers receiving Medicare, mothers with lower household income and mothers from the western region of the state.

Table 6.5. Percent of Mothers Receiving Tdap in the Perinatal Period (weighted)

	% Receiving Tdap in Perinatal Period[1]
Race	**P=0.003[2]**
White	93.7% [91.6, 95.8]
American Indian	88.2% [84.5, 91.9]
Other Races	88.3% [84.6, 91.9]
Ethnicity	**Not significant**
Hispanic	89.7% [80.1, 99.4]
Non-Hispanic	92.6% [90.8, 94.4]
Age (years)	**P=0.02**
<20	90.1% [82.6, 97.5]
20-24	92.6% [89.4, 95.8]
25-29	95.5% [93.1, 97.9]
30-34	92.4% [88.9, 95.9]
≥35	84.3% [76.3, 92.3]
Maternal Education	**P<0.001**
Less than High School	78.3% [70.9, 85.7]
High School	95.7% [93.4, 98.1]
More than High School	94.2% [92.2, 96.2]
Marital Status	**Not significant**
Married	92.0% [89.6, 94.3]
Not Married	93.6% [91.3, 95.9]
Insurance Before Pregnancy[3]	**P<0.001**
Private (direct purchase)	89.5% [80.4, 98.5]
Job-based	95.8% [94.0, 97.6]
Medicaid	94.9% [92.2, 97.7]
Medicare	72.3% [50.3, 94.3]
Other	90.5% [82.0, 99.1]
Uninsured	81.6% [75.2, 88.1]
Annual Household Income	**P=0.003**
<$15,000	86.8% [82.1, 91.6]
$15,000- $26,000	92.4% [87.8, 97.0]
$26,001 - $44,000	91.6% [86.8, 96.4]
$44,001 - $67,000	97.4% [94.9, 99.8]
$67,001 or more	95.9% [93.2, 98.6]
Region	**P=0.01**
Central	96.0% [92.3, 99.7]
Northeast	91.4% [87.0, 95.9]
Rapid City MSA	95.6% [92.1, 99.1]
Sioux Falls MSA	93.3% [90.3, 96.3]
Southeast	93.5% [87.6, 99.4]
West	83.3% [76.9, 89.7]

[1] 95% confidence intervals

[2] P-values are for a chi-square test of association;

[3] If more than one type of insurance was selected, a hierarchy was established to report the individual's insurance status. The hierarchy, in order, was: Private; Job-based (includes self or as a dependent); Other (includes military, VA, Champus & TriCare or Other); Medicaid; Medicare; Uninsured (includes IHS). For example, if an individual selected both 'Private' and 'Medicaid', the individual's insurance status was reported as 'Private'.

Summary

Prenatal Care

- 73.4% of South Dakota mothers began prenatal care in the first trimester and 94.2% began care in the first or second trimester.
- Beginning prenatal care in the first trimester was more likely among white mothers, older mothers, more educated mothers, married mothers, mothers with job-based or private insurance, and higher income mothers.
- 84.1% of South Dakota mothers attended 80% or more of their prenatal visits and this differed by race (88.5%, 63.4% and 80.4% for white, American Indian and other race mothers, respectively). The percentage of mothers attending 80% or more of their prenatal visits was greater among more educated mothers, married mothers, mothers with job-based or private insurance, and mothers from higher income households.
- 73.6% of South Dakota mothers received adequate or more than adequate care and this differed by race (81.1%, 43.4%, and 60.5% for white, American Indian and other race mothers, respectively).
- 89.0% of mothers were able to begin prenatal care as early as they wanted, but this varied by race (93.0%, 70.4%, and 82.9% for white, American Indian and other race mothers, respectively).
- Among mothers who did not receive prenatal care as early as they wanted, not knowing they were pregnant was the main reason for not obtaining care followed by not being able to get an appointment when they wanted one.
- 95.2% of mothers reported that they were able to attend all of their recommended prenatal visits, but this varied by race (97.0%, 85.4%, and 95.0% for white, American Indian and other race mothers, respectively).
- Barriers to attending recommended prenatal visits included not having transportation to get to the clinic or doctor's office and having too many other things going on.

Immunizations:

- 92.0% of South Dakota mothers reported that their healthcare provider offered them a flu shot or told them to get a flu shot 12 months before the delivery.
- 92.5% of mothers received a Tdap vaccine in the perinatal period with the majority receiving it during pregnancy.
- The lowest Tdap coverage was seen among American Indian mothers and mothers of other races, older mothers, less educated mothers, uninsured mothers or mothers receiving Medicare, mothers with lower household income and mothers from the western region of the state.

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WIC Services

Chapter 7
Women, Infants & Children (WIC) Services

Quote from a 2016 SD PRAMS Mother:

"My pregnancy went terrific & easy! WIC was very helpful & informative, I always get treated well there."

"I got a good doctor and the community health nurse office gave me a lot of education on what I should do to take care of my newborn baby. Thank you"

Background & Public Health Implications

The Special Supplemental Nutrition Program for Women, Infants and Children (WIC) is a short-term program designed to influence lifetime nutrition and health behaviors in targeted high-risk populations (1). WIC programs are for low-income pregnant and postpartum women as well as infants and children up to age 5 years and are funded by the federal government and administered by states. Eligibility requires having income at or below 185 percent of the U.S. Poverty Income Guidelines or currently enrolled in TANF, SNAP, or Medicaid as well as having been determined to be at nutritional risk. Benefits provided to WIC participants include supplemental nutritious foods, nutrition education and counseling; breastfeeding support either at WIC Clinics or through the Breastfeeding Peer Counseling Program; and screening and referral to other health, food services and social services. Numerous studies have shown that WIC is effective at increasing access to prenatal care and immunization rates as well as improving maternal, birth, and health outcomes (1). WIC serves about 53% of all infants born in the United States (2). In 2015, it was estimated that about 49% of eligible South Dakotan women, infants and children were being covered by WIC (3).

What's Happening in South Dakota

Based on the 2016 SD PRAMS-like data, 34.2% of mothers statewide reported being on WIC during their most recent pregnancy compared to 36.6% for the 2014 SD PRAMS-like survey. Being on WIC during pregnancy was associated with several demographic characteristics. The percentages of mothers on WIC were highest among American Indian mothers, Hispanic mothers, younger mothers, unmarried mothers, less educated mothers, mothers with lower household incomes, and mothers from the western region of the state (**Table 7.1**).

Table 7.1. Percent of Mothers Receiving WIC During Pregnancy by Demographic Characteristics (weighted)[1]

	% on WIC
Race	**P<0.001**[2]
White	22.3% [18.7, 26.0]
American Indian	80.7% [76.8, 84.7]
Other Races	59.8% [54.8, 64.8]
Ethnicity	**P<0.001**
Hispanic	68.3% [55.4, 81.2]
Non-Hispanic	32.5% [29.6, 35.3]
Age (years)	**P<0.001**
<20	75.3% [64.4, 86.2]
20-24	56.2% [49.0, 63.4]
25-29	28.8% [24.0, 33.6]
30-34	19.2% [14.6, 23.8]
≥35	22.9% [15.0, 30.8]
Marital Status	**P<0.001**
Married	15.7% [12.9, 18.4]
Unmarried	67.6% [62.3, 72.8]
Education	**P<0.001**
Less than High School	69.7% [62.0, 77.3]
High School	56.5% [49.0, 64.0]
More than High School	20.2% [17.1, 23.4]
Health Insurance Before Pregnancy[3]	**P<0.001**
Private (direct purchase)	12.6% [4.0, 21.2]
Job-based	16.3% [13.0, 19.6]
Medicaid	83.8% [77.3, 90.2]
Medicare	64.3% [41.6, 87.1]
Other	24.8% [13.0, 36.7]
Uninsured	67.8% [60.5, 75.0]
Annual Household Income	**P<0.001**
≤$15,000	77.0% [71.3, 82.8]
$15,001- $26,000	66.2% [57.1, 75.3]
$26,001 - $44,000	36.1% [28.4, 43.9]
$44,001 - $67,000	13.1% [7.2, 19.1]
$67,001 or more	0.2% [0, 0.5]
Region	**P<0.001**
Central	32.0% [24.1, 39.8]
Northeast	35.1% [27.8, 42.3]
Rapid City MSA	32.6% [24.7, 40.4]
Sioux Falls MSA	25.4% [20.2, 30.7]
Southeast	24.6% [15.4, 33.9]
West	65.5% [57.6, 73.4]

1 95% Confidence intervals

2 P-Values are for a chi-square test of association

3 If more than one type of insurance was selected, a hierarchy was established to report the individual's insurance status. The hierarchy, in order, was: Private; Job-based (includes self or as a dependent); Other (includes military, VA, Champus & TriCare or Other); Medicaid; Medicare; Uninsured (includes IHS). For example, if an individual selected both 'Private' and 'Medicaid', the individual's insurance status was reported as 'Private'.

Participation in WIC was associated with many health-related behaviors and outcomes. The following bullets highlight differences between WIC mothers and mothers not receiving WIC by topic areas within the PRAMS-like survey:

Preconception Care & Health-Related Actions:

WIC mothers were:

- More likely to have had a previous low birthweight infant than non-WIC mothers (18% vs. 7%, respectively)
- More likely *not* to be taking daily vitamins before pregnancy (70% vs. 36%)
- More likely to have been told by a healthcare provider that they had depression (15% vs. 10%)

The following are *health-related actions prior to pregnancy* that differed by WIC status. WIC mothers were:

- Less likely to have:
  - Dieted to lose weight (23% vs. 37%)
  - Exercised 3 or more days of the week (37% vs. 57%)
  - Had their teeth cleaned by a dentist or dental hygienist (42% vs. 68%)
- More likely to have visited a health care worker to be checked or treated for:
  - Diabetes (13% vs. 4%)
  - High blood pressure (15% vs. 5%)
  - Depression or anxiety (22% vs. 14%)

Intendedness of Pregnancy & Birth Control:

WIC mothers were:

- Less likely to have been trying to become pregnant (37% vs. 67%)
- Less likely to want to be pregnant (26% vs. 45%)
- More likely to state they did not want to be pregnant then or anytime in the future (8.5% vs. 4.5%)

The following are reasons that differed between WIC and non-WIC mothers on why they and their partners *did not do anything to keep from getting pregnant*. WIC mothers were:

- Less likely to state that they did not mind if they got pregnant (41% vs. 70%)
- More likely to state they had problems getting birth control when they needed it (8.4% vs. 0.6%)

There was no difference in the current use of birth control. Among those mothers who were *not* currently doing anything to keep from getting pregnant, WIC mothers were:

- Less likely to state that they did not to want to use birth control (19% vs. 50%)
- More likely to state they had their tubes tied or blocked (21% vs. low number event)

Prenatal Care:
WIC mothers were:

- More likely to:
    - Start prenatal care after five months of gestation (21% vs. 10%)
    - Attend less than 80% of possible prenatal visits (22% vs. 13%)
    - Have inadequate prenatal care (based on Kotelchuck Index; 24% vs. 10%)
    - Have a test for HIV (71% vs. 50%)
- Less likely to:
    - Have started prenatal care as early as they wanted (81% vs. 93%)
    - State that they were able to go to all of their recommended prenatal visits (93% vs. 97%)
    - Be offered a flu shot or told to get one by a healthcare provider (89% vs. 94%)
    - Have received Tdap during pregnancy (77% vs. 84%; Tdap during the perinatal period was 91% vs. 93%)

Among mothers who *did not get prenatal care as early as they wanted*, the following reasons differed between WIC and non-WIC mothers, with WIC mothers:

- More likely to state that they:
    - Did not have transportation to get to the clinic or doctor's office (29% vs. 9%)
    - Had no one to take care of their children (13% vs. 4%)

Among mothers who *were not able to go to all of their recommended prenatal care visits*, the following reasons differed between WIC and non-WIC mothers, with WIC mothers:

- More likely to state that they:
    - Did not have transportation to get to the clinic or doctor's office (55% vs. 15%)
    - Had no one to take care of their children (29% vs. 5%)
- Less likely to state that they did not have money or insurance to pay for the visits (4% vs. 19%)

The following are *topics that were discussed with mothers during any of their prenatal visits* that differed by WIC status.

WIC mothers were:

- More likely to have been talked to about:
    - How smoking can affect the baby (85% vs. 66%)
    - How drinking alcohol can affect the baby (82% vs. 66%)
    - How using illegal drugs can affect the baby (78% vs. 56%)
    - Breastfeeding (91% vs. 82%)
    - Using a seat belt during pregnancy (67% vs. 49%)
    - Getting tested for HIV (76% vs. 56%)
    - Physical abuse by husbands or partners (64% vs. 51%)
    - How important good oral health is during pregnancy and infancy (67% vs. 55%)
- Less likely to have been talked to about:
    - Doing tests to screen for birth defects or diseases that run in her family (81% vs. 86%)

The following are *questions that were asked of the mothers or advisement given by the healthcare provider during any of their prenatal visits* that differed by WIC status. WIC mothers were:

- More likely to have been asked questions about:
  - Whether someone was hurting them emotionally or physically (82% vs. 74%)
  - Using illegal drugs (81% vs. 72%)
  - Whether they wanted to be tested for HIV (71% vs. 50%)
- A higher percent of WIC mothers was advised by their healthcare provider:
  - Not to drink alcohol while they were pregnant (89% vs. 75%)
  - Not to use illegal drugs while they were pregnant (86% vs. 72%)

Dental Care during Pregnancy

WIC mothers were:

- Less likely to:
  - Know the importance of dental and gum care during pregnancy (85% vs. 91%)
  - Have their teeth cleaned by a dentist or hygienist (39% vs. 57%)
  - Have insurance to cover dental care during pregnancy (56% vs. 68%)
- More likely to:
  - Need to see a dentist for a problem (28% vs. 14%)
  - Have gone to a dentist about a problem (21% vs. 11%)

Among mothers who had problems with their teeth or gums, a higher percent of WIC mothers could not find a dentist or dental clinic that would take Medicaid patients compared to non-WIC mothers (10% vs. 3.3%, respectively).

Home Visiting[*]

WIC mothers were:

- More likely to have a home visitor come to their home to help them prepare for their new baby (8.1% vs. 1.9%)
- More likely to have a home visitor come to their home to help teach them how to take care of herself and her new baby (16% vs. 5%)

Among mothers who *had a home visitor come to their home during pregnancy*, the following topics that were discussed differed between WIC and non-WIC mothers, with WIC mothers:

- More likely to have been talked to about:
  - How smoking can affect the baby (96% vs. 43%)
  - How drinking alcohol can affect the baby (96% vs. 33%)
  - Screening for birth defects or diseases that run in the family (88% vs. 38%)
  - The importance of getting tested for HIV or other STDs (88% vs. 31%)
  - Physical or emotional abuse to women by their husbands or partners (93% vs 31%)
  - Breastfeeding (98% vs. 77%)
  - Her emotional well-being (97% vs. 66%)
  - How important good oral health is during pregnancy and infancy (89% vs. 28%)

[*] A home visitor is defined as a nurse, a health care worker, a social worker, or other person who works for a program that help pregnant women or mothers of newborns.

Substance Abuse – Tobacco, Smoking & Secondhand Smoke:
WIC mothers were:

- More likely to have used spit tobacco or e-cigarettes/vaping in the past two years (22% vs. 8.0%)
- More likely to have smoked in the past two years (45% vs. 20%).
- Among those who smoked in the last two years, WIC moms were more likely to smoke the three months *before* pregnancy (96% vs. 83%)
- More likely to allow smoking in some rooms in their home or at sometimes (8% vs. 1%)
- Less likely to reside in a home where no one is allowed to smoke (92% vs. 99%)
- Less likely to never have their baby in the same room or vehicle with someone who is smoking (93% vs. 98%)

Among mothers who *smoked cigarettes the three months before pregnancy,* there were differences in the reasons for making it hard for some people to quit smoking. WIC mothers were:

- More likely to state a lack of support from others to quit (43% vs. 19%)
- More likely to have been told by a healthcare provider to quit smoking (81% vs. 65%)

Substance Abuse – Alcohol:
WIC mothers were:

- Less likely to have drank in the past two years (57% vs. 82%)

Among those that drank in the last two years, WIC moms were less likely to have drank the three months *before* pregnancy (86% vs. 89%)

Among those that drank the 3 months *before* pregnancy, WIC mothers were:

  - More likely to drink more drinks per week than non-WIC mothers (8.3% vs. 3.0% for 7 drinks/week or more)
  - More likely to binge drink than non-WIC mothers (32% vs. 19% binge drinking two or more times)

Among those that drank *during* the last 3 months of pregnancy, WIC mothers were more likely to binge drink (17% vs. 3.8% binge drinking two or more times)

Substance Abuse – Illegal Drugs:
WIC mothers were:

- More likely to have used marijuana in the three months *before* pregnancy (10% vs. 2.8%) and *during* pregnancy (4.3% vs. 0.7%) than non-WIC mothers

Breastfeeding:
WIC mothers were:

- Less likely to have ever breastfed (81% vs. 94%)
- Less likely to be currently breastfeeding (among mothers who ever breastfed) (51% vs. 78%)

There was no difference between WIC and non-WIC mothers in whether someone suggested that they do not breastfeed (11% vs. 8.0%). However, among those mothers who had someone suggest that they not breastfeed, there were differences in who suggested this. WIC mothers were:

- More likely to state that the husband or partner suggested not breastfeeding (36% vs. 13%)
- More likely to state that their doctor, nurse or other health care worker suggested not breastfeeding (39% vs. 17%)

Among those who breastfed but were no longer breastfeeding, WIC mothers were:

- Less likely to state that one of the reasons for stopping was that breast milk alone did not satisfy their baby (25% vs. 46%)
- Less likely to state that they felt it was the right time to stop breastfeeding (4% vs. 10%)

Although not significantly different from non-WIC mothers, the main reason for stopping breastfeeding among WIC mothers was the feeling that they were not producing enough milk or their milk dried up (47.8%), followed by difficulty with latching or nursing (33.8%).

Postnatal/Postpartum Health & Care:
WIC mothers were:

- Less likely to have had a postpartum visit (83% vs. 95%)
- More likely to have discussed the following topics with a healthcare provider since the baby was born:
    - Support groups for new parents (50% vs. 42%)
    - Physical abuse to women by their husbands or partners (49% vs. 29%)
    - Resources in the community such as nurse home visitation programs, etc. (56% vs. 44%)
    - Getting to and staying a healthy weight after delivery (56% vs. 38%)
    - How to prevent their baby from getting tooth decay (48% vs. 25%)
- More likely to score high on a *depression* scale than non-WIC mothers (23% vs. 16%)
- More likely to have stated that they sometimes, often or always felt:
    - Hopeless (25% vs. 16%)
    - Panicky (30% vs. 23%)
    - Restless (45% vs. 30%)

WIC mothers were ***more likely*** to experience the following *stressors during the previous 12 months* compared to non-WIC mothers:

- A separation or divorce from husband or partner (12% vs. 3.5%)
- Moved to a new address (42% vs. 31%)
- Homelessness (4.2% vs. 0.3%)
- Husband or partner lost his job (12% vs. 6.0%)
- Mother lost her job even though she wanted to keep working (16% vs. 2.9%)
- Argued with husband or partner more than usual (26% vs. 14%)
- Husband or partner did not want her to be pregnant (8.1% vs. 4.3%)
- Problems paying rent, mortgage or other bills (24% vs. 9.1%)
- Husband or partner went to jail (12% vs. 1.6%)
- Someone very close had a problem with drinking or drugs (23% vs. 10%)
- Someone very close died (25% vs. 16%)

WIC mothers had fewer *social supports* than non-WIC mothers. WIC mothers were ***less likely*** to have *support* from the following if a problem came up:

- Husband or partner (73% vs. 93%)
- Mother, father, or in-laws (73% vs. 91%)
- Other family members or relatives (50% vs. 61%)
- A friend (36% vs. 54%)
- Religious community (8.2% vs. 19%)

The following *kinds of help available if a mother needed it* were different by WIC status. WIC mothers were ***less likely*** to have the following help available:

- Someone to loan them $50 (81% vs. 93%)
- Someone to help if they were sick and needed to be in bed (85% vs. 93%)
- Someone to talk with about their problems (83% vs. 94%)
- Someone to take care of their baby (84% vs. 94%)
- Someone to help if they were tired and feeling frustrated with their new baby (85% vs. 94%)

WIC mothers were ***more likely*** to experience the following *abuse before, during or after pregnancy* than non-WIC mothers:

12 Months Before Pregnancy:

- Husband or partner pushed, hit, slapped, kicked, choked, or physically hurt her (6.5% vs. 1.5%)

During Pregnancy:

- Husband or partner pushed, hit, slapped, kicked, choked, or physically hurt her (5.7% vs. .11%)
- Husband or partner threatened her or made her feel unsafe in some way (8.7% vs. 1.6%)
- She was frightened for the safety of herself or her family because of anger or threats of her husband or partner (5.8% vs. 2.0%)
- Husband or partner tried to control her daily activities (9.4% vs. 2.8%)
- Husband or partner forced her to take part in touching or any sexual activity when she did not want to (2.4% vs. 0.3%)

Since the baby was born:

- Husband or partner threatened her or made her feel unsafe in some way (3.2% vs. 1.0%)
- She was frightened for the safety of herself or her family because of anger or threats of her husband or partner (3.8% vs. 0.4%)
- Husband or partner tried to control her daily activities (6.3% vs. 1.5%)
- Husband or partner forced her to take part in touching or any sexual activity when she did not want to (1.5% vs. 0.1%)

Infant Sleep:

Infants of WIC mothers were:

- Less likely to always sleep in their own crib (30% vs. 41%)
- More likely to have their crib or bed in the same room as the mother (78% vs. 68%) as per AAP recommendation
- More likely to sleep on a twin or larger mattress or bed (35% vs. 21%)
- More likely to sleep with a blanket (57% vs. 49%)

Among those babies who do not always sleep in his or her own crib, babies of WIC mothers were:

- Less likely to sleep with their mother's husband or partner (24% vs. 38%)

Healthcare providers of WIC mothers were:

- More likely to tell mothers to place the baby's crib or bed in her room (66% vs. 44%)
- More likely to tell mothers what things should or should not go in the bed with the baby (94% vs. 84%)

Adverse Childhood Experiences (ACEs):

WIC mothers were ***more likely*** to have ACEs than non-WIC mothers, including:

- Emotional abuse (28% vs. 15%)
- Physical abuse (19% vs. 7.0%)
- Sexual abuse (14% vs. 8.9%)
- Emotional neglect (22% vs. 10%)
- Physical neglect (7.1% vs. 3.5%)
- Parental divorce (58% vs. 36%)
- Mother treated violently (14% vs. 5.9%)
- Household substance abuse (30% vs. 21%)
- Incarcerated household member (15% vs. 6.5%)
- ACE score (sum of all positive responses) of 4 or more (23% vs. 12%)

Some of the differences between WIC and non-WIC mothers in health-related behaviors and outcomes were investigated in greater detail. In bivariate analyses, a higher percentage of WIC mothers smoked the three months before pregnancy, while a smaller percentage of WIC mothers drank the three months before pregnancy, compared to mothers not on WIC (**Table 7.2**). BMI did not differ between mothers receiving WIC and those who did not receive WIC. Compared to non-WIC mothers, WIC mothers had higher percentages in 3+ stressors the year before the pregnancy, abusive events during or after pregnancy, high adverse childhood experiences (ACE) scores, depression at the time of the survey completion, and a smaller percentage of WIC mothers had intended pregnancies. Survey results also indicated that mothers who received WIC during pregnancy had a higher percent of low birthweight (LBW) infants and preterm births than mothers who did not receive WIC (**Figure 7.1**). After controlling for sociodemographic factors, there was no association between any of the health-related behaviors or outcomes and WIC participation (**Table 7.2**) or LBW and preterm birth and WIC participation (p=0.40 and p=0.93, respectively). The associations

between many of the health-related behaviors and outcomes with WIC participation are a reflection of the high-risk population of mothers who receive WIC benefits during pregnancy.

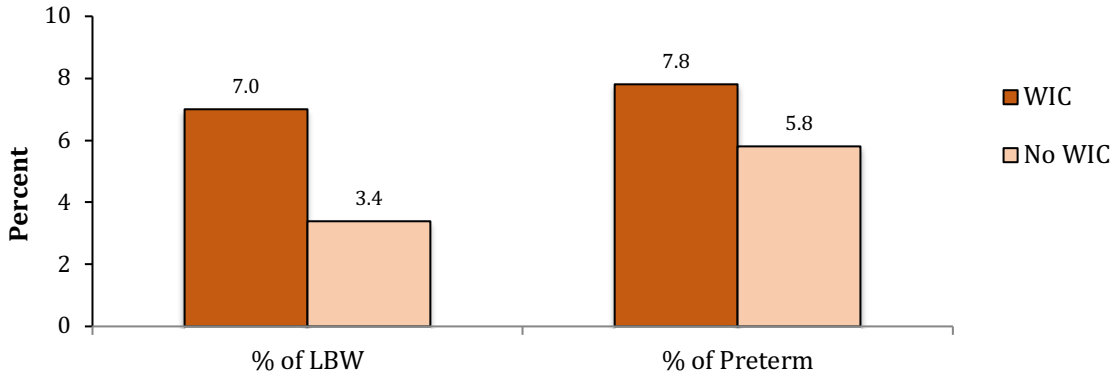
Table 7.2. Percent of Mothers with Various Outcomes by Participation in WIC During Pregnancy (weighted)

Variable	WIC	No WIC	Bivariate Association with WIC [1]	Multivariate Association with WIC [2]
Pregnancy Intendedness			<0.001	0.27
Intended	25.8	45.0		
Mistimed	37.8	38.2		
Unintended	8.4	4.5		
Unsure	27.9	12.2		
Smoke 3 Months Before Pregnancy			<0.001	0.22
No	56.9	83.4		
Yes	43.1	16.6		
Drink 3 Months Before Pregnancy			<0.001	0.15
No	52.0	26.7		
Yes	48.0	73.3		
BMI Category			0.83	0.69
Underweight	1.5	2.0		
Normal	44.8	44.7		
Overweight	24.3	26.2		
Obese	29.4	27.2		
Depression			0.01	0.82
No	77.1	84.4		
Yes	22.9	15.6		
Stressors			<0.001	0.20
0	23.9	39.1		
1-2	34.9	42.6		
3+	41.2	18.3		
Abuse During Pregnancy			<0.001	0.87
No	87.9	96.5		
1+ Abusive Events	12.1	3.5		
Abuse After Pregnancy			<0.001	0.81
No	92.6	98.3		
1+ Abusive Events	7.4	1.7		
ACE Categories			<0.001	0.15
0	25.5	49.3		
1	28.2	20.3		
2	10.5	10.0		
3	13.0	8.2		
4+	22.8	12.2		

[1] P-Value based on a chi-square test of association

[2] Based on logistic regression controlling for maternal race, age, education, marital status, income and region of the state. Multivariate analyses are used to determine whether a variable is independently associated with the outcome after taking into account other variables that also may be important.

Figure 7.1.Percent of Infants Born LBW or Preterm by WIC Participation (weighted)



Significant difference in percentage of LBW between WIC and non-WIC mothers based on bivariate analysis (chi-square test) that did not remain significant when sociodemographic characteristics were included in the analyses. Percentage of preterm births did not differ betwen WIC and non-WIC mothers.

Summary

- 34.2% of South Dakota mothers received WIC services during their most recent pregnancy.
- The percentages of mothers on WIC were highest among American Indian mothers, Hispanic mothers, younger mothers, unmarried mothers, less educated mothers, mothers with lower household incomes, and mothers from the western region of the state.
- WIC Mothers were more likely to have been talked to about how smoking, alcohol or illegal drug use can affect their baby; breastfeeding; using a seatbelt during pregnancy; the importance of good oral health during pregnancy; getting tested for HIV and physical abuse.
- WIC Mothers were more likely to have a home visitor (nurse, a health care worker, a social worker, or other person who works for a program) to help them prepare for their new baby and follow-up for care of herself and her baby.
- WIC Mothers received advice from healthcare providers after the baby was born regarding support groups, physical abuse, resources available in their community, getting to and staying a healthy weight after delivery, and how to prevent their baby from getting tooth decay.
- Bivariate associations with receipt of WIC services during pregnancy included:
    - Pregnancy intendedness (smaller percent of WIC moms had intended pregnancies)
    - Smoking the 3 months before pregnancy (greater percent of WIC moms smoked)
    - Drinking the 3 months before pregnancy (smaller percent of WIC moms drank)
    - Depression at time of survey completion (greater percent of WIC moms were depressed)
    - Presence of stressors (greater percent of WIC moms had 3+ stressors)
    - Abuse both before and after pregnancy (greater percent of WIC moms were abused)
    - ACE scores (greater percent of WIC moms had higher ACE scores)
    - LBW infants (greater percent of WIC moms had LBW infants)
    - Preterm births (greater percent of WIC moms had preterm infants)

When taking sociodemographic characteristics into account, there were ***no differences*** in the above health-related behaviors or health outcomes between WIC mothers and non-WIC mothers, thereby reflecting the high-risk population that receives WIC benefits.

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2. https://www.fns.usda.gov/wic/about-wic-wic-glance
3. https://fns-prod.azureedge.net/sites/default/files/ops/WICEligibles2015-Summary.pdf

Home Visiting

Chapter 8
Home Visiting

Quote from a 2016 SD PRAMS Mother:

"My experience at the time my pregnancy was a lot of fear and worry because of my age, single mother and feeling alone a lot of the time with no support. I am glad it's over with and my baby is healthy and happy."

Background & Public Health Significance

Home visiting programs for infants and young children can improve family relationships, advance school readiness, reduce child maltreatment, improve maternal and infant outcomes, and increase family economic self-sufficiency. The term "home visiting" refers to an evidence-based strategy in which a professional delivers a service in a community or a private home setting (1). According to the American Academy of Pediatrics (AAP) 2017 Policy Statement on Early Childhood Home Visiting, the AAP supports federal funding of state home-visiting initiatives, the expansion of evidence-based programs, and a robust, coordinated national evaluation designed to confirm best practices and cost-efficiency (1).

Home visiting programs vary from state to state in target population and content. Many states employ more than one approach in order to address their state-specific priorities, as is the case in South Dakota. Multiple home visitation programs including Bright Start, Healthy Start, Early Head Start, Family Spirit, and Parent as Teachers are implemented across the state through various agencies. These agencies, such as the South Dakota Department of Health (SDDOH) and the Center for American Indian Health, target specific populations and carry out evidence-based model curriculums depending on their specific initiatives and mission. For example, one model employed by the SDDOH is the Bright Start Initiative. This top-priority state initiative is to assure that every baby born in South Dakota has the opportunity for a good start in life (2). Registered nurses partner with families from pregnancy through the child's second or third birthday to achieve improved pregnancy outcomes, improved infant and toddler growth and development, and build self-sufficient, healthy families. First-time mothers residing in seven service delivery areas throughout South Dakota are eligible to enroll in the state's home visiting program prior to 28 weeks' gestation.

General benefits to home visitation programs include (3):

- Cultivating parents' ability to form strong, positive attachments with their children and to keep them safe.
- Promoting children's healthy physical, cognitive, and social-emotional development by monitoring their progress, guiding parents in recognizing their children's and their own needs, and accessing appropriate services.
- Improving maternal and child health.

What's Happening in South Dakota

Based on 2016 PRAMS-like data, 4.0% of South Dakota mothers reported that a home visitor came to their home during their pregnancy to help prepare for their new baby. Home visiting in South Dakota continues after the baby is born until the child graduates from the program around age two. The postpartum period is a critical time in an infant's life and in addition to regular physician visits and checkups, home visiting provides another opportunity to promote healthy development, assist

parents in determining the infant's needs, and navigating the parent(s) toward appropriate resources. When asked if a home visitor came to their home to help them learn how to take care of themselves or their new baby, 8.3% of mothers responded 'Yes'. The percent of women who had a home visitor during and after their pregnancy by different demographic characteristics is shown in **Table 8.1**.

There were significant race differences in the percentage of mothers stating that they had a home visitor during pregnancy and after the baby was born with American Indian mothers having the highest percentage followed by mothers of other races. The percent of mothers who had a home visitor during and after pregnancy was also higher among younger mothers, mothers with less than a high school education, unmarried mothers, mothers with annual household incomes less than $15,000, and mothers in the western region of the state.

As mentioned, one of the benefits of home visiting is improving maternal and child health. One way to promote improvements in this area is through providing education and consultations during home visits. **Figure 8.1** shows the topics that were talked about by the home visitor with the mother during her pregnancy. Because these responses are limited to the 4.0% of mothers who stated they had a home visitor during pregnancy, the number of respondents is small; therefore, race differences are not shown.

Figure 8.1. Percentage of Mothers Stating These Topics were Talked About by a Home Visitor During Pregnancy (weighted, limited to mothers who had a home visitor)

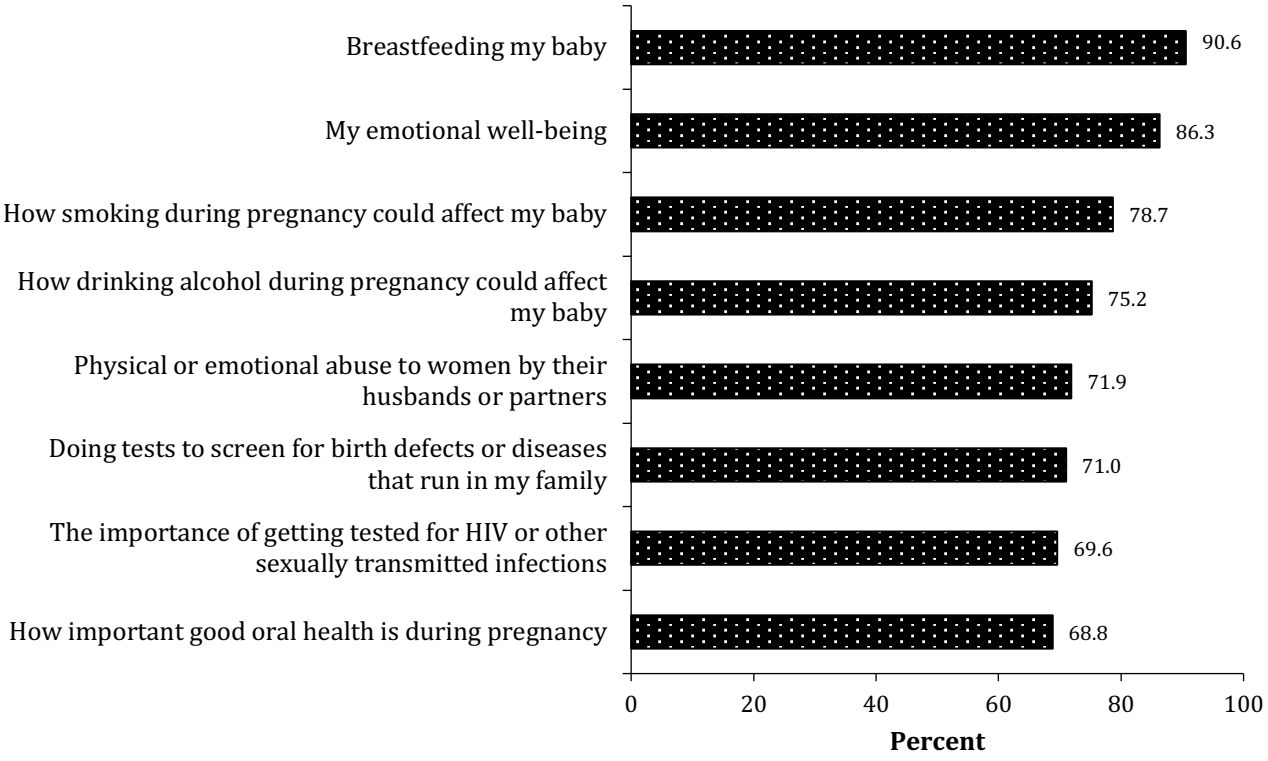

Table 8.1. Percent of Mothers with a Home Visitor During or After Pregnancy by Demographic Characteristics (weighted)

	% with Home Visitor During Pregnancy[1]	% with Home Visitor After Pregnancy
Race	**P<0.001**[2]	**P<0.001**[2]
White	1.3% [0.4, 2.2]	4.4% [2.6, 6.1]
American Indian	13.9% [10.3, 17.5]	25.2% [20.8, 29.7]
Other Races	10.9% [7.6, 14.1]	15.1% [11.3, 18.8]
Ethnicity	**Not significant**	**Not significant**
Hispanic	2.5% [0.0, 5.1]	8.5% [2.0, 15.1]
Non-Hispanic	4.0% [3.1, 5.0]	8.3% [6.7, 9.9]
Age (years)	**P<0.001**	**P<0.001**
<20	10.4% [5.4, 15.4]	23.1% [14.0, 32.2]
20-24	7.0% [3.9, 10.0]	11.3% [7.3, 15.3]
25-29	2.9% [1.7, 4.2]	5.4% [3.5, 7.3]
30-34	2.5% [1.0. 4.0]	6.3% [3.5, 9.1]
≥35	1.4% [0.2, 2.7]	8.0% [2.9, 13.1]
Maternal Education	**P<0.001**	**P=0.005**
<High School	10.4% [6.8, 14.1]	14.4% [9.8, 18.8]
High School	4.7% [2.5, 6.8]	8.5% [5.6, 11.5]
>High School	2.5% [1.4, 3.5]	6.9% [5.0, 8.9]
Marital Status	**P<0.001**	**P<0.001**
Married	2.3% [1.2, 3.4]	5.0% [3.3, 6.7]
Not married	7.0% [5.2, 8.8]	14.2% [11.1, 17.3]
Insurance[3]	**^**[2]	**P<0.001**
Private (direct purchase)	5.7% [0.0, 12.6]	10.4% [0.8, 20.0]
Job-based	2.0% [1.0, 3.1]	5.1% [3.2, 7.0]
Medicaid	10.0% [6.5, 13.5]	18.4% [13.3, 23.5]
Medicare	2.1% [0.0, 5.7]	8.9% [1.3, 16.4]
Other	LNE	5.7% [0.0, 11.9]
Uninsured	7.5% [4.5, 10.5]	12.6% [8.6, 16.6]
Annual Household Income	**P<0.001**	**P<0.001**
<$15,000	9.5% [6.6, 12.5]	14.6% [10.5, 18.6]
$15,001- $26,000	5.1% [2.1, 8.1]	9.0% [5.4, 12.7]
$26,001 - $44,000	2.0% [0.9, 3.2]	11.1% [6.3, 15.9]
$44,001 - $67,000	2.5% [0.0, 5.1]	5.8% [2.0, 9.6]
$67,001 or more	LNE	2.9% [0.6, 5.1]
Region	**P<0.001**	**P<0.001**
Central	2.9% [1.1, 4.7]	4.4% [1.4, 7.5]
Northeast	3.1% [1.3, 4.8]	6.2% [3.2, 9.3]
Rapid City MSA	3.4% [1.1, 5.8]	8.1% [3.8, 12.3]
Sioux Falls MSA	2.9% [1.3, 4.6]	5.8% [3.2, 8.3]
Southeast	3.0% [0.0, 6.2]	11.2% [3.9, 18.5]
West	10.4% [6.4, 14.4]	19.4% [14.4, 24.3]

1 95% Confidence intervals.

2 P-Values are for a chi-square test of association; ^could not perform chi-square due to zero cells.

3 If more than one type of insurance was selected, a hierarchy was established to report the individual's insurance status. The hierarchy, in order, was: Private; Job-based (includes self or as a dependent); Other (includes military, VA, Champus & TriCare or Other); Medicaid; Medicare; Uninsured (includes IHS). For example, if an individual selected both 'Private' and 'Medicaid', the individual's insurance status was reported as 'Private'.

Summary

- 4.0% of South Dakota mothers reported having a home visitor during their pregnancy to help prepare for their new baby, whereas 8.3% said a home visitor provided services after the baby was born.
- The percent who had a home visitor either *during* or *after* pregnancy was highest among American Indian mothers, younger mothers, mothers with less than a high school education, unmarried mothers, mothers with annual household incomes less than $15,000, and mothers in the western region of the state.
- The most recalled topics covered at home visits during pregnancy was providing information about breastfeeding and talking with the mother about her emotional well-being.

References

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Oral Health

Chapter 9
Oral Health

Quote from a 2016 SD PRAMS Mother:

"I would really like to see more info on oral health because I did not know pregnant women needed to take better care of our teeth."

Background & Public Health Significance

Oral health during pregnancy is just as important to consider as other aspects of health (1). If dental diseases during pregnancy are left untreated, they can affect not only the mother, but the fetus as well. One of the most common untreated dental diseases is periodontitis. Periodontitis is associated with both preterm birth and low birthweight, which are known to be leading causes of infant mortality (2). Because snacking can increase during pregnancy, it is also important to brush and take care of the teeth to decrease plaque buildup and reduce the risk of tooth decay.

The importance of dental care during pregnancy is apparent by its inclusion as a National Performance Measure (NPM #13A) in the Health Resources & Services Administration (HRSA) Title V Maternal Child Health Block Grant. In 2014, it was estimated using CDC national PRAMS data that 51.9% of mothers received a preventive dental visit during pregnancy (3).

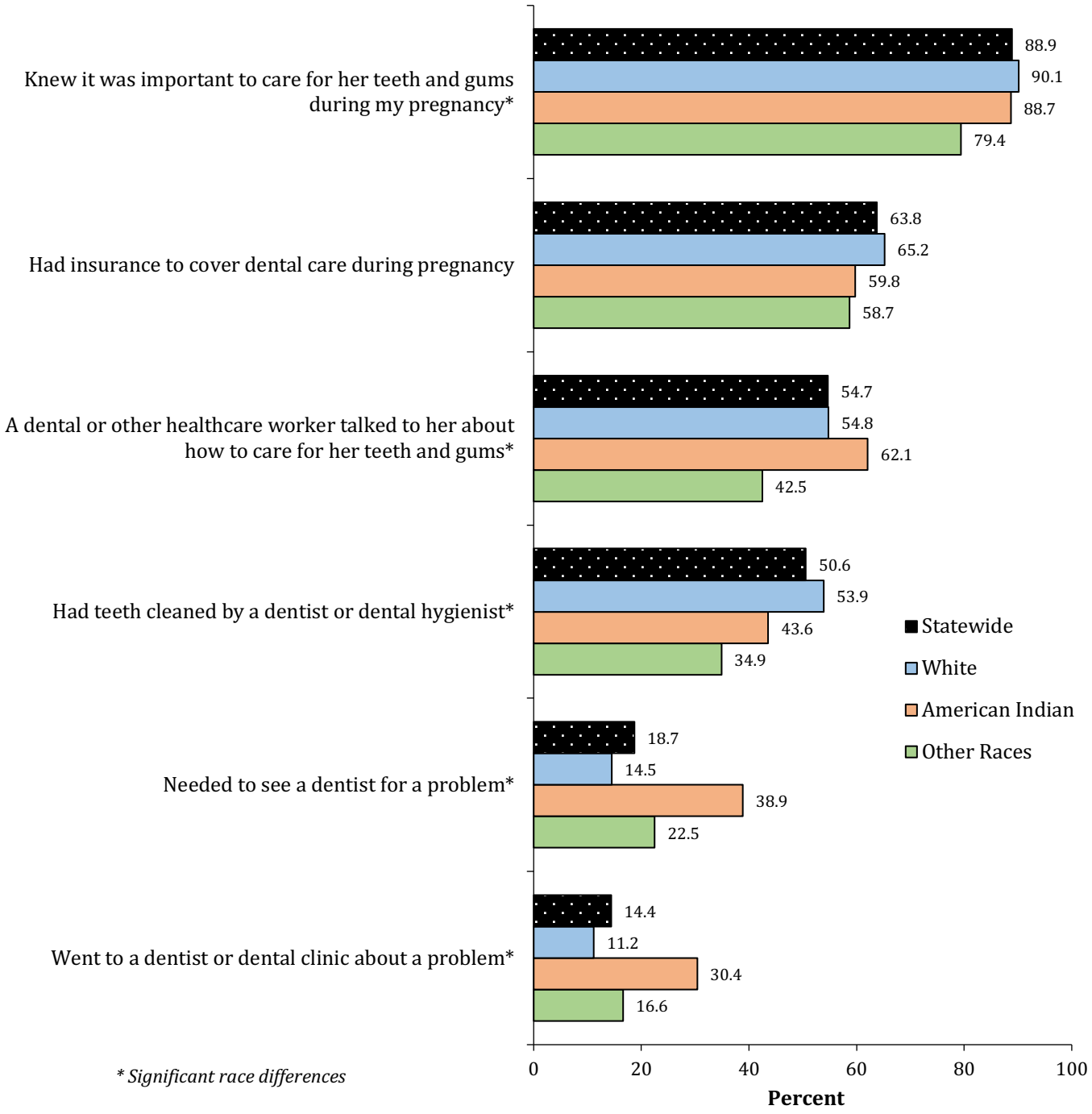
What's Happening in South Dakota

When asked about preconception healthcare or behaviors, it was found that 58.5% of South Dakota mothers reported having their teeth cleaned by a dentist or dental hygienist at some time during the 12 months ***before*** pregnancy, which differed by race with a higher percentage of white mothers (63.9%) having their teeth cleaned than American Indian mothers (39.3%) and mothers of other races (44.4%) (see Preconception Care chapter).

Figure 9.1 shows the percent of mothers who responded 'yes' to various questions regarding the care of her teeth ***during*** pregnancy. There were significant race differences in all responses except having insurance to cover dental care during pregnancy. Demographic characteristics associated with receiving dental care ***during*** pregnancy are shown in **Table 9.1**, with 50.6% of South Dakota mothers having their teeth cleaned ***during*** pregnancy. Preventive dental care was associated with all demographic characteristics except the region of the state the mother resided. White mothers, non-Hispanic mothers, older mothers, more educated mothers, married mothers, insured (job-based) mothers, and mothers with higher income were more likely to have had a preventive dental visit during pregnancy than American Indian or other race mothers, Hispanic mothers, younger mothers, less educated mothers, unmarried mothers, uninsured mothers, and low-income mothers. Mothers resided in the Sioux Falls MSA were more likely to have their teeth cleaned ***during*** pregnancy.

In order to identify populations that are ***not*** receiving information about dental care during pregnancy, it was determined which demographic characteristics were associated with a healthcare worker talking with the mother about how to care for her teeth and gums during pregnancy (**Table 9.1**). The highest percentages of mothers ***not*** talked to about caring for teeth and gums during pregnancy included mothers of other races, Hispanic mothers, mothers with a high school education, uninsured mothers, mothers with household incomes in the $26,001-$44,000/year range and mothers from the central, southeast and northeast regions of the state.

Figure 9.1. Percent of Mothers Who Reported that She Did the Following Activities Related to Dental Care *During* Pregnancy by Race (weighted)



** Significant race differences*

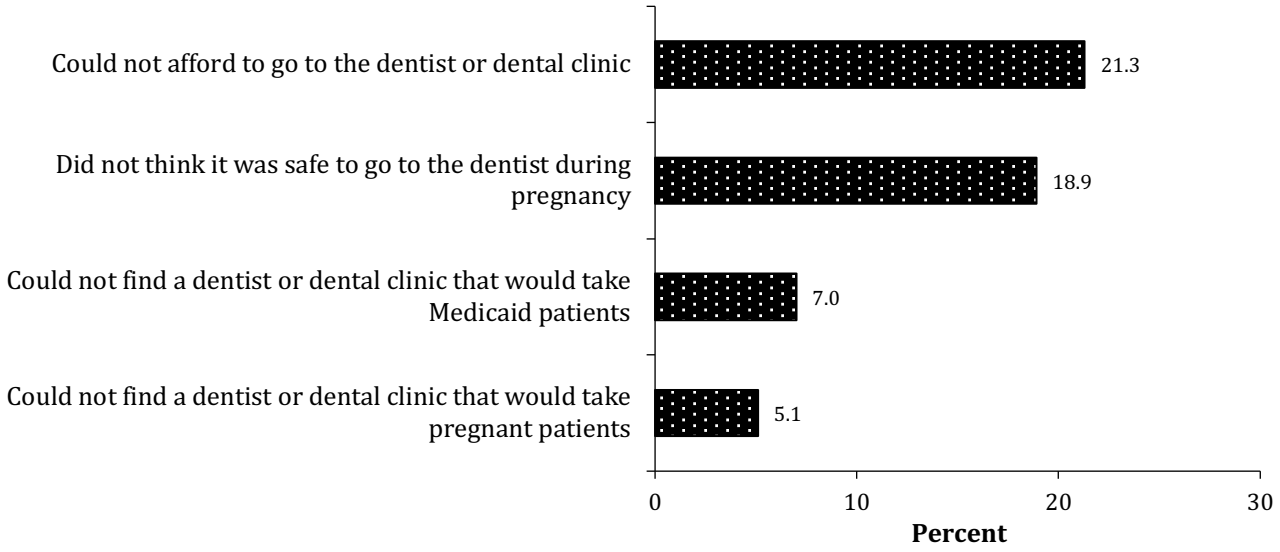
Table 9.1. Percent of Mothers Having a Preventive Dental Care Visit During Pregnancy (weighted) [1]

	% Preventive Dental Care *During* Pregnancy	% *Not* Talked to About Dental Care During Pregnancy
Race	**P<0.001[2]**	**P<0.001**
White	53.9% [49.6, 58.1]	45.2% [40.9, 49.4]
American Indian	43.6% [38.6, 48.6]	37.9% [33.0, 42.8]
Other Races	34.9% [30.0, 39.9]	57.5% [52.4, 62.7]
Ethnicity	**P=0.005**	**P=0.01**
Hispanic	30.0% [17.2, 42.9]	64.7% [50.9, 78.5]
Non-Hispanic	51.8% [48.3, 55.2]	44.2% [40.7, 47.6]
Age (years)	**P<0.001**	**Not significant**
<20	40.3% [28.5, 52.1]	54.1% [42.4, 65.7]
20-24	37.5% [30.5, 44.5]	51.6% [44.3, 58.9]
25-29	50.1% [44.3, 56.0]	44.4% [38.6, 50.3]
30-34	61.8% [55.6, 68.0]	40.4% [34.1, 46.7]
≥35	53.6% [43.2, 64.1]	43.5% [33.1, 53.8]
Maternal Education	**P<0.001**	**P=0.004**
Less than High School	38.9% [31.4, 46.4]	50.2% [42.4, 58.1]
High School	28.5% [21.8, 35.1]	55.1% [47.7, 62.6]
More than High School	59.3% [55.1, 63.5]	41.5% [37.3, 45.7]
Marital Status	**P<0.001**	**Not significant**
Married	57.8% [53.6, 62.0]	43.3% [39.0, 47.6]
Not Married	37.7% [32.6, 42.8]	48.8% [43.5, 54.2]
Insurance Before Pregnancy[3]	**P<0.001**	**P=0.003**
Private (direct purchase)	33.9% [20.2, 47.6]	57.6% [43.2, 72.0]
Job-based	60.9% [56.3, 65.4]	41.9% [37.3, 46.5]
Medicaid	49.3% [41.3, 57.3]	36.9% [29.2, 44.6]
Medicare	42.5% [20.2, 64.8]	54.9% [32.0, 77.8]
Other	52.4% [38.4, 66.4]	40.1% [26.3, 53.9]
Uninsured	23.1% [17.1, 29.1]	59.0% [51.6, 66.3]
Annual Household Income	**P<0.001**	**P<0.001**
<$15,000	35.7% [29.5, 41.9]	47.5% [40.9, 54.0]
$15,000- $26,000	33.7% [24.9, 42.5]	51.6% [42.1, 61.1]
$26,001 - $44,000	35.9% [27.8, 44.0]	58.1% [49.8, 66.4]
$44,001 - $67,000	56.5% [47.9, 65.1]	40.9% [32.3, 49.4]
$67,001 or more	72.3% [66.3, 78.3]	34.9% [28.4, 41.3]
Region	**Not significant**	**P=0.02**
Central	45.4% [36.1, 54.7]	55.6% [46.4, 64.8]
Northeast	48.7% [40.8, 56.5]	50.0% [42.2, 57.8]
Rapid City MSA	48.4% [39.6, 57.2]	37.6% [29.1, 46.0]
Sioux Falls MSA	57.5% [51.3, 63.8]	40.3% [34.0, 46.5]
Southeast	46.6% [35.5, 57.8]	53.1% [42.0, 64.3]
West	48.1% [40.4, 55.7]	42.2% [34.6, 49.8]

[1] 95% confidence intervals
[2] P-values are for a chi-square test of association;
[3] If more than one type of insurance was selected, a hierarchy was established to report the individual's insurance status. The hierarchy, in order, was: Private; Job-based (includes self or as a dependent); Other (includes military, VA, Champus & TriCare or Other); Medicaid; Medicare; Uninsured (includes IHS). For example, if an individual selected both 'Private' and 'Medicaid', the individual's insurance status was reported as 'Private'.

Among mothers who had a problem with their teeth or gums, the most common stated reason that made it hard for them to go to a dentist or dental clinic was not being able to afford it (**Figure 9.2**; due to small numbers, only statewide estimates are given).

Figure 9.2. Percent of Mothers Who Reported that These Things Made It Hard for Her to Go to the Dentist or Clinic about a Problem (weighted; includes only mothers who had problems with their teeth or gums during pregnancy [n=134])



Summary

- 58.5% of South Dakota mothers reported having their teeth cleaned by a dentist or dental hygienist at some time during the 12 months ***before*** pregnancy, and this varied by race (63.9%, 39.3%, and 44.4% for white, American Indian, and other race mothers, respectively)
- 50.6% of South Dakota mothers had their teeth cleaned by a dentist or dental hygienist ***during*** pregnancy, and this varied by race (53.9%, 43.6%, and 34.9% for white, American Indian, and other race mothers, respectively).
- Mothers most likely to have had a preventive dental visit during pregnancy included white mothers, non-Hispanic mothers, older mothers, more educated mothers, married mothers, insured (job-based) mothers, and mothers with higher income.
- Mothers least likely to report that their healthcare provider talked to them about how to care for their teeth and gums during pregnancy included mothers of other races, Hispanic mothers, mothers with a high school education, uninsured mothers, mothers with household incomes in the $26,001-$44,000/year range and mothers from the central, southeast and northeast regions of the state.
- 18.7% of mothers needed to see a dentist for a problem and 14.4% went to a dentist or dental clinic about a problem during pregnancy. Among mothers who had a dental problem, 21.3% stated it was hard to go to the dentist about the problem because they could not afford to go, 18.9% did not think it was safe to go to the dentist during pregnancy, and 7.0% could not find a dentist or dental clinic that would take Medicaid patients.

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Substance Use
(Tobacco, Alcohol, Illicit Drugs)

Chapter 10
Substance Use Before & During Pregnancy
(Tobacco, Alcohol, Illicit Drugs)

Quote from a 2016 SD PRAMS Mother:

"I quit doing everything when I got pregnant. No drinking, smoking, doing drugs, eating unhealthy foods. The smoking took a bit but I quit that too."

"Drugs and alcoholic beverages are harmful in pregnancy because the baby's development is affected. Managing this is really helpful to the pregnancy process."

Background & Public Health Implications

The use of tobacco, alcohol and illicit drugs by pregnant women can lead to significant maternal, fetal, and neonatal morbidity (1,2). The 2016 National Survey on Drug Use and Health reported the following prevalence rates for cigarette, alcohol, and illicit drug use in women aged 15-44 years (3):

Table 10.1. Prevalence of Cigarette Use, Alcohol Use, and Illicit Drug Use in Previous Month among US Women Aged 15-44 Years by Pregnancy Status, 2016

	Non-Pregnant	Pregnant
Cigarette Use	19.9%	10.0%
Alcohol Use	53.5%	8.3%
Binge Alcohol Use	28.6%	4.3%
Illicit Drug Use	13.2%	6.3%

Although the rate of smoking during pregnancy has decreased (4,5), there has been a significant increase in opiate use (6). Studies have shown that substance abuse is related to an increased risk for SIDS, mental and physical birth defects or abnormalities, problems with fetal development, preterm birth, low birthweight (LBW), and many other adverse outcomes (7-9). It has been shown that pregnant women with substance use disorders have lower rates of seeking prenatal care and higher rates of low birthweight infants and preterm births than pregnant women without substance use disorders (10).

Substance abuse is a major contributor to health care costs and social and public health problems such as crime and domestic violence. The Healthy People 2020 goals set by the U.S. Department of Health and Human Services are a list of national benchmarks that will help improve maternal and fetal outcomes. They cover many areas, but the ones specific to substance abuse are listed below (11):

- MICH 11: Increase abstinence from alcohol, cigarettes, and illicit drugs among pregnant women.
- MICH 16.3: Increase the proportion of women delivering a live birth who did not smoke prior to pregnancy.
- MICH 16.4: Increase the proportion of women delivering a live birth who did not drink alcohol prior to pregnancy.
- MICH 18: Reduce postpartum relapse of smoking among women who quit smoking during pregnancy.
- MICH 25: Reduce the occurrence of fetal alcohol syndrome (FAS).

Although the goals listed above are national goals, they are also important and applicable to South Dakota. Evaluating where South Dakota lies within those goals gives health professionals and researchers a better indication of the needs of mothers and infants in our state and areas that could be improved.

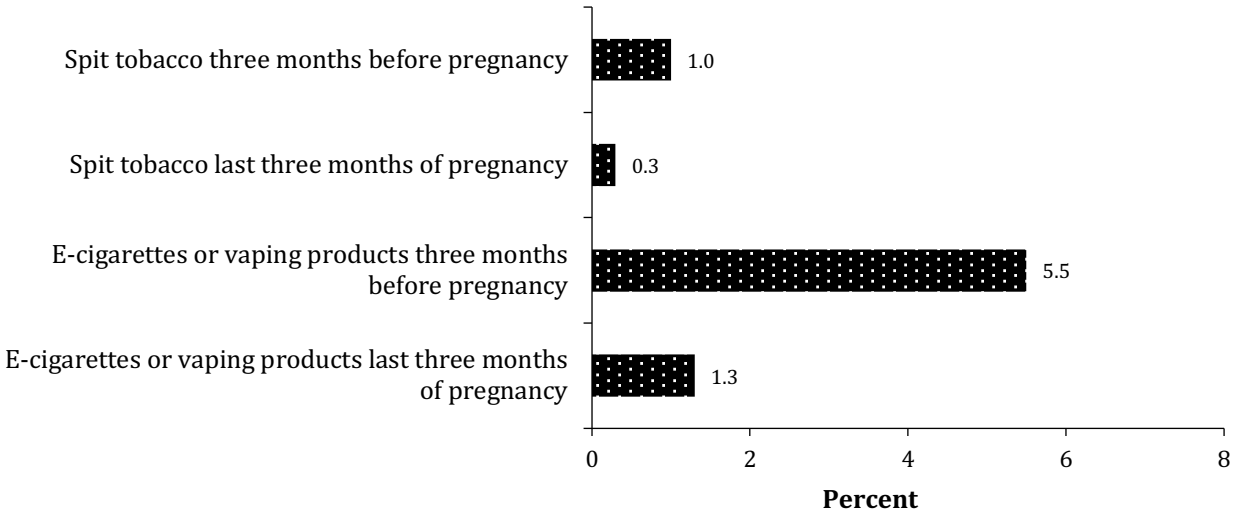
What's Happening in South Dakota

Spit Tobacco and Use of E-cigarettes or Vaping Products

Tobacco use during pregnancy is associated with an increased risk of various fetal problems. According to multiple studies, smoking during pregnancy is associated with developmental problems of the fetal brain and kidneys, LBW and preterm birth (9, 12). Preterm birth is one of the leading causes of death in the neonatal period (13).

Although much is known about the adverse effects of smoking on the fetus, less is known about the effects of spit tobacco (chewing tobacco and snuff) and e-cigarettes or other vaping products. **Figure 10.1** shows the percent of mothers statewide who reported using spit tobacco or e-cigarettes the three months before pregnancy and the last three months of pregnancy. Percentages of mothers using e-cigarettes or vaping products the three months before pregnancy were higher among American Indian mothers, younger mothers, unmarried mothers, low income mothers, and mothers from Rapid City or southeastern South Dakota (**Table 10.2**). Demographic characteristics were not compared between users and non-users of spit tobacco before pregnancy or spit tobacco and e-cigarette use during pregnancy due to the small numbers. Demographic characteristics associated with e-cigarette use before pregnancy.

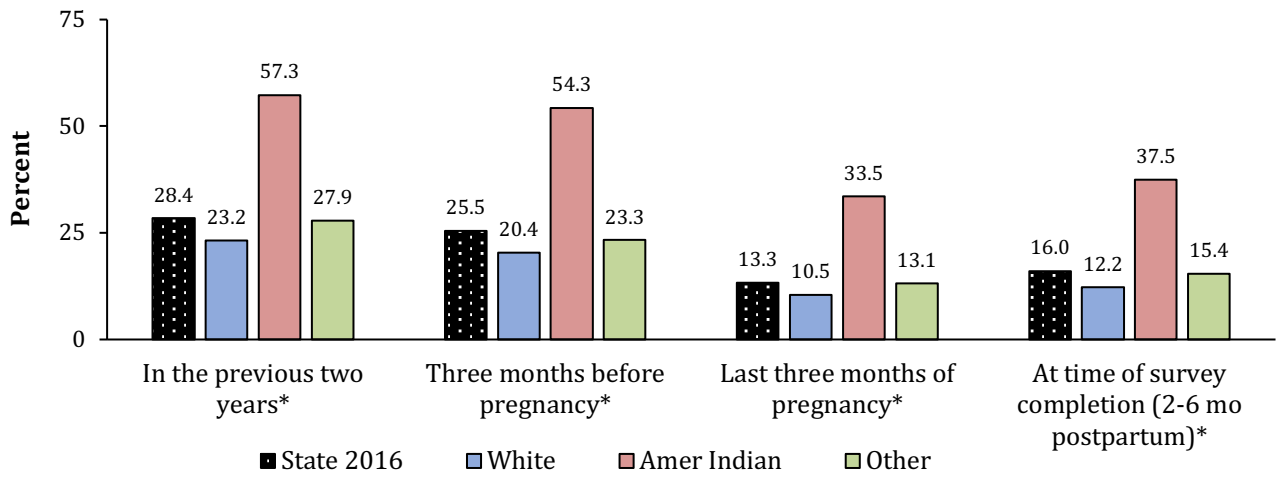
Figure 10.1. Spit Tobacco and Use of E-cigarettes or Vaping Products Before and During Pregnancy (weighted)



Cigarette Smoking

In 2016, 28.4% of South Dakota mothers reported that they smoked in the previous two years, 25.5% smoked the three months ***before*** pregnancy, 13.3% smoked ***during*** the last three months of pregnancy, and 16.0% were smoking at the time of survey completion (2-6 months postpartum) (**Figure 10.2**). A higher percentage of American Indian mothers reported smoking at all time points than white mothers and mothers of other races.

Figure 10.2. Percentage of South Dakota Mothers Smoking at Various Times Around Pregnancy by Race (weighted)



** Significant race differences*

The number of cigarettes smoked during the last three months of pregnancy among mothers who smoked in the last two years is shown in **Figure 10.3** by race. Among South Dakota mothers who smoked in the last two years, 60.6% did not smoke during the last three months of pregnancy, and of those who smoked the majority smoked five or fewer cigarettes per day.

Figure 10.3. Number of Cigarettes Smoked *During* the Last Three Months of Pregnancy for Those Mothers Who Smoked During the Last Two Years, by Race* (weighted)

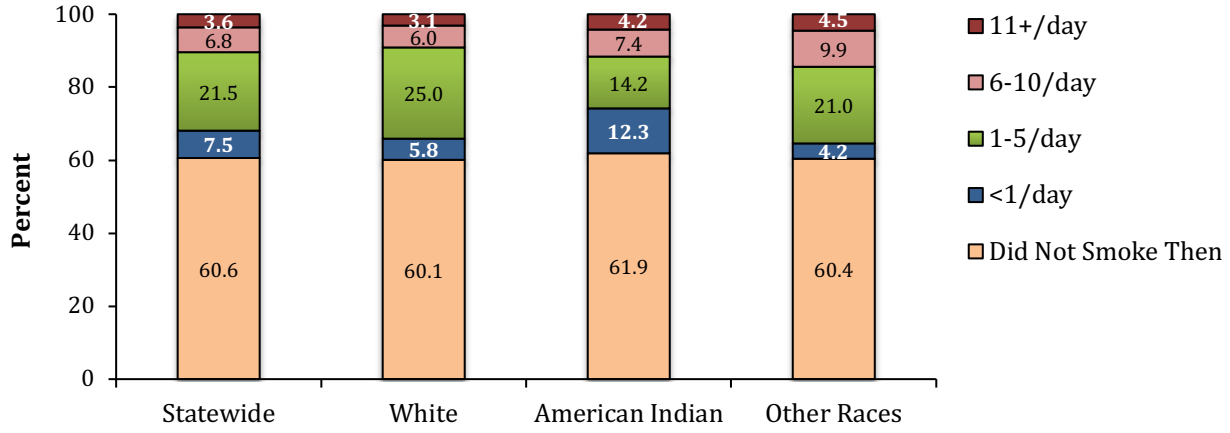


Table 10.2 shows the prevalence of smoking the three months ***before*** pregnancy by demographic characteristics of mothers in South Dakota in 2016. The prevalence of smoking the three months before pregnancy was highest for mothers in the following demographic categories: American Indian race, younger mothers, less educated mothers, mothers who were not married, mothers with lower household income, and mothers residing in the western region of South Dakota.

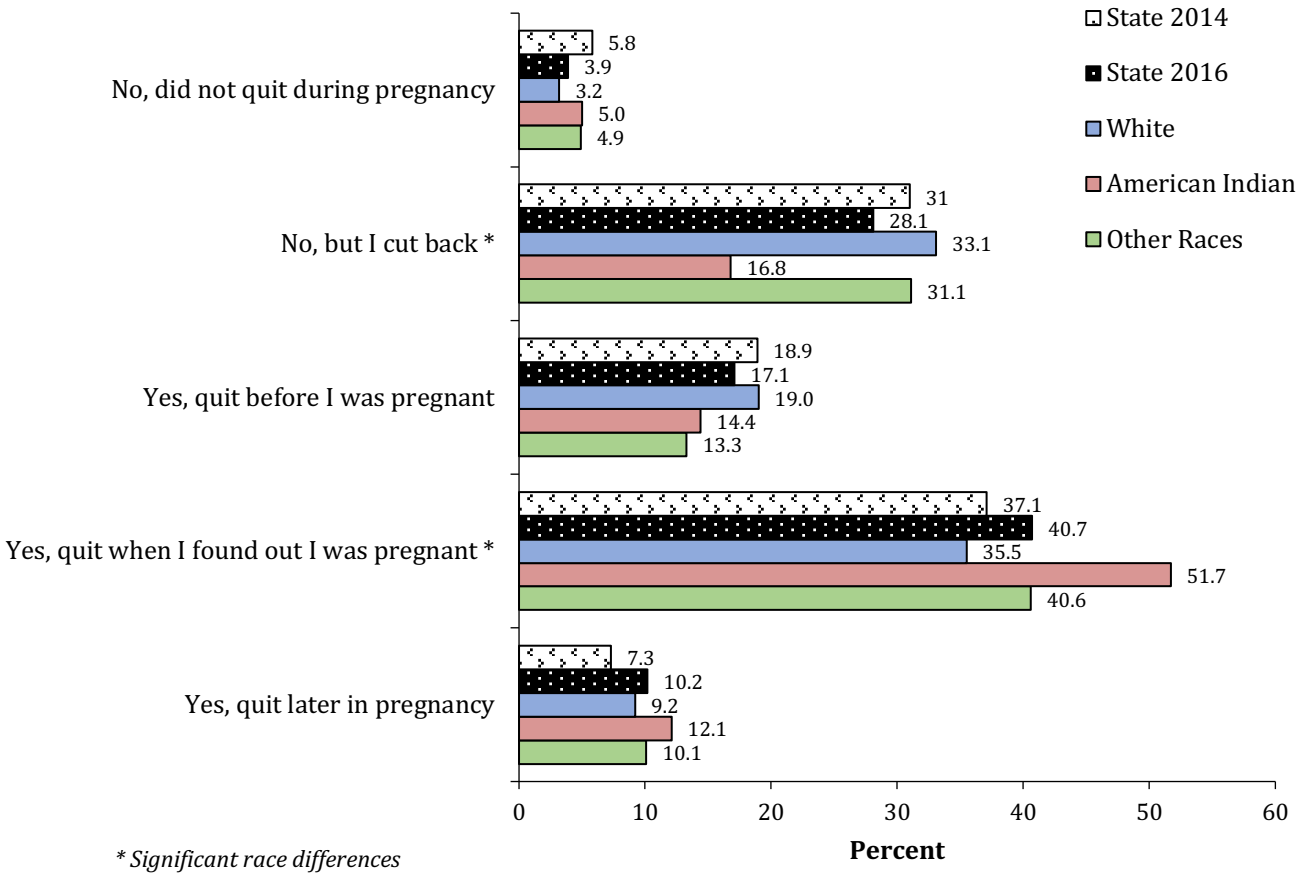
Table 10.2. Percent of Mothers Who Used E-cigarettes, Smoked or Drank Three Months *Before* Pregnancy by Demographic Characteristics [1] (weighted)

	% Using E-cigarettes[2]	% Smoking	% Drinking
Race	**p=0.008[3]**	**p<0.001**	**p<0.001**
White	4.9% [3.0, 6.8]	20.4% [16.9, 23.9]	71.6% [67.7, 75.5]
American Indian	9.7% [6.6, 12.7]	54.3% [49.2, 59.3]	45.9% [40.9, 50.9]
Other Races	4.0% [2.0, 6.0]	23.3% [18.9, 27.8]	36.4% [31.5, 41.4]
Ethnicity	**Not significant**	**Not significant**	**P<0.001**
Hispanic	12.1% [1.4, 22.7]	15.2% [6.3, 24.2]	37.8% [23.4, 52.2]
Non-Hispanic	5.2% [3.6, 6.7]	26.0% [23.1, 28.9]	65.8% [62.7, 68.9]
Age (years)	**p=0.03**	**p<0.001**	**p<0.001**
<20	12.7% [4.0, 21.4]	37.6% [25.8, 49.3]	38.4% [26.7, 50.0]
20-24	8.9% [4.8, 12.9]	40.1% [33.1, 47.1]	56.1% [49.0, 63.3]
25-29	3.4% [1.5, 5.3]	21.6% [17.1, 26.0]	66.7% [61.4, 72.0]
30-34	4.3% [1.6, 7.1]	19.0% [14.0, 24.0]	75.3% [70.1, 80.4]
≥35	4.2% [0, 9.3]	18.9% [11.2, 26.6]	61.3% [51.5, 71.1]
Education	**Not significant**	**p<0.001**	**p<0.001**
<High School	9.8% [4.4, 15.1]	37.3% [29.7, 44.9]	38.9% [31.1, 46.8]
High School	5.8% [2.4, 9.3]	39.3% [32.0, 46.6]	50.4% [43.0, 57.9]
>High School	4.5% [2.8, 6.3]	19.1% [15.9, 22.3]	74.0% [70.3, 77.6]
Marital Status	**p<0.001**	**p<0.001**	**p<0.001**
Married	2.6% [1.3, 3.9]	13.2% [10.4, 16.1]	69.1% [65.2, 72.9]
Unmarried	10.8% [7.2, 14.4]	47.8% [42.4, 53.2]	56.3% [51.1, 61.5]
Insurance Before Pregnancy[4]	**Not available**	**p<0.001**	**p<0.001**
Private (direct purchase)	LNE	15.7% [5.5, 25.9]	69.9% [56.4, 83.4]
Job-based	3.1% [1.5, 4.7]	19.0% [15.3, 22.7]	72.7% [68.7, 76.7]
Medicaid	12.6% [6.2, 19.0]	45.2% [37.2, 53.2]	42.1% [34.2, 50.1]
Medicare	LNE	20.7% [1.8, 39.6]	59.7% [38.5, 80.9]
Other	LNE	13.7% [4.8, 22.7]	76.0% [64.1, 87.9]
Uninsured	11.1% [6.0, 16.2]	45.2% [37.8, 52.6]	46.4% [38.9, 54.0]
Annual Household Income	**p<0.001**	**p<0.001**	**p<0.001**
$0 to $15,000	13.1% [7.9, 18.3]	47.8% [41.3, 54.3]	43.2% [36.8, 49.7]
$15,001 to $26,000	11.9% [5.5, 18.3]	40.2% [31.1, 49.3]	65.4% [57.0, 73.8]
$26,001 to $44,000	2.6% [0.2, 5.1]	26.0% [18.5, 33.4]	55.4% [47.3, 63.6]
$44,001 to $67,000	2.9% [0.1, 5.7]	16.8% [10.4, 23.1]	69.7% [61.8, 77.6]
$67,001+	0.9% [0, 1.9]	9.0% [5.2, 12.8]	84.6% [79.7, 89.4]
Region	**Not significant**	**P=0.002**	**p=0.003**
Central	4.9% [1.2, 8.5]	27.6% [19.8, 35.3]	73.3% [65.5, 81.1]
Northeast	2.7% [0.3, 5.1]	26.0% [19.2, 32.8]	54.2% [46.4, 62.0]
Rapid City MSA	8.5% [3.4, 13.6]	27.1% [19.4, 34.8]	64.0% [55.8, 72.3]
Sioux Falls MSA	4.3% [1.6, 7.1]	19.3% [14.2, 24.3]	67.8% [62.2, 73.5]
Southeast	8.3% [1.6, 14.9]	19.1% [10.5, 27.8]	80.6% [72.5, 88.6]
West	7.9% [4.0, 11.8]	40.5% [33.2, 47.8]	52.8% [45.3, 60.3]

[1] Mothers who did not use e-cigarettes, smoke or drink in the last 2 years were included in these calculations, along with mothers who quit.
[2] 95% confidence intervals; LNE = low number event (n<3)
[3] P-Values are for a chi-square test of association
[3] If more than one type of insurance was selected, a hierarchy was established to report the individual's insurance status. The hierarchy, in order, was: Private; Job-based (includes self or as a dependent); Other (includes military, VA, Champus & TriCare or Other); Medicaid; Medicare; Uninsured (includes IHS). For example, if an individual selected both 'Private' and 'Medicaid', the individual's insurance status was reported as 'Private'

Among mothers who smoked the three months before pregnancy, American Indian mothers were more likely to quit smoking when they found out they were pregnant and less likely to cut back compared to white mothers (**Figure 10.4**, $p<0.05$).

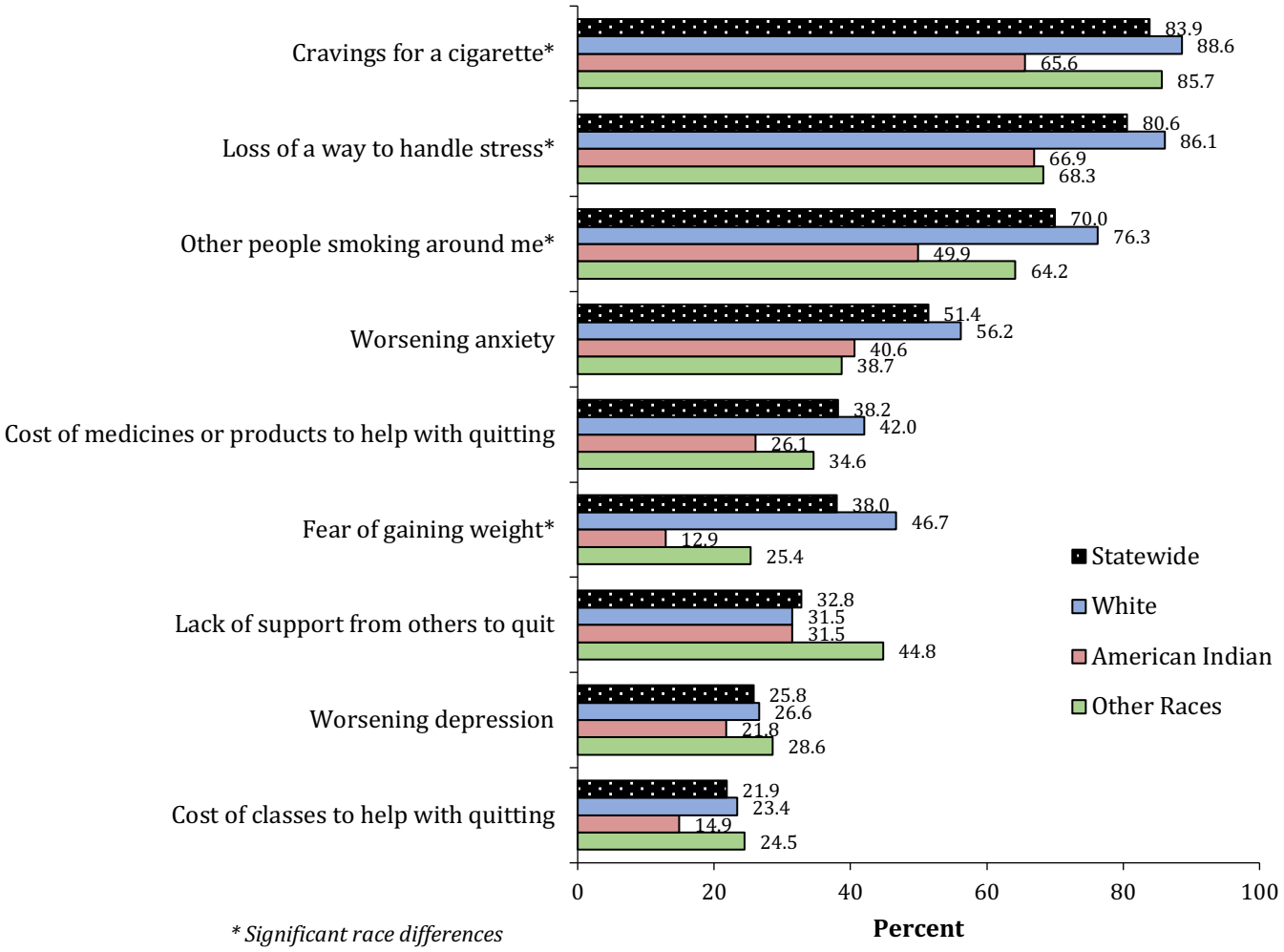
Figure 10.4. Quit Status of South Dakota Mothers Who Reported Smoking Cigarettes the Three Months *Before* Pregnancy, by Race and Year(weighted)



** Significant race differences*

Mothers who smoked the three months ***before*** pregnancy were asked to choose from a list of factors that made it difficult to quit smoking (**Figure 10.5)**. For all races, the top two factors that hindered smoking cessation were the cravings for a cigarette and the loss of a way to handle stress.

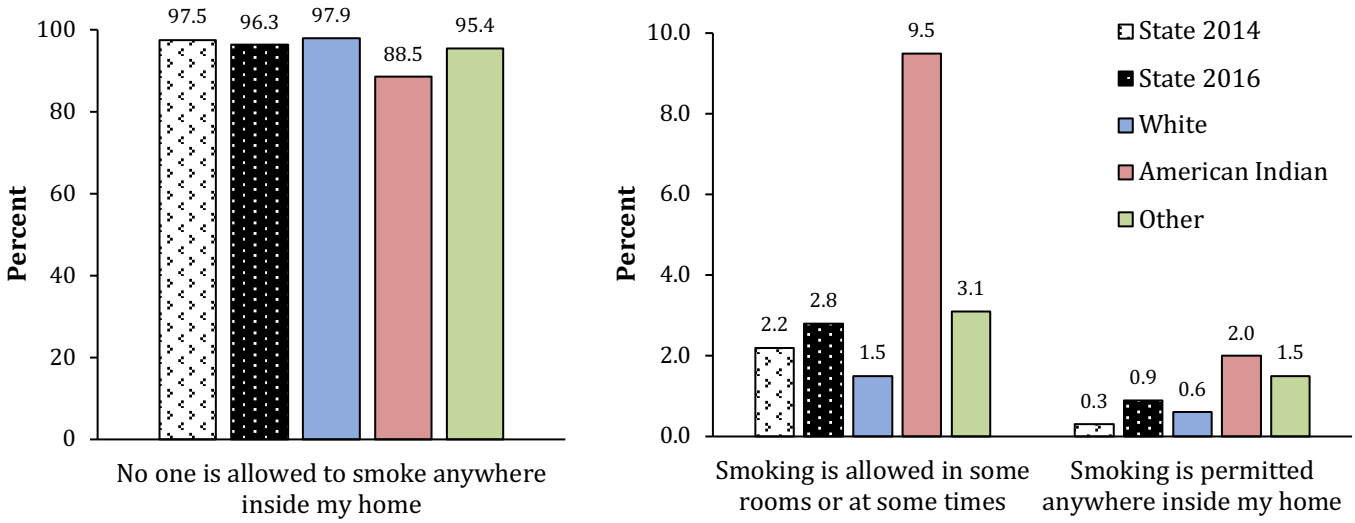
Figure 10.5. Among Mothers Who Smoked the Three Months *Before* Pregnancy, Things that Make It Hard to Quit Smoking, by Race (weighted, could check more than one)



** Significant race differences*

Figure 10.6 shows the percentage of mothers who allow smoking in their home by race. Most mothers do not allow smoking in their home (96.3%), while 2.8% allow smoking in some rooms or at sometimes in their home. White mothers had the highest percent that did not allow smoking in their homes (97.9%). There was a significant association between rules about smoking inside the home and race (p<0.001).

Figure 10.6. Percentage of Mothers' Homes Where Smoking is Not Allowed or Allowed by Race and Year (weighted)



Alcohol Use

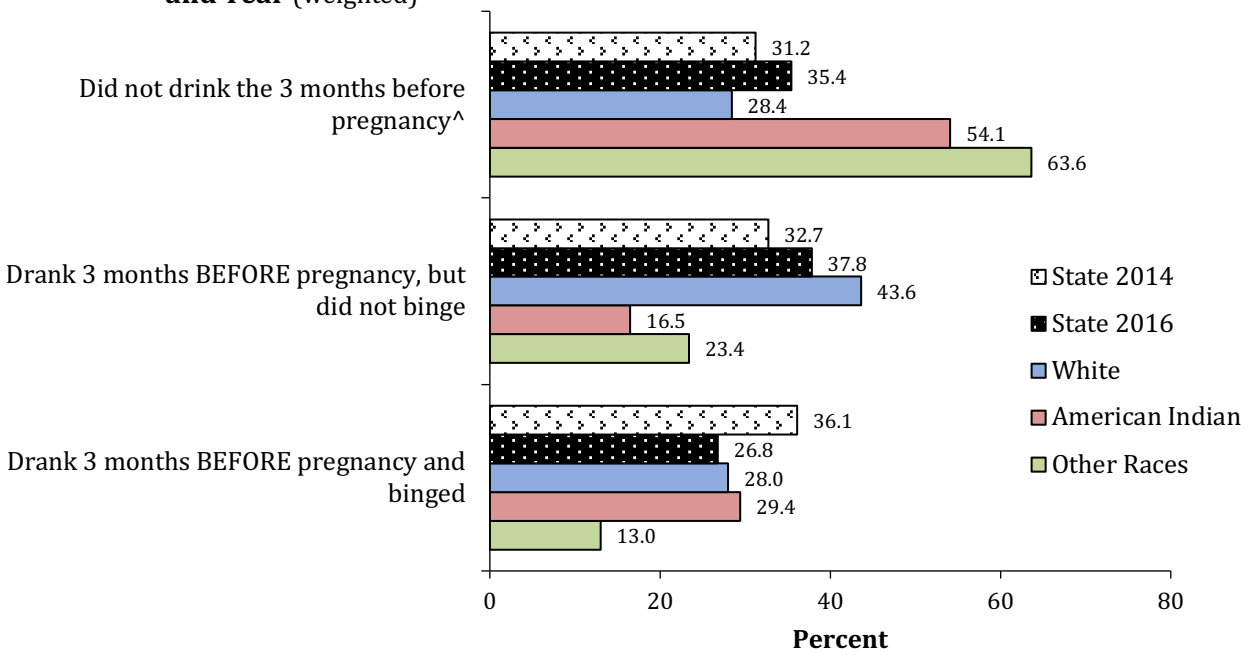
Alcohol consumption during pregnancy can have negative effects including Fetal Alcohol Syndrome (FAS) (14). FAS includes physical abnormalities, behavioral problems, learning disabilities, or below average head size, height, and weight. Since many pregnancies are unintended and often not known until late in the first trimester, it is important to reduce alcohol consumption in women of childbearing age who are at high risk of pregnancy.

Figure 10.7 shows the statewide alcohol consumption and binge drinking rates of South Dakota mothers in 2014 and 2016 during the three months ***before*** pregnancy. Statewide, 64.6% of mothers drank at some time during the three months before pregnancy; alcohol consumption with binge drinking (four or more drinks within a two-hour span) occurred in 26.8% of South Dakota mothers in 2016 dropping from 36.1% in 2014. A higher percentage of white mothers drank compared to American Indian mothers and mothers of other races (both, p<0.001), and American Indian mothers drank more than mothers of other races (p=0.003). Binge drinking was the lowest among other race mothers compared to both white and American Indian mothers (p<0.01). The prevalence of alcohol consumption the three months ***before*** pregnancy was highest among white mothers, non-Hispanic mothers, mothers aged 25 to 34 years, more educated mothers, married mothers and mothers from households with higher income levels (**Table 10.2**).

Figure 10.8 shows the statewide rates of South Dakota mothers who drank and the quantity consumed ***during*** the last three months of pregnancy. In 2014, 8.7% of mothers drank during the last three months of pregnancy compared to 7.3% in 2016. Statewide, 26.7% of mothers did not drink during the last 2 years, 66.0% drank at some time during the last two years but not during the last three months of

pregnancy, 6.1% drank less than one drink per week, 0.8% drank one to three drinks per week, and 0.4% drank four or more drinks per week during the last three months of pregnancy. The rate of binge drinking was less than 1%.

Figure 10.7. Drinking Status of South Dakota Mothers the Three Months *Before* Pregnancy by Race and Year (weighted)



Significant race differences in all three of the above categories at p<0.01 (see text)
^ Includes mothers who did not drink in the last two years

Figure 10.8. Drinking Status of South Dakota Mothers *During* the Last Three Months of Pregnancy (weighted, all races)

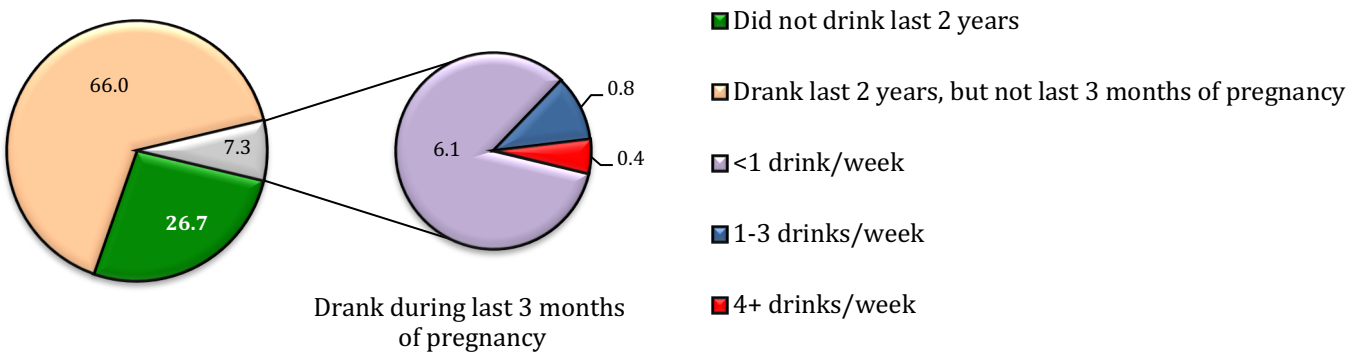
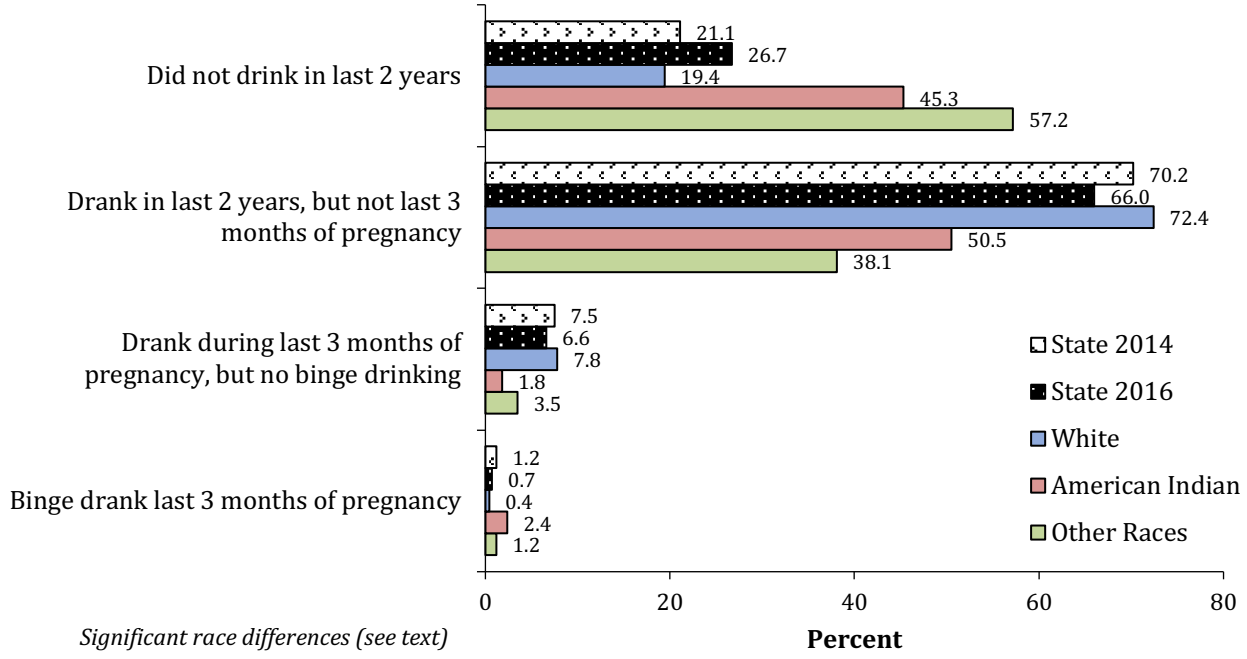


Figure 10.9 shows drinking status ***during*** the last three months of pregnancy by race. These data show that across all races, most mothers who consumed alcohol in the past two years did not drink during the last three months of pregnancy. Drinking during the last three months of pregnancy, but with no binge drinking, occurred among 7.8% of white mothers, 1.8% of American Indian mothers and 3.5% of mothers of other races (p<0.001). Drinking during the last three months of pregnancy, with binge drinking, occurred among 0.4% of white mothers, 2.4% of American Indian mothers and 1.2% of mothers of other races (p=0.006). The total percentages of mothers who drank during the last three months of pregnancy, including both those who binge drank and those who did not, were 8.2% of white mothers, 4.2% of American Indian mothers and 4.7% of mothers of other races (p=0.01).

Figure 10.9. Drinking Rates of South Dakota Mothers *During* the Last Three Months of Pregnancy by Race and Year (weighted)



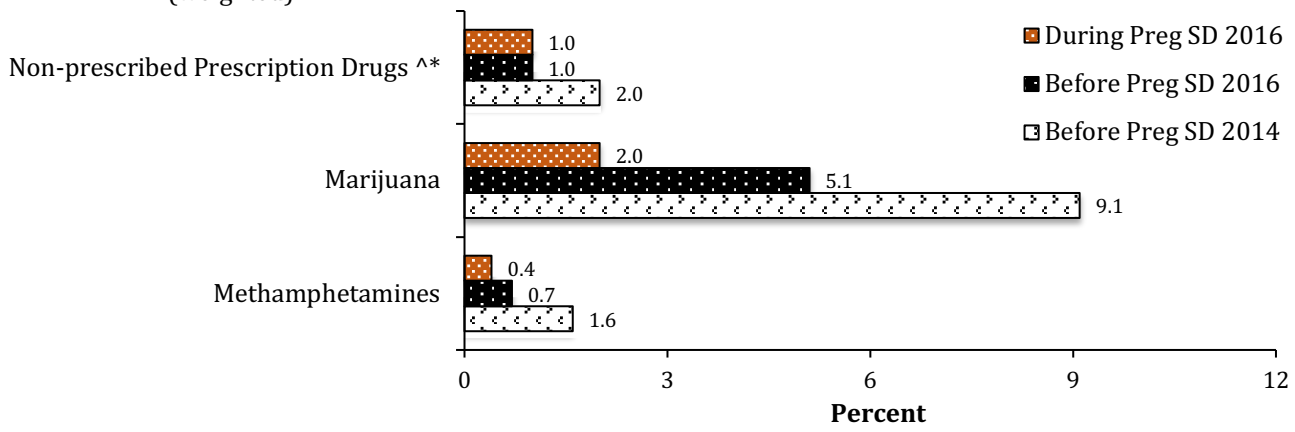
Illicit Drug Use

Illicit drug use during pregnancy leads to increased risks of adverse outcomes to the pregnant mother as well as the developing fetus. Illicit substances may cause drug dependence and addiction for the newborns, and they may exhibit withdrawal symptoms or neonatal abstinence syndrome (6, 8). Other drugs like marijuana or cocaine exhibit problems like growth defects, behavior problems, increased risk for miscarriage or still birth, heart problems, and preterm labor (8).

Figure 10.10 shows self-reported illicit drug use among South Dakota mothers. In 2014, questions about drug use were added mid-year and the results were based on partial data only. Data from 2016 indicate that 5.1% of the mothers surveyed used marijuana during the three months prior to their pregnancy, while 1.0% used non-prescribed prescription drugs and 0.7% used methamphetamines. Drug use by race is not given due to the small numbers. Use of heroin, hallucinogens, cocaine and inhalants (glue, paint, etc.) were

each less than 0.2% statewide (data not shown). The prevalence of illicit drug use either ***before*** or ***during*** pregnancy are not given by demographic characteristics due to the small numbers.

Figure 10.10. Self-Reported Drug Use Among Mothers Three Months Before and During Pregnancy (weighted)



^ Includes oxycodone, hydrocodone, & oxycontin
Heroin, hallucinogens, cocaine and inhalants (glue, paint, etc.) were <0.2% statewide.

Summary

Use of Spit Tobacco & E-Cigarette/Vaping Products

- 1.0% of South Dakota mothers used spit tobacco (chewing tobacco and snuff) the three months before pregnancy and less than 1% used it the last three months of pregnancy.
- 5.5% of South Dakota mothers used e-cigarettes or vaping products the three months before pregnancy while 1.3% used these products the last three months of pregnancy.
- The prevalence of using e-cigarettes or vaping products the three months before pregnancy was highest among American Indian mothers, younger mothers, unmarried mothers, low income mothers, and mothers from Rapid City or southeastern South Dakota.

Cigarette Smoking

- 28.4% of mothers smoked cigarettes in the last two years, 25.5% smoked the three months before pregnancy, 13.3% smoked during the last three months of pregnancy, and 16.0% smoked at the time of survey completion.
- Although American Indian mothers were more likely to smoke cigarettes the three months before pregnancy than white mothers (54.3% vs. 20.4%), among those who smoked American Indian mothers were more likely to quit when they found out they were pregnant compared to white mothers (51.7% vs. 35.5%, respectively).
- Among mothers who smoked three months before pregnancy, the top things that made smoking hard to quit was cravings for a cigarette (83.9%) and loss of a way to handle stress (80.6%).
- 96.3% of South Dakota mothers did not allow smoking anywhere in their home, but this varied by race with 97.9%, 88.5%, and 95.4% of white, American Indian, and other race mothers not allowing smoking in their home.
- The prevalence of cigarette smoking the three months before pregnancy was highest for American Indian mothers, mothers in the younger age groups, less educated mothers, mothers who were not married, and mothers from lower income households.

Alcohol Use

- 64.6% of South Dakota mothers drank the three months before pregnancy and 7.3% drank during the last three months of pregnancy.
- 26.8% of South Dakota mothers had at least one episode of binge drinking the three months before pregnancy and less than 1% binge drank the last three months of pregnancy.
- The prevalence of alcohol consumption the three months before pregnancy was highest among white mothers, non-Hispanic mothers, mothers aged 25 to 34 years, more educated mothers, married mothers and mothers from households with higher income levels.

Illicit Drug Use

- 5.1% of mothers reported using marijuana the three months before pregnancy in 2016, down from an estimated 9.1% in 2014. Non-prescription drugs, including oxycodone, hydrocodone and oxycontin were reported to be used by 1.0% of mothers and methamphetamines were reported to be used by 0.7% of mothers.

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Maternal Health During Pregnancy

Chapter 11
Maternal Health During Pregnancy

Quote from 2016 SD PRAMS Mothers:

"I would like someday to see a cure for preeclampsia because my babies have been in intensive care for a long time. It is very sad to live those moments…"

Background & Public Health Implications

An infant's health at birth can be greatly affected by the mother's health during pregnancy. Health risks such as obesity, diabetes, hypertension, and depression pose threats to the health of the infant and mother. Although physical ailments are more obvious, mental health is also a factor to consider because of the potential adverse effects for the mother and infant. In 2016, the infant mortality rate was 4.8 per 1,000 live births among South Dakota residents**.** Awareness of potential maternal health risks during pregnancy and receipt of adequate prenatal care can reduce infant mortality and other adverse outcomes for the mother and fetus. Based on 2016 vital records, 72.7% percent of South Dakota mothers received prenatal care in the first trimester (**see Section on Prenatal Care**)[*]**.** Being able to recognize health dangers or potential risks can help create a healthy life for both the mother and infant.

A high body mass index (BMI) prepregnancy and excessive weight gain during pregnancy are associated with adverse pregnancy outcomes including increased risk of maternal hypertension and increased rates of cesarean section (1). Type 1 or type 2 diabetes, as well as gestational diabetes, can lead to health concerns for the mother and baby not only during pregnancy and delivery but also for a lifetime. Women with diabetes have an increased risk of high blood pressure and preterm labor. Possible complications for the baby at delivery include low blood sugar, respiratory distress and birth trauma due to increased birthweight. In addition, the long-term concern is that gestational diabetes increases the future risk of developing Type 2 diabetes in both the mother and her infant (2).

Preeclampsia, a type of hypertension that affects pregnant mothers, is a major factor in maternal and fetal mortality. Mild preeclampsia is characterized by a blood pressure greater than 140/90 mmHg (3). Along with hypertension, preeclampsia can be diagnosed by excessive protein loss in the urine, liver and kidney dysfunction, and issues with the central nervous system such as headaches and vision problems. Preeclampsia is associated with intrauterine growth retardation (IUGR), placental abruption, and oligohydramnios (low amniotic fluid levels).

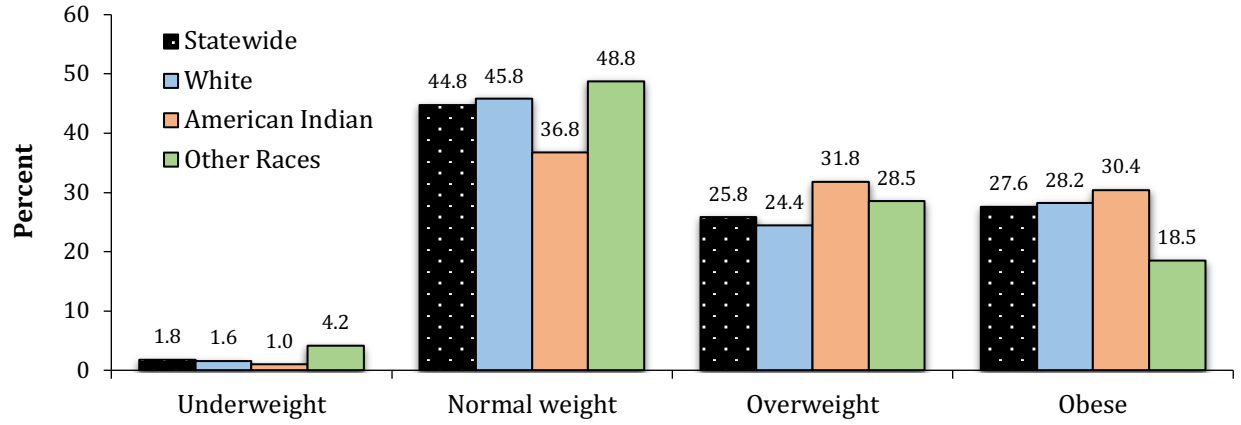
Mental health disorders such as depression, anxiety, or perceived stress can contribute to negative birth outcomes. About 23% of pregnant women in the US suffer from minor or major depression. Depression may affect the mother, developing fetus, birthing process and infant development (4). Depression can also lead to physiological complications such as intra-uterine growth restriction, low birth weight, and preterm birth (5), making it an important disorder to screen for in pregnant women.

What's Happening in South Dakota

The distribution of pre-pregnancy BMI is shown in **Figure 11.1** by race. Statewide, 53.4% of mothers were overweight or obese prior to pregnancy; American Indian mothers had the highest prevalence of overweight and obese prior to pregnancy (62.2%) and mothers of other races had the lowest (47.0%).

[*] Based on bth_prn2=(1, 2 or 3) and denominator=number known and bth_mrst=SD

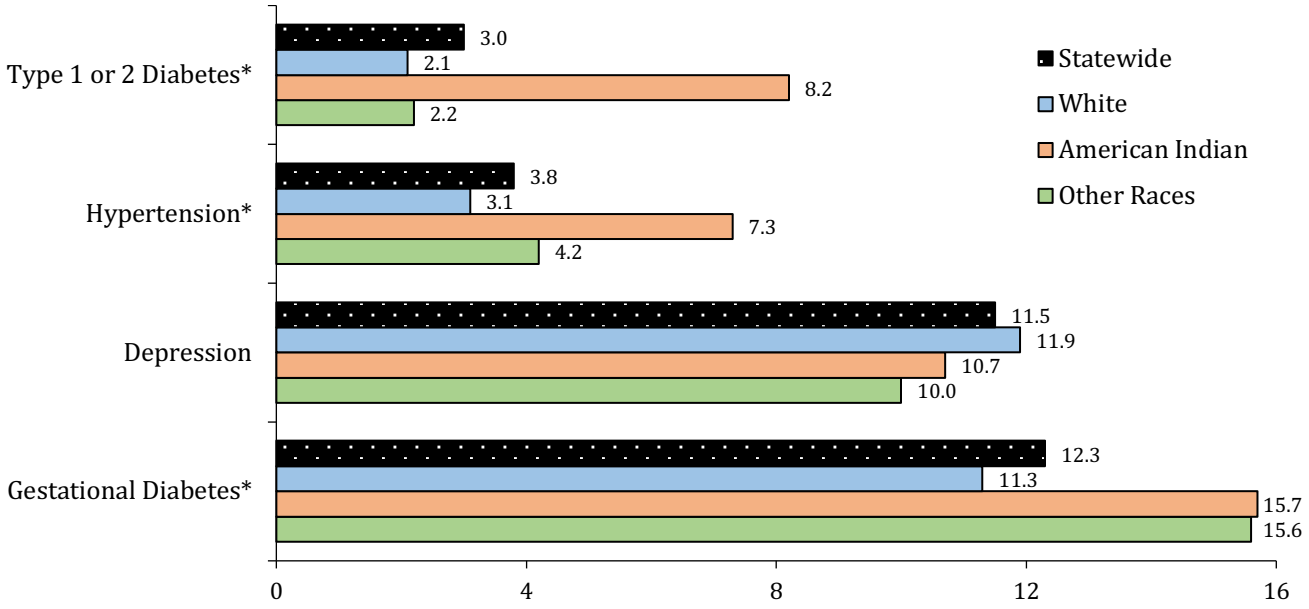
Figure 11.1. Distribution of Pre-pregnancy BMI of Mothers by Race (weighted, based on height & weight reported on survey; <18.5=underweight; 18.5-24.9=normal weight; 25-29.9=overweight; 30+=obese)*



** Significant race differences in BMI distribution*

Self-reported diagnoses of chronic diseases prior to pregnancy are shown in **Figure 11.2** by race. American Indian mothers had a higher prevalence of diabetes and hypertension prior to pregnancy, and a lower percent of white mothers were diagnosed with gestational diabetes during pregnancy.

Figure 11.2. Prevalence of Diabetes, Hypertension and Depression Prior to Pregnancy and Diagnosis of Gestational Diabetes (weighted)



** Significant race differences*

Due to the high morbidity and mortality associated with obesity, diabetes, hypertension, and depression, the prevalence of mothers reporting these conditions prior to pregnancy by demographic characteristics are shown in **Table 11.1.** A lower percentage of Hispanic mothers reported being diagnosed with depression than non-Hispanic mothers, and a higher percentage of diabetes was seen with older mothers, unmarried mothers and mothers with lower household income compared to younger mothers, married mothers and mothers with greater household income.

Table 11.1. Percent Obese and Mothers Self-reporting a Diagnosis of Diabetes, Hypertension, or Depression Prior to Pregnancy and Development of Gestational Diabetes During Pregnancy by Demographic Characteristics (weighted) [1]

	% Obese	% Diabetes	% Hypertension	% Depression	% Developing Gestational Diabetes
Ethnicity	**Not significant[2]**	**Not significant**	**Not significant**	**P=0.002**	**Not significant**
Hispanic	22.4% [10.4, 34.4]	1.3% [0, 3.5]	6.0% [0, 12.6]	3.1% [0.3, 5.9]	18.8% [7.3, 30.3]
Non-Hispanic	27.9% [24.8, 31.0]	3.0% [2.0, 4.1]	3.7% [2.5, 5.0]	11.9% [9.6, 14.2]	12.0% [9.8, 14.1]
Age (years)	**Not significant**	**P=0.03**	**Not significant**	**Not significant**	**Not significant**
<20	16.6% [8.8, 24.5]	4.2% [0, 9.2]	3.3% [0.0, 8.1]	12.0% [4.8, 19.2]	12.2% [5.0, 19.3]
20-24	28.1% [21.3, 34.8]	2.9% [0.5, 5.3]	4.5% [1.5, 7.5]	12.5% [7.7, 17.3]	9.9% [5.9, 13.9]
25-29	25.9% [20.8, 31.1]	1.7% [0.4, 3.1]	2.9% [1.3, 4.6]	12.1% [8.0, 16.1]	10.1% [6.8, 13.4]
30-34	30.2% [24.3, 36.1]	2.4% [0.8, 3.9]	4.4% [1.9, 6.8]	10.7% [6.7, 14.7]	14.9% [10.4, 19.4]
≥35	31.6% [21.9, 41.4]	8.0% [2.4, 13.7]	4.4% [0.2, 8.5]	9.6% [2.5, 16.6]	17.0% [9.2, 24.8]
Maternal Education	**Not significant**	**Not significant**	**Not significant**	**Not significant**	**Not significant**
<High School	22.4% [15.4, 29.4]	6.1% [2.5, 9.7]	5.3% [2.3, 8.3]	14.2% [8.4, 20.0]	16.6% [11.2, 22.1]
High School	32.7% [25.7, 39.6]	2.9% [0.7, 5.1]	5.6% [2.1, 9.0]	12.5% [7.5, 17.5]	10.2% [5.9, 14.4]
>High School	27.3% [23.5, 31.1]	2.4% [1.2, 3.6]	3.1% [1.7, 4.4]	10.7% [8.0, 13.5]	12.1% [9.3, 14.8]
Marital Status	**Not significant**	**P=0.02**	**Not significant**	**Not significant**	**P=0.02**
Married	26.0% [22.2, 29.8]	1.9% [0.8, 3.1]	3.4% [1.8, 5.0]	10.5% [7.8, 13.2]	14.1% [11.2, 17.0]
Not married	30.5% [25.5, 35.5]	4.8% [2.6, 6.9]	4.6% [2.7, 6.5]	13.3% [9.5, 17.1]	9.1% [6.4, 11.7]
Health Insurance Before Pregnancy[3]	**Not significant**	**^**	**Not significant**	**Not significant**	**Not significant**
Private (direct purchase)	25.4% [12.4, 38.4]	1.1% [0, 2.6]	1.3% [0.0, 3.0]	15.6% [5.2, 26.0]	18.7% [6.6, 30.7]
Job-based	27.4% [23.2, 31.6]	1.7% [0.5, 2.9]	3.3% [1.6, 4.9]	10.0% [7.1, 13.0]	10.3% [7.5, 13.0]
Medicaid	29.6% [20.0, 37.2]	7.6% [4.1, 11.1]	8.0% [4.4, 11.5]	16.7% [10.6, 22.9]	12.6% [8.3, 16.8]
Medicare	43.8% [19.8, 67.9]	9.0% [0, 25.2]	9.0% [0.0, 25.2]	6.6% [0.0, 18.7]	3.1% [0.0, 7.0]
Other	19.4% [8.2, 30.7]	--	2.2% [0.0, 6.5]	7.0% [0.0, 14.0]	11.3% [2.6, 20.0]
Uninsured	29.3% [22.6, 36.1]	5.1% [1.7, 8.4]	2.9% [0.6, 5.1]	14.2% [8.4, 20.1]	17.1% [11.7, 22.6]
Annual Household Income	**Not significant**	**P=0.04**	**Not significant**	**Not significant**	**Not significant**
<$15,000	30.9% [24.4, 37.3]	5.3% [3.0, 7.7]	6.9% [3.6, 10.3]	13.0% [8.4, 17.6]	13.8% [9.8, 17.8]
$15,001- $26,000	30.0% [24.4, 38.6]	5.2% [1.5, 8.8]	2.6% [0.0, 5.2]	14.1% [7.1, 21.1]	11.4% [5.5, 17.3]
$26,001 - $44,000	25.6% [18.3, 33.0]	0.2% [0.0, 0.5]	3.0% [0.5, 5.6]	13.8% [7.6, 19.9]	11.4% [6.3, 16.5]
$44,001 - $67,000	33.6% [25.3, 41.9]	2.1% [0.0, 4.8]	4.4% [0.9, 8.0]	13.0% [7.1, 18.9]	13.5% [7.7, 19.3]
$67,001 or more	20.8% [15.3, 26.2]	2.8% [0.4, 5.1]	2.2% [0.2, 4.3]	8.0% [4.3, 11.7]	10.5% [6.4, 14.6]
Region	**P=0.05**	**P=0.02**	**Not significant**	**Not significant**	**P=0.03**
Central	35.0% [26.3, 43.7]	3.7% [0.9, 6.6]	7.1% [2.4, 11.8]	7.7% [3.4, 12.1]	17.4% [10.3, 24.5]
Northeast	28.2% [21.0, 35.4]	1.9% [0.0, 4.0]	4.0% [0.9, 7.1]	17.4% [11.3, 23.6]	7.6% [3.9, 11.4]
Rapid City MSA	22.3% [14.9, 29.7]	5.4% [1.3, 9.5]	2.3% [0.1, 4.6]	10.8% [5.2, 16.4]	7.9% [3.6, 12.2]
Sioux Falls MSA	25.8% [20.2, 31.5]	0.8% [0.0, 1.8]	2.9% [0.8, 4.9]	11.5% [7.3, 15.7]	15.7% [11.2, 20.2]
Southeast	38.5% [27.4, 49.6]	2.4% [0.0, 5.5]	3.5% [0.0, 7.6]	9.7% [2.9, 16.5]	13.8% [6.0, 21.6]
West	21.9% [16.1, 27.7]	6.5% [2.9, 10.2]	4.8% [2.6, 7.1]	7.8% [4.0, 11.6]	10.7% [6.8, 14.6]

[1] 95% confidence intervals; ^ Unable to determine significance due to zero cells; See Figures 11.1 and 11.2 for race differences. Obesity based on BMI calculated from height & weight on survey.

[2] P-Values are for a chi-square test of association

[3] If more than one type of insurance was selected, a hierarchy was established to report the individual's insurance status. The hierarchy, in order, was: Private; Job-based (includes self or as a dependent); Other (includes military, VA, Champus & TriCare or Other); Medicaid; Medicare; Uninsured (includes IHS). For example, if an individual selected both 'Private' and 'Medicaid', the individual's insurance status was reported as 'Private'.

Summary

- 53.4% of South Dakota mothers were overweight or obese prior to pregnancy.
- American Indian mothers had 2 to 4 times the prevalence of type 1 or type 2 diabetes and hypertension than white mothers and mothers of other races.
- A higher percentage of diabetes was seen with older mothers, unmarried mothers and mothers with lower household income compared to younger mothers, married mothers and mothers with greater household income.
- 11.5% of South Dakota mothers reported being diagnosed with depression prior to pregnancy, and a higher percent of non-Hispanic reported depression than Hispanic mothers.
- 12.3% of South Dakota mothers were diagnosed with gestational diabetes, with a higher percent of American Indian mothers and mothers of other races being diagnosed than white mothers (15.7% and 15.6% vs. 11.3%, respectively).

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Breastfeeding

Chapter 12

Breastfeeding

Quotes from 2016 SD PRAMS Mothers:

"Nursing is always best for your baby. Saying a person doesn't have enough milk doesn't make sense. The more you pump/ feed your baby, the more milk your body will produce. I feel more moms (new moms) need to know this."

"Let mothers know that it is ok to not breastfeed - sometimes it doesn't work for everyone."

Background & Public Health Significance

Breastfeeding is considered to be the best method for infant feeding. According to the American Academy of Pediatrics 2012 Policy Statement, breastfeeding is stated to be a "public health issue and not only a lifestyle choice" (1). Recommendations given by the Centers for Disease Control and Prevention (CDC) state that a new mother should exclusively breastfeed for six months with continued breastfeeding for up to one year, while other foods are being introduced. Breastfeeding may continue as long as the mother desires. There are numerous benefits to breastfeeding including decreasing postpartum blood loss through increased uterine contractions. Long-term benefits for the mother may include lower risk of diabetes, ovarian cancer, and certain types of breast cancer (1). Benefits to the infant include receiving a large variety of antibodies that are in breast milk that may help infants fight off viral and bacterial infections. Additionally, human milk provides the precise amounts of proteins, carbohydrates, fats, minerals, and vitamins that are needed for optimal health, with the exception of vitamins D and K. Long-term benefits of breastfeeding for the infant may include a reduced risk of developing obesity, type 2 diabetes, infections, atopic dermatitis, and asthma later in life (1-3).

Most women in the United States are aware that breastfeeding is an optimal source of nutrition for the infant. **Table 12.1** shows the U.S. Healthy People 2020 target rates for breastfeeding. Data from the CDC 2013 and 2014 Breastfeeding Report Cards indicate that South Dakota is close to or above the national rates for the majority of breastfeeding categories, but below the U.S. Healthy People 2020 target rates (4). Additionally, these data show decreases between 2013 and 2014 in the percent of South Dakota mothers who breastfed their infants, with the percentage of mothers exclusively breastfeeding their infant at 3 months dropping from 51.9% in 2013 to 42.0% in 2014.

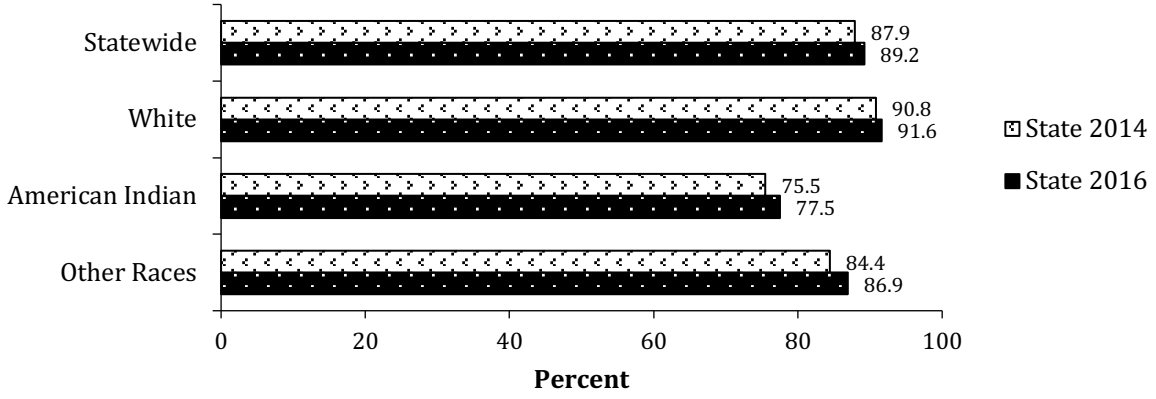
Table 12.1. Breastfeeding Rate Comparisons based on CDC Data (4)

	% Ever Breastfed	% Breastfeeding at 6 months	% Breastfeeding at 12 months	% Exclusively Breastfeeding at 3 months	% Exclusively Breastfeeding at 6 months
Healthy People 2020 Target	81.9%	60.6%	34.1%	46.2%	25.5%
CDC Breastfeeding Report Card					
US National Results					
2013	76.5%	49.0%	27.0%	37.7%	16.4%
2014	79.2%	49.4%	26.7%	40.7%	18.8%
South Dakota Results					
2013	76.2%	49.7%	31.5%	51.9%	26.3%
2014	77.7%	45.6%	18.3%	42.0%	15.9%

What's Happening in South Dakota

Based on 2016 PRAMS-like data, 89.2% of South Dakota mothers breastfed after delivery even for a short period of time, which is higher than what was reported on the 2013 and 2014 CDC Breastfeeding Report Cards. The percent of mothers who *ever breastfed or pumped breast milk to feed their baby after delivery, even for a short period of time,* in 2014 and 2016 is shown by race in **Figure 12.1** and by demographic characteristics in **Table 12.2**. Breastfeeding rates varied by race, maternal age, education, marital status, health insurance, household annual income, and region of the state, but not by ethnicity. A greater percentage of white mothers breastfed than American Indian mothers and mothers of other races. Higher percentages of mothers with a post-high school education, married mothers, and mothers with higher annual household income breastfed their infant compared to mothers with less than a high school education, mothers who were not married, and mothers with lower annual household income. A lower percentage of young mothers breast-fed compared to older mothers.

Figure 12.1. Percent of Mothers Who Ever Breastfed, Even for a Short Period of Time by Race and Year (weighted)



Reasons given by mothers for never breastfeeding are listed in **Figure 12.2** by race. Among all mothers, 'not wanting to breastfeed' was the main reason given, while 'going back to work or school' was also a main reason for mothers of other races.

A healthcare provider talked to 89.4% of mothers about breastfeeding their infant during a prenatal visit. There was no difference in the percentage of mothers who breastfed between those who were talked to by a healthcare provider (90.1%) and those who were not (85.2%) (p=0.12).

When asked if anyone suggested that the mother *not* breastfeed her new baby, 9.2% of mothers stated 'yes'. The person suggesting that the mother not breastfeed is shown in **Figure 12.3**. There were no race differences in either the percentage of mothers who had someone suggest they not breastfeed or the person who made the suggestion. There was a trend that the percentage of mothers who breastfed was lower if someone had suggested to them that they should not breastfeed (83.4%) compared to the percentage of mothers who breastfed if no one had made that suggestion (89.9%) (p=0.08).

At the time of survey completion, 69.8% of the mothers were still breastfeeding or feeding pumped milk to their infant. There were significant race differences in the percentages still breastfeeding, with 72.8% of white mothers, 52.8% of American Indian mothers, and 65.2% of mothers of other races still breastfeeding (p<0.001).

Table 12.2. Percent of Mothers Who Ever Breastfed, Even for a Short Period of Time, by Demographic Characteristics (weighted) [1]

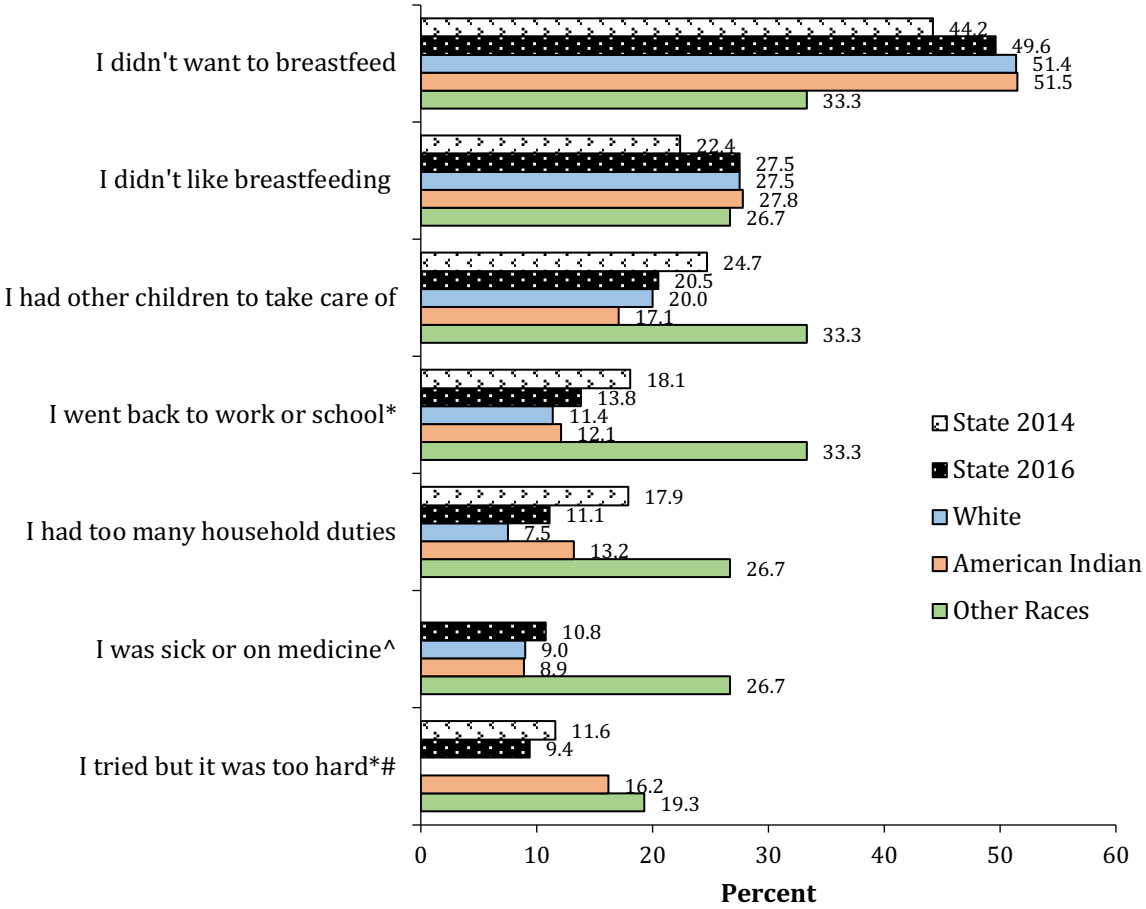
	% Breastfed
Race	**P<0.001**[2]
White	91.6% [89.2, 94.0]
American Indian	77.5% [73.2, 81.8]
Other Races	86.9% [83.3, 90.4]
Ethnicity	**Not significant**
Hispanic	91.6% [83.5, 99.6]
Non-Hispanic	89.1% [87.1, 91.1]
Age (years)	**P<0.001**
<20	77.7% [67.7, 87.7]
20-24	85.7% [80.7, 90.8]
25-29	88.9% [85.4, 92.5]
30-34	94.2% [91.7, 96.8]
≥35	90.0% [84.3, 95.7]
Maternal Education	**P<0.001**
<High School	79.3% [73.2, 85.4]
High School	81.2% [75.2, 87.1]
>High School	93.6% [91.6, 95.5]
Marital Status	**P<0.001**
Married	92.8% [90.6, 94.9]
Not married	82.7% [78.8, 86.5]
Health Insurance Before Pregnancy[3]	**P<0.001**
Private (direct purchase)	97.4% [92.6, 100]
Job-based	91.9% [89.4, 94.4]
Medicaid	72.8% [65.3, 80.3]
Medicare	91.1% [83.6, 98.7]
Other	94.2% [88.0, 100]
Uninsured	86.3% [81.3, 91.2]
Annual Household Income	**P=0.003**
<$15,000	81.7% [77.1, 86.4]
$15,001- $26,000	85.4% [78.8, 92.0]
$26,001 - $44,000	90.1% [85.3, 94.9]
$44,001 - $67,000	89.9% [84.6, 95.1]
$67,001 or more	94.5% [91.5, 97.6]
Region	**P<0.001**
Central	89.3% [83.8, 94.7]
Northeast	87.2% [82.1, 92.2]
Rapid City MSA	88.3% [82.6, 94.1]
Sioux Falls MSA	95.6% [93.2, 97.9]
Southeast	86.4% [78.6, 94.1]
West	80.5% [74.8, 86.2]

1 95% Confidence intervals

2 P-Values are for a chi-square test of association

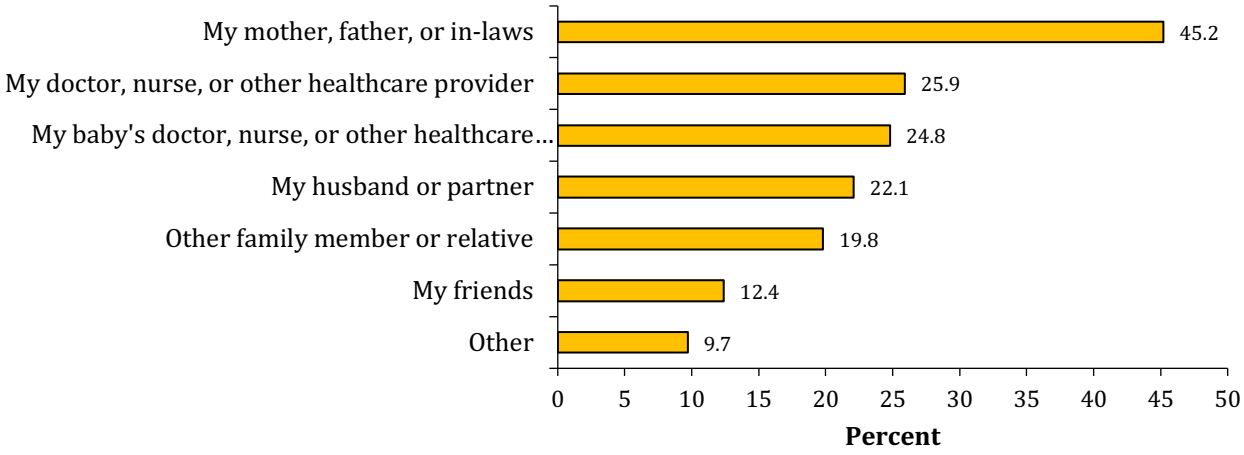
3 If more than one type of insurance was selected, a hierarchy was established to report the individual's insurance status. The hierarchy, in order, was: Private; Job-based (includes self or as a dependent); Other (includes military, VA, Champus & TriCare or Other); Medicaid; Medicare; Uninsured (includes IHS). For example, if an individual selected both 'Private' and 'Medicaid', the individual's insurance status was reported as 'Private'.

Figure 12.2. Reasons for Never Breastfeeding Among Mothers Who Never Breastfed by Race and Year (weighted, more than one reason could be checked)



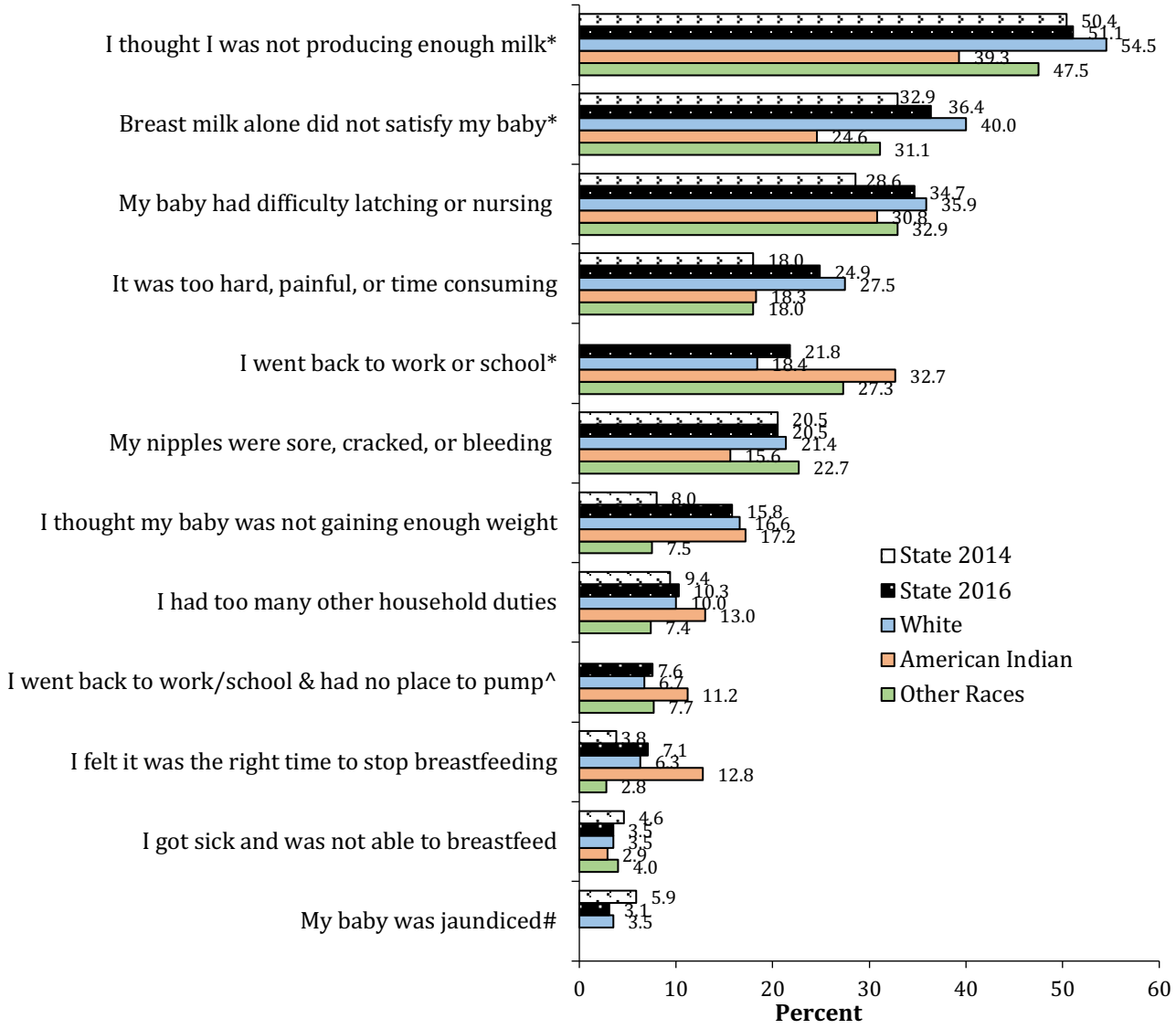
** Significant race differences; ^ Not asked in 2014; # Low number event (<3) among white mothers*
Going back to work or school and having no place to pump (1.9% statewide) or not being able to afford supplies to pump were low number events (<3 mothers) among all race groups.

Figure 12.3. Person Suggesting that the Mother Not Breastfeed Among Mothers Who had Someone Make the Suggestion (weighted, more than one reason could be checked)



Reasons for stopping breastfeeding are given in **Figure 12.4** by race. The most common reason for stopping breastfeeding was that the mother thought she was not producing enough milk to satisfy her baby. A smaller percentage of American Indian mothers stated that they thought they were not producing enough milk or that breast milk alone did not satisfy the baby compared to white mothers and mothers of other races. A smaller percent of white mothers stated that they stopped breastfeeding because they had to go back to work or school compared to American Indian mothers and mothers of other races.

Figure 12.4. Reasons for Stopping Breastfeeding by Race and Year (weighted, more than one reason could be checked)



** Significant race differences, p≤0.05. ^ Similar question was not available in 2014.*
 # Low number event for mothers of other races (LNE, n<3). Going back to work or school and not being able to afford the supplies to pump were LNE by race (1.7% statewide).

In addition to determining which demographic factors were associated with ever breastfeeding, it was also determined whether ever breastfeeding was associated with behaviors around the time of pregnancy (smoking or drinking the three months prior to pregnancy) or risk factors (BMI before pregnancy, intendedness of pregnancy, stressors, abuse during or after pregnancy, depression at the time of survey completion, or adverse childhood experiences [ACE] scores). The other factors associated with ever breastfeeding were pregnancy intendedness (**Figure 12.5**, p=0.005) and smoking the three months before pregnancy (**Figure 12.6**, p=0.03). Provision of extra breastfeeding support to mothers with unintended pregnancies, or mothers who smoked prior to pregnancy, may lead to higher statewide breastfeeding rates.

Figure 12.5. Pregnancy Intendedness by Whether or Not Mothers Ever Breastfed (weighted)

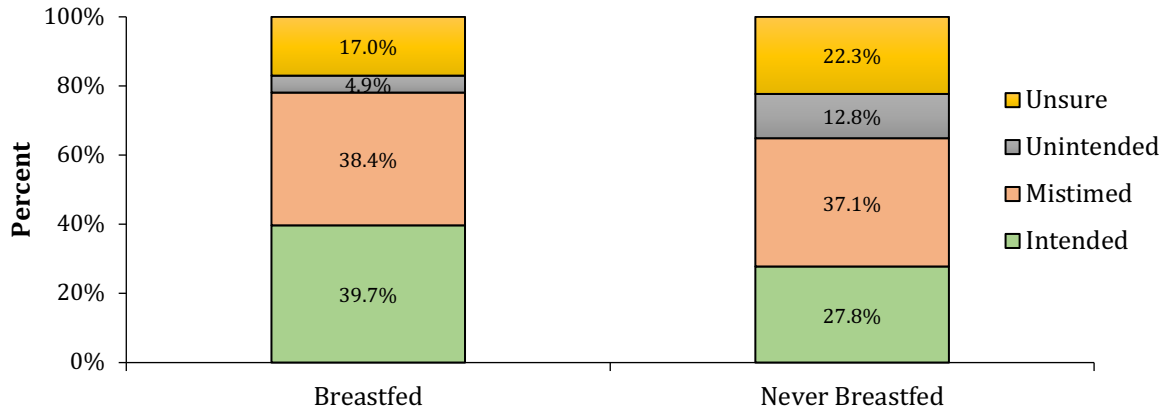
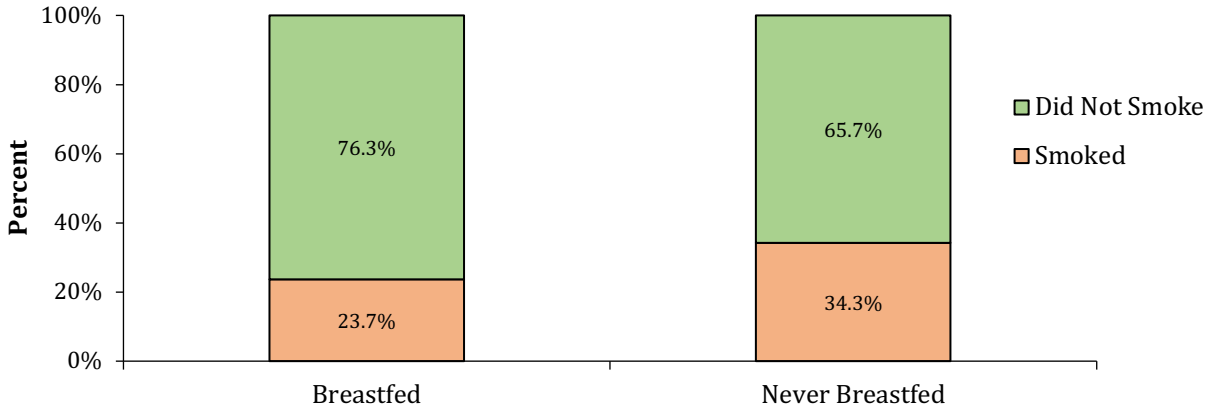


Figure 12.6. Smoking the Three Months Before Pregnancy by Whether or Not Mothers Ever Breastfed (weighted)



Summary

- 89.2% of mothers breastfed or pumped breast milk to feed their baby after delivery, even for a short period of time and this differed by race: 91.6% for white mothers, 77.5% for American Indian mothers, and 86.9% for mothers of other races.
- A greater percentage of white mothers breastfed than American Indian mothers and mothers of other races. Higher percentages of mothers with a post-high school education, married mothers, and mothers with higher annual household income breastfed their infant compared to mothers with less than a high school education, mothers who were not married, and mothers with lower annual household income. A lower percentage of young mothers breast-fed compared to older mothers.
- 9.2% of mothers had someone suggest to them that they should *not* breastfeed: 83.4% of these mothers breastfed compared to 89.9% if they did not have someone suggest not to breastfeed (borderline significant, p=0.08). Parents or in-laws were the most common person suggesting not to breastfeed.
- The main reason for not breastfeeding among all mothers was not wanting to breastfeed, while going back to work or school was also a main reason among mothers of other races.
- The main reason for stopping breastfeeding was the mother believed she was not producing enough milk (51.2%).
- A higher percent of mothers who never breastfed had an unintended pregnancy or smoked the three months before pregnancy than mothers who breastfed.

Where do we go from here?

According to a review on interventions promoting breastfeeding (5), interventions with formal breastfeeding education or individual-level professional support did not increase initiation or duration rates. However, evidence suggests that lay support may be effective in increasing short- and long-term breastfeeding rates. According to the U.S. Centers for Disease Control and Prevention, peer support groups are especially helpful in the first few days after childbirth, although many mothers benefit from long-term participation. Training is a necessary component of peer support as well as monitoring by a professional with specific training in skilled lactation care. Among other factors, access to International Board of Certified Lactation Consultants (IBCLC's) and community partnerships for making and receiving referrals are critical for successful peer support programs (6).

The South Dakota WIC Program promotes and supports breastfeeding as the optimal method for infant feeding unless breastfeeding is contraindicated. The South Dakota WIC Program receives federal dollars for South Dakota's Breastfeeding Peer Counseling Program, which is operated statewide, every day of the week. The Breastfeeding Peer Counselors help WIC moms make an educated choice of how to feed their infant, discuss common breastfeeding concerns, help work breastfeeding into a WIC mother's life, educate family and personal support groups on breastfeeding, and provide WIC moms with emotional support and encouragement during and after their pregnancy. In 2017, this program offered breastfeeding information and reassurance to approximately 2,800 pregnant and breastfeeding mothers (unpublished data). Support is provided through texting and email by seven Breastfeeding Peer Counselors located throughout the State.

To further support breastfeeding in the state, the Office of Child and Family Services has provided training opportunities for healthcare professionals working for the South Dakota Department of

Health as Certified Lactation Counselors (CLC) and International Board of Certified Lactation Counselors (IBCLC). There are currently 46 CLC- and 2 IBCLC-certified health professionals. Support groups such as the Breastfeeding Peer Counseling Program mentioned above and La Leche League will be instrumental in maintaining high breastfeeding rates. Increased referrals from physicians and professional lactation consultants to expectant and new mothers to these organizations for support and encouragement may further breastfeeding success.

In addition, the Department of Health created the Breastfeeding and Infant Mortality Team comprised of representation from the Maternal and Child Health Program, the Office of Child and Family Services, and the Office of Chronic Disease Prevention and Health Promotion. Formation of this team provided the capacity for South Dakota to further breastfeeding advocacy efforts through partnership and resource development for businesses, mothers and families, with future plans to focus on breastfeeding in healthcare and childcare facilities. One of the greatest successes is the Breastfeeding-Friendly Business Initiative which has resulted in over 390 South Dakota businesses pledging to support both their breastfeeding customers and employees. By taking the pledge, businesses are taking an active role in community support for breastfeeding families by proudly displaying a *Breastfeeding Welcome Here* window cling at their public entrances. According to the 2016 PRAMS-like survey, 89.2% of mothers in South Dakota have initiated breastfeeding surpassing the Healthy People 2020 goal of 81.9% (4). These gains are due in part to the efforts of the Department of Health.

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Postpartum Health

Chapter 13

Postpartum Health

Quote from a 2016 SD PRAMS Mother:

"I would really like to see more info about postpartum depression after the baby is born, because not only me but my boyfriend had baby blues bad."

Background & Public Health Implications

Postpartum care visits (PPCV) are important because there is an assessment of the mother's physical health and they allow for the identification of pregnancy-related issues like postpartum depression, gestational diabetes and breast health, along with providing additional information on breastfeeding (1). Early postpartum care of the mother offers opportunities for healthcare providers to assess specific behaviors and needs of the mother, which ultimately can affect infant health care. In 2009-2010, 93.2% of U.S. women reported having their infant seen by a doctor within 1 week after birth, with non-Hispanic American Indian/Alaska Native mothers having the lowest percent (89.0%) (1). The American College of Obstetricians and Gynecologists also recommends that mothers attend a postpartum visit 4 to 6 weeks after delivery (1). Only 78.6% of women with 12 or less years of education reported having a postpartum doctor's visit 4 to 6 weeks after giving birth. On the other hand, 95.1% of mothers with 16 or more years of education reported having a postpartum check-up (1).

In 2011, 14.4% of infants born in the US were admitted to the NICU (2). While reducing the number of NICU admissions is an important goal, ensuring adequate postnatal care in infants is also important. *Recommendations for Preventive Pediatric Health Care* is a comprehensive set of guidelines for pediatricians to follow for well-child care and was developed by the American Academy of Pediatrics (AAP) and Bright Futures (3). According to these guidelines, every infant should have a newborn evaluation at birth, within 48 to 72 hours after discharge from the hospital, which is typically within 3 to 5 days of birth.

Postpartum depression is an important mental health issue that affects approximately 7-13% of women (4). Left untreated, serious detriments can occur to the infant, mother, family, and society. Studies have shown that infants of mothers suffering from postpartum depression may have delayed developmental behaviors, decreased long-term growth, and increased emergency room visits (5). Depressed mothers are less likely to follow safety recommendations such as car seat use and a safe sleeping position and are more likely to cease breastfeeding early (6).

According to the U.S. Preventative Services Task Force (USPSTF), depression is among the leading causes of disability in persons 15 years and older, is common in postpartum and pregnant women, and affects not only the woman, but her child as well (6). The USPSTF found that screening improves the accurate identification of adult patients with depression in primary care settings, including pregnant and postpartum women. Due to these findings, the USPSTF recently released a recommendation for screening for depression in the general adult population, including pregnant and postpartum women. Furthermore, screenings should be implemented with adequate systems in place to ensure accurate diagnosis, effective treatment, and appropriate follow-up (6).

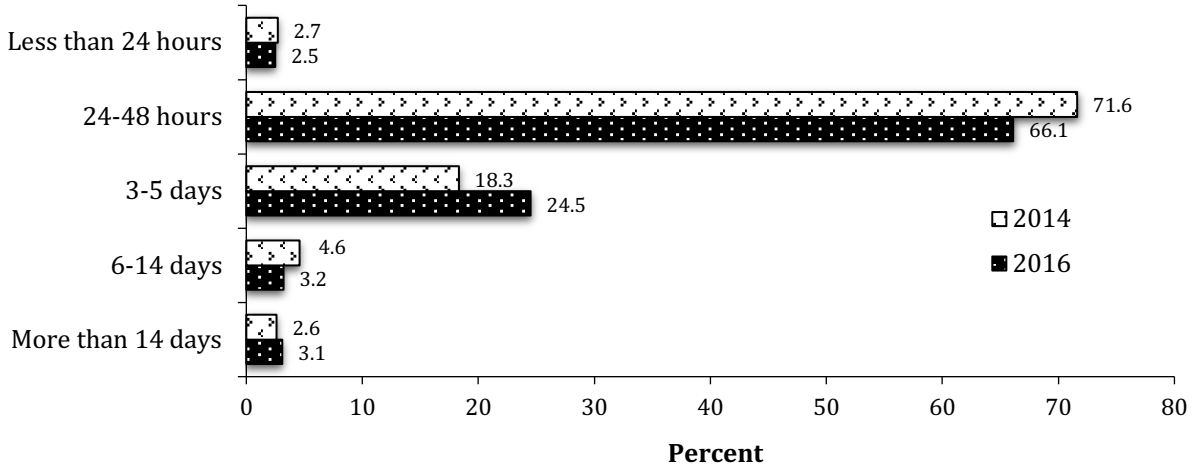
Screening for maternal postpartum depression can be conducted through a variety of screening instruments. One tool is a six-item scale developed for the CDC PRAMS, designated as the PRAMS-6. The mom answers how often she has felt or experienced six items since her new baby was born. The six questions include: 1) I felt down, depressed, or sad; 2) I felt hopeless; 3) I felt slowed down; 4) I felt panicky; 5) I felt restless; and 6) I felt fearful. A three-item subscale of the PRAMS-6 is the PRAMS-3D and includes questions 1-3 of the above. Both the PRAMS-6 and the PRAMS-3D show a moderate level of accuracy for detecting postpartum depression and are comparable to the accuracy level of the Patient Health Questionnaire-9 (PHQ-9), which has been validated in a variety of populations and languages (7).

Pediatricians and family practitioners play a pivotal role in discussing postpartum depression with mothers in order to initiate treatment as soon as possible (6). Healthcare providers can be the first individuals to provide information on supportive resources in the area for mothers (such as nurse home visitation), which can impact the health of the infant. Nurse home visitation programs positively impact infant health by decreasing child neglect and abuse and improving healthy behaviors of the mother such as cessation of smoking, especially in mothers who are young, single and/or low income (8).

What's Happening in South Dakota

In 2016, 8.6% of South Dakota mothers self-reported having their baby placed in a NICU following birth compared to 12.4% in 2014. NICU admissions in 2016 differed by race with rates of 7.0% for infants of white mothers, 14.0% for American Indian, and 13.8% for infants of mothers of other races ($p<0.001$). The length of hospital stay is shown in **Figure 13.1.**

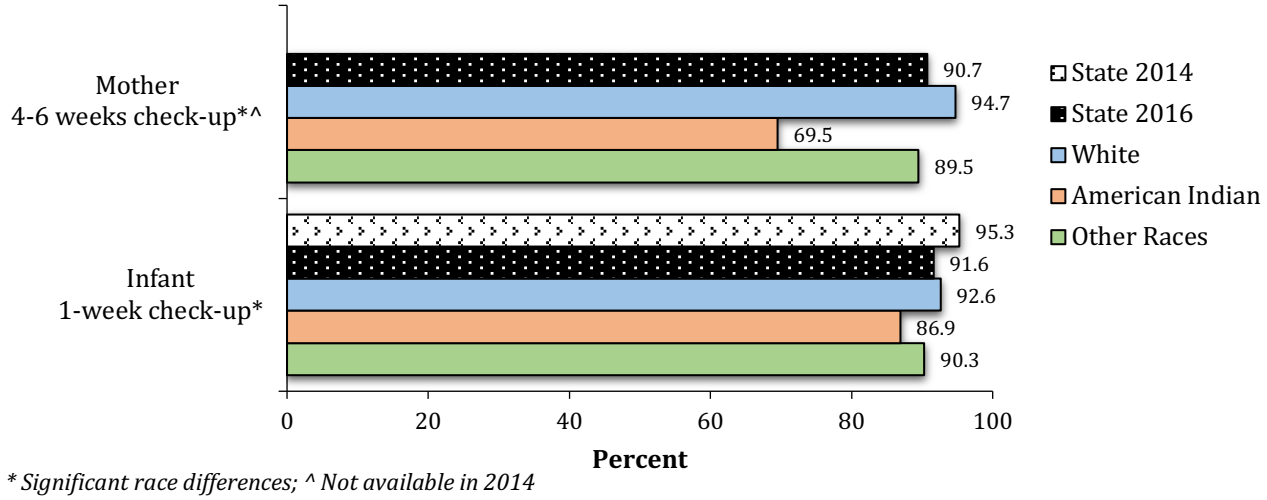
Figure 13.1. Length of Infant Hospital Stay Following Birth by Year (weighted)



Less than 0.5% born outside of hospital or still in hospital in both years.

The percentages of South Dakota infants reported to have been seen for a one-week checkup after birth and mothers who reported a postpartum visit are shown in **Figure 13.2**. Note that 4.0% of infants were still in the hospital at the time of the one-week check-up (3.9% for white, 3.7% for American Indian and 4.7% for other races).

Figure 13.2. Percent of Infants with One Week Check-up and Mothers with 4 to 6 Week Postpartum Visit by Race and Year (weighted)

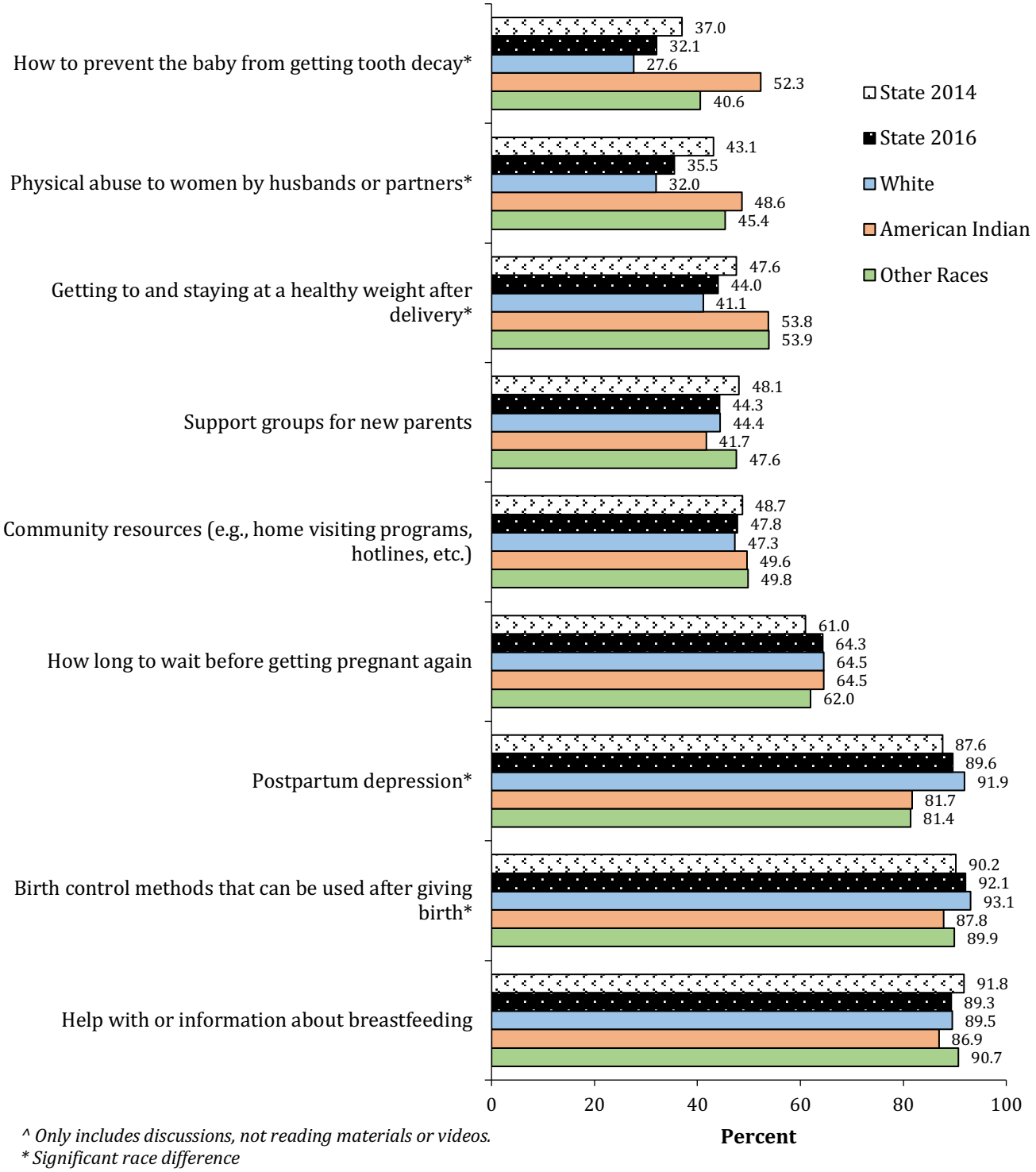


** Significant race differences; ^ Not available in 2014*

Discussion with and education of mothers on postpartum topics is important for the health of the mother as well as the health and development of the infant. **Figure 13.3** displays percentages of mothers who indicated 'Yes' to a variety of topics covered by their healthcare provider since their baby was born.

As seen in **Figure 13.3**, 89.6% of South Dakota mothers who delivered a baby in 2016 indicated that a doctor, nurse, or other health care worker talked to them about postpartum depression. Among women who attended a 4- to 6-week postpartum checkup, 92.8% were talked to about postpartum depression compared to 81.2% of the women who did not attend a 4- to 6-week postpartum visit (significant, p=0.002).

Figure 13.3. Percent of Mothers Who Indicated Topic Was Covered by a Doctor, Nurse, or Other Health Care Worker *Since* Their Baby was Born by Race and Year (weighted) ^



^ Only includes discussions, not reading materials or videos.
** Significant race difference*

Table 13.1 gives the 2016 SD PRAMS results for women's feelings and experiences following childbirth. In 2016, 18.1% of South Dakota women who delivered a baby were classified as having symptoms of postpartum depression.

Table 13.1. Components of Depression and Anxiety (weighted)

Feelings and experiences that women sometimes have after childbirth:					
	Never (1)	Rarely (2)	Sometimes (3)	Often (4)	Always (5)
I felt down, depressed or sad	34.9%	27.4%	28.0%	8.4%	1.3%
I felt hopeless	66.9%	13.9%	14.2%	3.9%	1.1%
I felt slowed down	40.3%	17.2%	29.5%	11.4%	1.6%
I felt panicky	56.8%	18.2%	16.6%	7.3%	1.1%
I felt restless	46.2%	18.9%	24.1%	8.7%	2.1%
I felt fearful	66.6%	15.6%	11.6%	5.1%	1.1%
PRAMS-3D Index for Depression[1]	18.1%				

[1] Percent of women with depression based on sum of Likert Scales for the first three feelings (sad, hopeless and slowed down). Sum greater than or equal to 9 is indicative of depression with Likert scores ranging from 1 (never) to 5 (always).

The percent of mothers with postpartum depression is given in **Table 13.2** by demographic characteristics. Depression was more common among mothers who were not married and mothers from households with lower annual incomes than among married mothers and mothers from household with higher income.

Table 13.2. Percent of Mothers with Depression as Determined from PRAMS-3D by Demographic Characteristics (weighted) [1]

	% with Depression
Race	**Not significant[2]**
White	17.4% [14.1, 20.7]
American Indian	19.4% [15.3, 23.5]
Other Races	21.9% [17.4, 26.5]
Ethnicity	**Not significant**
Hispanic	18.1% [7.4, 28.9]
Non-Hispanic	18.1% [15.4, 20.9]
Age (years)	**Not significant**
<20	24.5% [13.9, 35.0]
20-24	24.4% [18.1, 30.7]
25-29	15.5% [11.1, 19.9]
30-34	15.8% [11.0, 20.5]
≥35	16.3% [8.3, 24.3]
Maternal Education	**Not significant**
Less than High School	19.3% [12.7, 25.8]
High School	23.8% [17.2, 30.4]
More than High School	16.3% [13.1, 19.5]
Marital Status	**P<0.001**
Married	13.3% [10.4, 16.3]
Not Married	26.8% [21.8, 31.8]
Insurance Before Pregnancy[3]	**Not significant**
Private (direct purchase)	13.1% [3.3, 22.9]
Job-based	16.8% [13.2 20.3]
Medicaid	20.8% [13.9, 27.7]
Medicare	21.6% [0.3, 42.9]
Other	16.1% [5.9, 26.4]
Uninsured	24.1% [17.4, 30.9]
Annual Household Income	**P=0.01**
<$15,000	24.3% [18.4, 30.2]
$15,000- $26,000	23.6% [15.7, 31.6]
$26,001 - $44,000	22.0% [14.7, 29.2]
$44,001 - $67,000	17.8% [11.1, 24.5]
$67,001 or more	11.0% [6.8, 15.2]
Region	**Not significant**
Central	18.1% [10.9, 25.2]
Northeast	21.1% [14.5, 27.8]
Rapid City MSA	24.3% [16.6, 32.1]
Sioux Falls MSA	16.6% [11.7, 21.4]
Southeast	11.3% [4.8, 17.8]
West	15.0% [9.9, 20.1]

[1] 95% confidence intervals
[2] P-values are for a chi-square test of association;
[3] If more than one type of insurance was selected, a hierarchy was established to report the individual's insurance status. The hierarchy, in order, was: Private; Job-based (includes self or as a dependent); Other (includes military, VA, Champus & TriCare or Other); Medicaid; Medicare; Uninsured (includes IHS). For example, if an individual selected both 'Private' and 'Medicaid', the individual's insurance status was reported as 'Private'.

Summary

- 8.6% of South Dakota mothers self-reported that their infant was admitted to the neonatal intensive care unit following birth, with a greater percent of American Indian mothers and mothers of other races reporting admission than white mothers (14.0% and 13.8% vs. 7.0%, respectively).
- 90.8% of South Dakota mothers reported having a postpartum check-up and this differed significantly by race: 94.7% for white mothers, 69.6% for American Indian mothers, and 89.5% for mothers of other races.
- 91.6% of mothers reported that their baby was seen for a one-week checkup after birth and this differed significantly by race: 92.6% for whites, 86.9% for American Indians, and 90.3% for other races.
- Higher percentages of American Indian mothers and mothers of other races were talked to by their healthcare provider about how to prevent their baby from getting tooth decay, physical abuse by husbands or partners, and getting to and staying at a healthy weight compared to white mothers.
- A higher percentage of white mothers were talked to by their healthcare provider about postpartum depression and birth control methods than American Indian mothers or mothers of other races.
- 18.1% of South Dakota mothers who delivered a baby in 2016 were classified as having symptoms of depression.
- The risk of exhibiting depression symptoms was higher among unmarried mothers and mothers with low annual household incomes.

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Infant Sleep

Chapter 14
Infant Safe Sleep

Background & Public Health Implications

Placing infants to sleep in a prone position (on their stomach) has been identified as a major risk factor for SIDS (1), and the American Academy of Pediatrics (AAP) recommends that infants be placed to sleep on their backs. Because sleep position is a major risk factor for SIDS, the public health effort in reducing SIDS has focused on promoting infants sleeping on their backs. The Healthy People 2020 goal is to increase the proportion of infants who are put to sleep on their backs to 75.8% (2).

In 2015, approximately 3,700 US infant deaths occurred suddenly and unexpectedly, and these are most often referred to as Sudden Unexpected Infant Deaths (SUID). Sudden Infant Death Syndrome (SIDS), a subtype of SUID, was responsible for 1,600 of the SUID deaths in 2015 (3). Unsafe sleep-related SUIDs can occur due to suffocation by soft bedding; another person rolling on top of the sleeping infant (overlay); an infant being trapped between two objects, such as a mattress and a wall (wedging or entrapment); or strangulation due to environmental causes, for example, an infant's head getting stuck between crib railings (3).

In November of 2016, the AAP's Task Force on Sudden Infant Death Syndrome released updated recommendations for a safe sleep environment to reduce SIDS and sleep-related infant deaths related to suffocation and entrapment (4). These recommendations are for infants up to one year of age. There are 15 A-level recommendations based on results of published research considered to be of high quality. Four of the recommendations related to safe sleep practices were addressed in the PRAMS survey:

AAP Recommendation	PRAMS-like Survey Question
1. Back to sleep for every sleep.	1. In which one position do you most often lay your baby down to sleep?
2. Use a firm sleep surface.	2. In the past 2 weeks, how often has your new baby slept alone in his or her own crib or bed?
3. Keep soft objects and loose bedding away from the infant's sleep area.	3. Tell us how your new baby most often slept in the past 2 weeks… • With a blanket • With toys, cushions, or pillows… • With crib bumper pads
4. Room-sharing with the infant on a separate sleep surface is recommended.	4. When your baby sleeps alone, is his or her crib or bed in the same room where you sleep?

The recommendation regarding room-sharing should not be confused with co-sleeping, or bed-sharing. The AAP has recommended discontinuing the use of the term "co-sleeping" and instead using "room-sharing" (infant sleeping in the same room but on a separate surface) and "bed-sharing" (infant sleeping on the same surface or bed) to describe the sleep environment.

The AAP recommends putting infants solely on their back to sleep for the first year of their life, rather than on their stomach or side. This recommendation remains true for infants dealing with reflux, as sleeping on their back does not increase the risk of aspiration. Furthermore, the AAP and the North American Society for Pediatric Gastroenterology and Nutrition agree that "the risk of SIDS outweighs the benefit of prone or lateral sleep position on GER (gastroesophageal reflux)". Caregivers are recommended to continue placing infants on their back to sleep even after the infant begins to roll from front to back and back to front; although, the infant can be allowed to sleep in

the position that he or she takes after placed on their backs.

The infant's sleep surface should be firm with a fitted sheet and free from pillows, blankets/quilts and soft objects including toys, cushions, crib bumper pads. Sleeping surfaces designed for sitting, or that are at an incline, are not recommended for routine sleep. This includes, but is not limited to, car seats, swings, slings, infant carriers, and strollers. Sleeping in these devices, especially for infants less than 4 months old, can increase risk of positional asphyxiation or suffocation. It is recommended to move a sleeping infant from these devices to a flat surface as soon as possible.

Recent evidence from the AAP demonstrates that room-sharing may decrease the risk of SIDS by up to 50%. Specifically, "it is recommended that infants sleep in the parents' room, close to the parents' bed, but on a separate surface designed for infants, ideally for the first year of life, but at least for the first 6 months." The AAP suggests that room-sharing is critical the first 6 months and may facilitate the monitoring and comforting of the infant, which can in turn reduce the risk of SIDS as well as other sleep-related deaths that occur during bed-sharing (infant sharing a sleeping surface with the caregiver). The AAP specifically warns against bed-sharing and states that there is no evidence to support the use of in-bed sleepers, or sleeping devices that are designed for bed-sharing. The risk of SIDS, or unexpected infant death, is greatly increased with bed-sharing when the infant is 4 months or younger, the caregiver is a smoker or the mother smoked during pregnancy, the caregiver is using sedating medications or substances (alcohol), the caregiver is a nonparent, or when bed-sharing occurs on a soft surface or with soft bedding. These circumstances should be strictly avoided.

It is important to note that the AAP recognizes that parents may fall asleep with their infant during times of feeding or comforting. In these cases, the AAP suggests feeding the infant in bed instead of an armchair or sofa and away from any type of bedding, since couches and armchairs are high risk locations due to suffocation through entrapment or wedging between seat cushions.

What's Happening in South Dakota

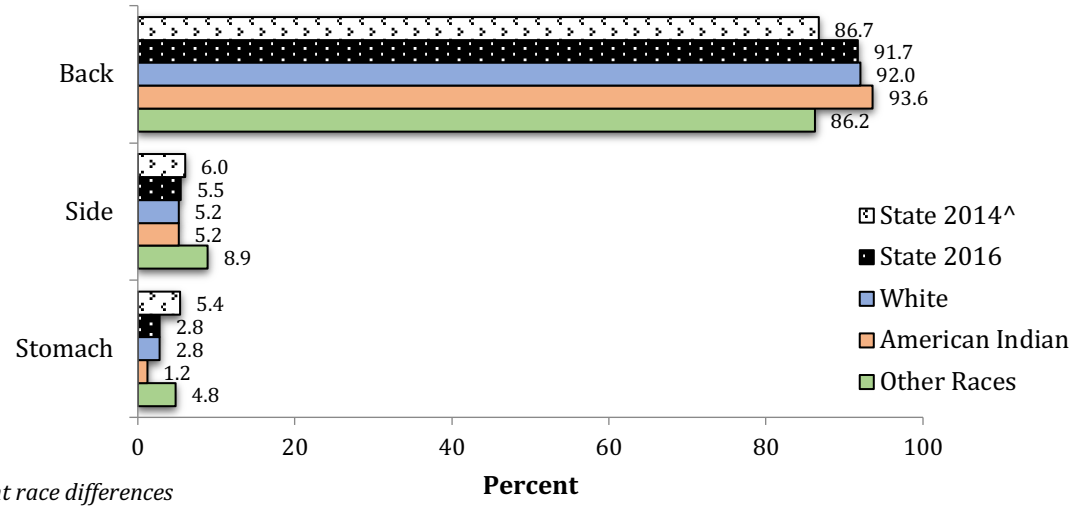
In 2016, 91.7% of South Dakota mothers reported that they most often placed their baby to sleep on his or her back, an increase from 2014 (**Figure 14.1**). This percentage differed by race (p=0.03), with 92.0% and 93.6% of white and American Indian mothers placing their infant on their back, while only 86.2% of mothers of other races reported putting their infant on his or her back.

Only 22.0% of American Indian infants and 24.3% of infants of other race mothers always sleep in their own crib or bed compared to 41.5% of white infants (**Figure 14.2**). Among those babies not sleeping in their own crib, 92.9% slept with the mother, 32.5% slept with the husband or partner and 3.6% slept with someone else. Differences by race in the distribution for who the baby sleeps with were found only for babies sleeping with the husband or partner (p=0.02), with white mothers have the highest percentage (35.9%) compared to American Indian mothers (25.0%) and mothers of other races (26.1%).

It is possible that mothers who are currently breastfeeding may be more likely to bed-share than mothers who are not breastfeeding. This was not observed, with 37.8% of breastfed infants always sleeping alone compared to 37.3% of infants who are not breastfed (p=0.9).

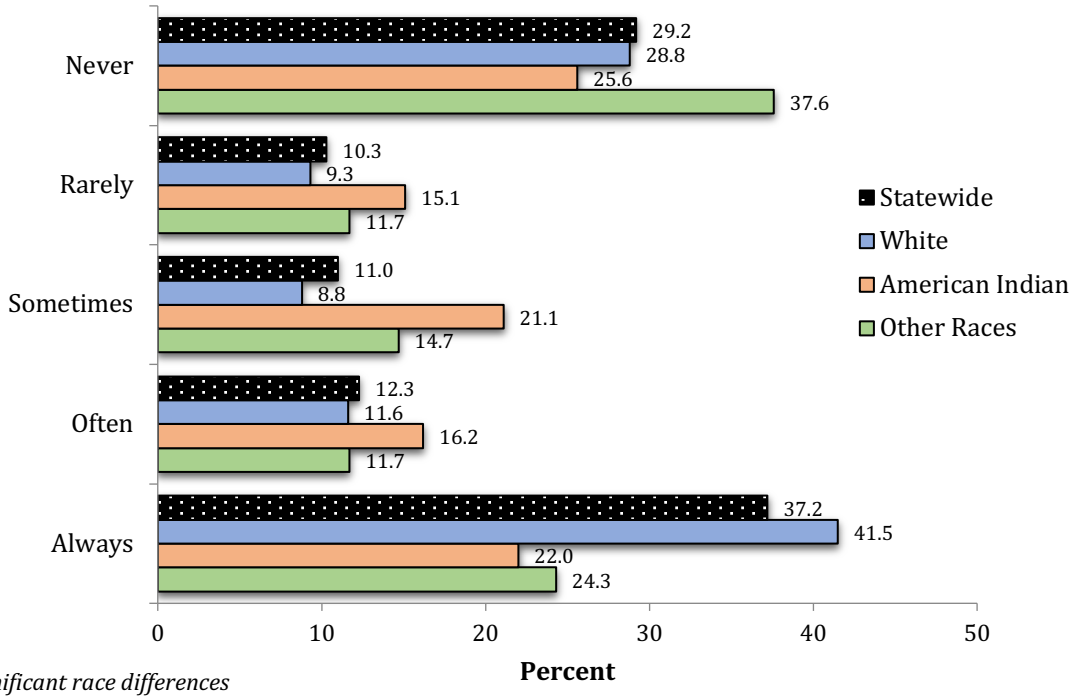
Although a crib, bassinet, or portable crib was the most common location for infants to sleep, other locations such as twin or larger mattresses, infant swings or car seats also were common (**Figure 14.3**).

Figure 14.1. Most Often Position the Infant is Laid Down to Sleep by Race and Year (weighted)*



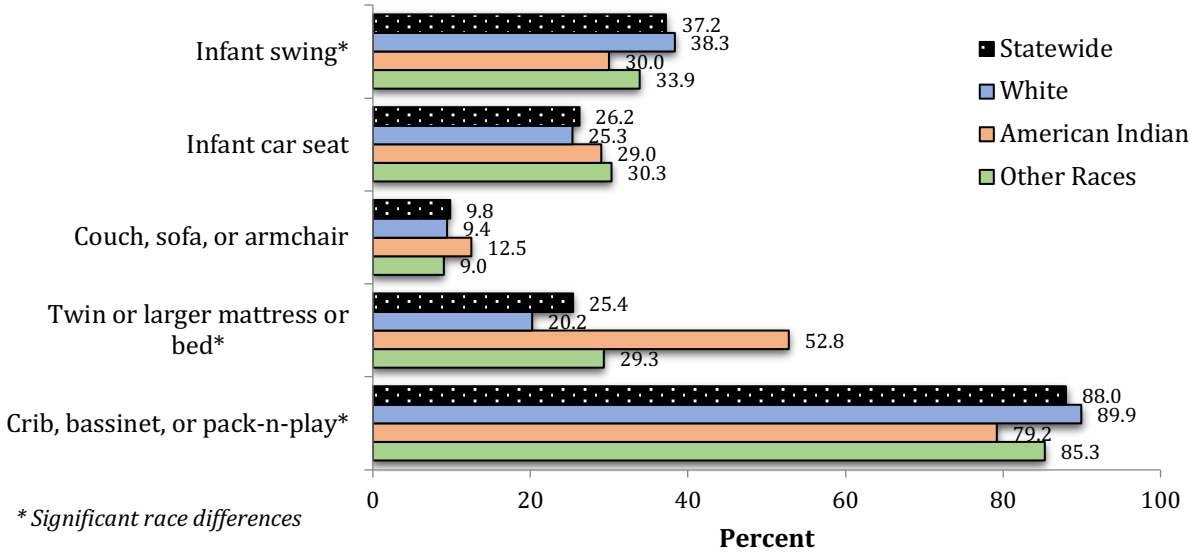
** Significant race differences*
^ In 2014, 1.9% stated multiple positions

Figure 14.2. How Often Infant Sleeps in His or Her Own Crib or Bed by Race (weighted) *



** Significant race differences*

Figure 14.3. Where the Baby Most Often Slept in the Past Two Weeks by Race (weighted; checked yes if it usually applies, no if it did not – could check more than one)



In addition to recommending that infants be placed on their back to sleep with no bed-sharing, it also is recommended that the sleep surface be free of soft objects, blankets and bedding and that there is room-sharing with the infant on a separate sleep surface. **Figure 14.4** summarizes how the infant most often sleeps. **Figure 14.5** shows the percent of infants that room-share with their mother.

Figure 14.4. How Infants Slept in the Past Two Weeks by Race (weighted; check all that apply)

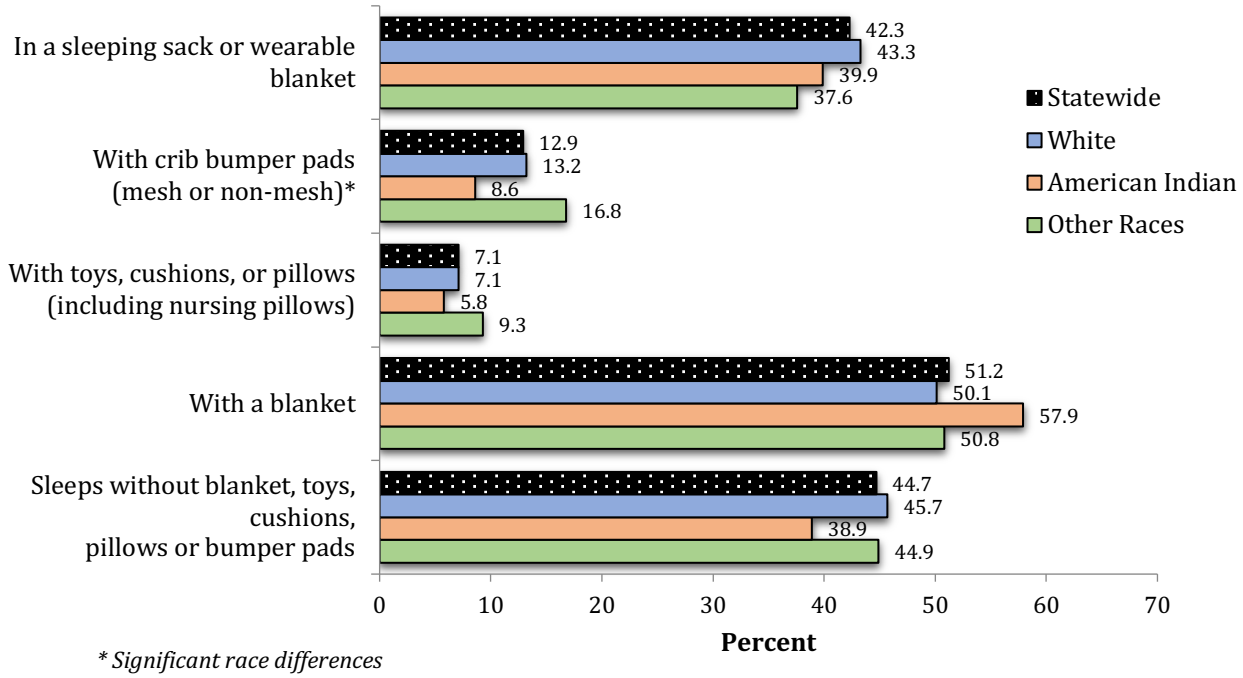
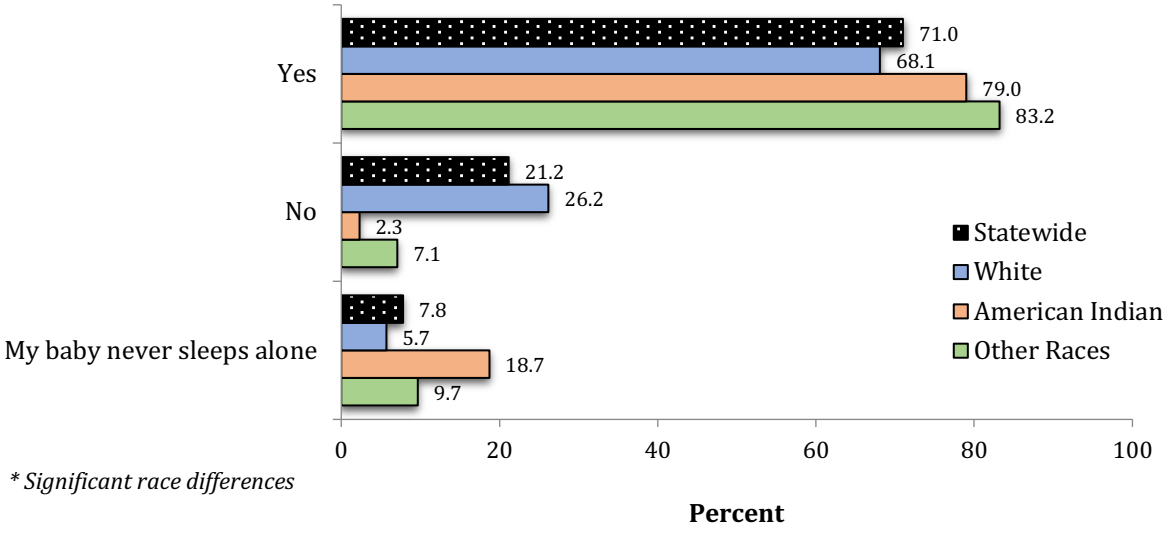


Figure 14.5. Room-sharing When the Infant Slept Alone by Race * (weighted)



** Significant race differences*

The percentages of the population meeting the four AAP recommendations by various demographic characteristics are shown in **Table 14.1** and the at-risk populations are summarized below:

1.) Infant is placed on their back to sleep (91.7% meet this recommendation). The following populations were *least* likely to meet this recommendation:
   - Mothers of other races
   - Hispanic mothers
   - Young mothers
   - Less than a high school education
   - Medicare or uninsured prior to pregnancy
   - Household income of $15-26,000 per year

2.) Infant always sleeps alone in his or her own crib (37.2% meet this recommendation). The following populations were *least* likely to meet this recommendation:
   - American Indian and other races
   - Less than a high school education
   - Not married
   - Medicaid before pregnancy
   - Household income of $15,000 or less per year.

3.) No blankets, toys, cushions, pillows or bumper pads (44.7% meet this recommendation). The following populations were *least* likely to meet this recommendation:
   - Younger mothers
   - Not married
   - Household income of $15-26,000 per year

Table 14.1. Percent of Infants Placed on Their Backs to Sleep, Who Always Sleeps Alone, Whose Sleeping Area is Free of Objects, and Who Room-share with Their Mother by Demographic Characteristics (weighted) [1]

	% Placed on Their Backs to Sleep	% Who Always Sleep Alone	% Sleeping in Area Free of Objects	% Room-Sharing with Mother
Race	**P=0.01**[2]	**P<0.001**	**Not significant**	**P<0.001**
White	92.0% [89.7, 94.3]	41.5% [37.3, 45.7]	45.7% [41.3, 50.0]	68.1% [64.1, 72.0]
American Indian	93.6% [91.1, 96.1]	22.0% [17.7, 26.2]	38.9% [33.7, 44.1]	79.0% [74.7, 83.3]
Other Races	86.2% [82.5, 89.8]	24.3% [19.8, 28.9]	44.9% [39.5, 50.4]	83.2% [79.2, 87.1]
Ethnicity	**P=0.01**	**Not significant**	**Not significant**	**Not significant**
Hispanic	79.4% [66.0, 92.8]	23.5% [11.1, 36.0]	41.0% [26.0, 56.0]	84.2% [73.2, 95.2]
Non-Hispanic	92.2% [90.4, 94.0]	38.0% [34.5, 41.4]	44.8% [41.2, 48.4]	70.2% [66.9, 73.5]
Age (years)	**Not significant**	**Not significant**	**P=0.05**	**Not significant**
<20	87.8% [79.7, 95.9]	26.3% [15.4, 37.2]	29.9% [18.2, 41.6]	77.9% [67.7, 88.1]
20-24	91.1% [86.7, 95.5]	31.4% [24.4, 38.5]	39.0% [31.6, 46.4]	74.1% [67.6, 80.7]
25-29	90.1% [86.7, 93.5]	39.0% [33.2, 44.9]	46.8% [40.6, 52.9]	70.1% [64.6, 75.7]
30-34	94.5% [91.8, 97.3]	41.2% [34.8, 47.5]	46.2% [39.6, 52.8]	69.1% [62.9, 75.2]
≥35	92.1% [86.2, 98.0]	38.8% [28.3, 49.2]	54.3% [43.6, 64.9]	68.2% [58.1, 78.4]
Maternal Education	**P=0.007**	**P<0.001**	**Not significant**	**P<0.001**
Less than High School	86.2% [80.3, 92.1]	24.8% [17.7, 31.9]	37.8% [29.7, 46.0]	82.0% [75.6, 88.4]
High School	88.0% [83.0, 93.1]	30.7% [23.6, 37.9]	40.6% [33.0, 48.2]	78.2% [71.9, 84.5]
More than High School	93.7% [91.7, 95.8]	41.7% [37.4, 45.9]	47.0% [42.6, 51.3]	66.7% [62.6, 70.8]
Marital Status	**Not significant**	**P<0.001**	**P=0.001**	**P=0.004**
Married	91.0% [88.6, 93.4]	42.6% [38.3, 46.9]	49.0% [44.6, 53.4]	67.5% [63.4, 71.6]
Not married	92.9% [90.2, 95.7]	27.2% [22.2, 32.1]	36.7% [31.3, 42.1]	77.5% [72.8, 82.1]
Insurance Before Pregnancy[3]	**P=0.005**	**P=0.02**	**Not significant**	**Not significant**
Private (direct purchase)	92.9% [86.2, 99.5]	31.9% [18.0, 45.8]	48.3% [33.1, 63.5]	81.3% [69.1, 93.4]
Job-based	94.2% [92.1, 96.3]	42.5% [37.9, 47.2]	48.4% [43.6, 53.2]	67.9% [63.5, 72.3]
Medicaid	92.4% [88.3, 96.5]	25.7% [18.7, 32.8]	43.6% [34.9, 52.3]	82.6% [76.2, 89.0]
Medicare	82.2% [62.8, 100]	33.0% [9.9, 56.1]	31.2% [10.1, 52.3]	67.7% [44.7, 90.7]
Other	82.8% [72.1, 93.5]	34.5% [21.1, 47.9]	37.4% [23.5, 51.2]	71.8% [59.3, 84.4]
Uninsured	85.7% [79.8, 91.6]	29.6% [22.2, 36.9]	35.9% [28.3, 43.5]	69.1% [61.5, 76.7]

Table 14.1. Percent of Infants Placed on Their Backs to Sleep, Who Always Sleep Alone, Whose Sleeping Area is Free of Objects and Room-share with Their Mother by Demographic Characteristics (weighted) - ***continued***

	% Placed on Their Backs to Sleep	% Who Always Sleep Alone	% Sleeping in Area Free of Objects	% Room-Sharing with Mother
Annual Household Income	**P=0.04**	**P<0.001**	**P=0.007**	**P<0.001**
$0 to $15,000	90.0% [85.9, 94.0]	22.6% [16.8, 28.3]	41.8% [34.9, 48.8]	81.8% [76.6, 87.0]
$15,001 to $26,000	85.3% [78.4, 92.3]	39.1% [29.8, 48.3]	33.7% [24.8, 42.5]	73.4% [65.0, 81.9]
$26,001 to $44,000	91.8% [87.2, 96.4]	30.9% [23.2, 38.7]	39.5% [31.2, 47.8]	74.7% [67.2, 82.2]
$44,001 to $67,000	96.0% [92.9, 99.2]	42.9% [34.3, 51.4]	46.5% [37.7, 55.2]	69.3% [61.4, 77.3]
$67,001+	93.4% [90.1, 96.8]	47.5% [40.8, 54.3]	54.2% [47.4, 61.0]	59.9% [53.3, 66.6]
Region	**Not significant**	**Not significant**	**Not significant**	**Not significant**
Central	91.4% [86.0, 96.8]	30.2% [21.2, 39.2]	38.4% [28.9, 48.0]	74.0% [65.3, 82.7]
Northeast	90.2% [85.3, 95.1]	35.7% [28.1, 43.3]	43.9% [36.0, 51.8]	75.7% [68.7, 82.6]
Rapid City MSA	92.8% [88.1, 97.4]	45.1% [36.1, 54.1]	48.0% [38.8, 57.1]	67.1% [58.6, 75.7]
Sioux Falls MSA	92.7% [89.6, 95.7]	38.2% [32.0, 44.4]	46.9% [40.4, 53.4]	70.5% [64.5, 76.5]
Southeast	93.4% [88.9, 97.9]	44.9% [33.7, 56.2]	47.9% [36.2, 59.6]	59.6% [48.6, 70.7]
West	89.3% [83.9, 94.7]	29.2% [21.8, 36.7]	40.5% [32.5, 48.5]	74.7% [67.8, 81.6]

1 95% confidence intervals

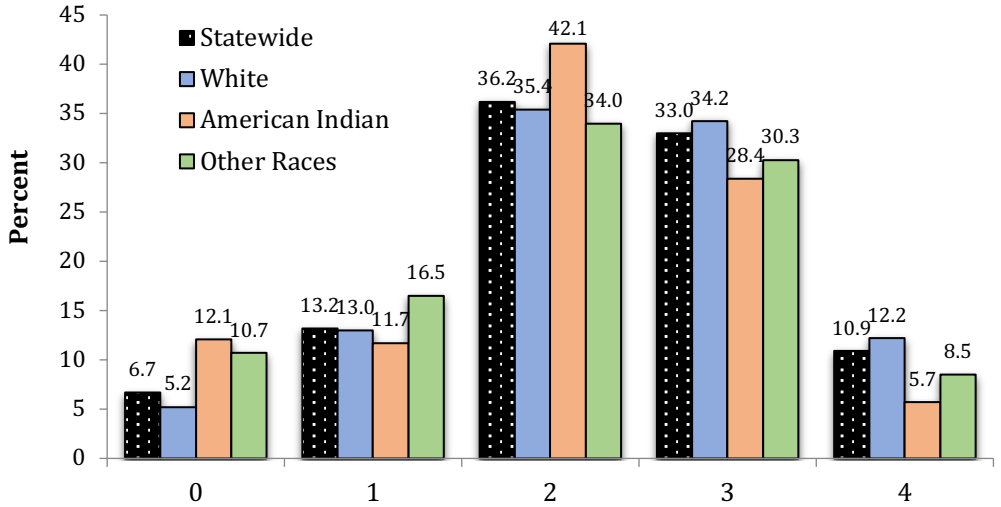
2 P-Values are for a chi-square test of association

3 If more than one type of insurance was selected, a hierarchy was established to report the individual's insurance status. The hierarchy, in order, was: Private; Job-based (includes self or as a dependent); Other (includes military, VA, Champus & TriCare or Other); Medicaid; Medicare; Uninsured (includes IHS). For example, if an individual selected both 'Private' and 'Medicaid', the individual's insurance status was reported as 'Private'.

4.) Baby's crib or bed is in the same room as the mother (71.0% meet this recommendation). The following populations were *least* likely to meet this recommendation:
   - White mothers
   - More than high school education
   - Married
   - High income

To estimate what percent of the population currently meets the AAP recommendations, we summed how many of the four recommendations were achieved for each mother. **Figure 14.6** shows the distribution of the number of recommendations that each racial group has met. The majority of South Dakota mothers have only met two of the four recommendations and only 10.9% of mothers have met all four recommendations.

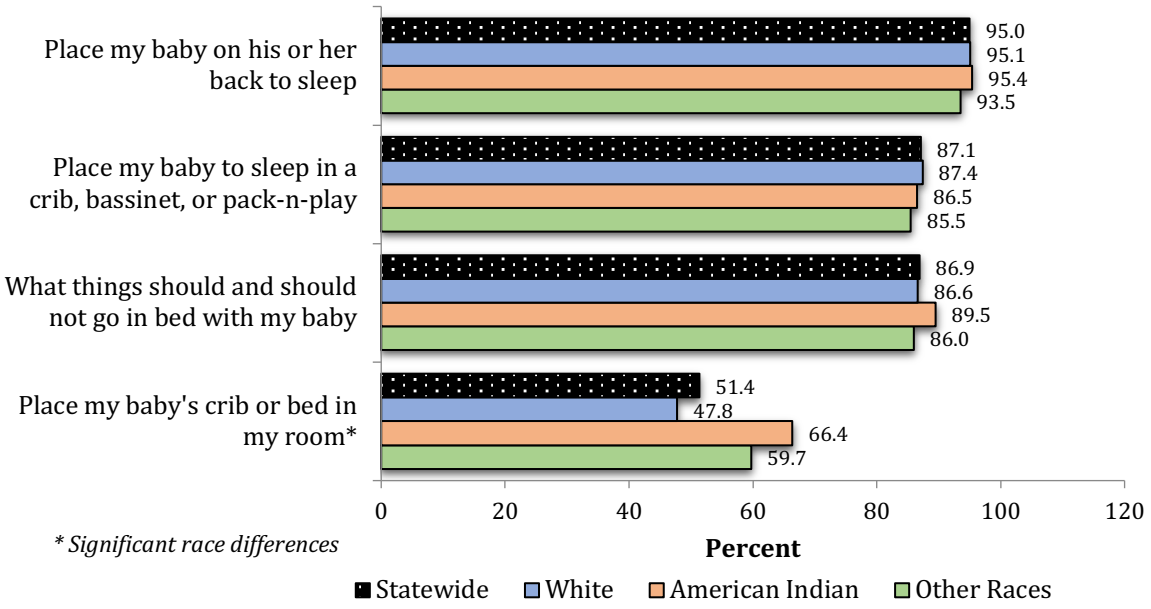
Figure 14.6. Number of AAP Sleep Recommendations that Have Been Met by South Dakota Mothers by Race * (weighted)



** Significant race differences*

Educating parents on safe and unsafe infant sleep practices is an important area to cover during pre- and postnatal care visits. Shown in **Figure 14.7**, 95.0% of South Dakota mothers reported that healthcare workers discussed back to sleep position for their infant; 87.1% reported that health care workers discussed that their baby should sleep in a crib, bassinet, or pack-n-play; 86.9% reported that health care workers discussed what things should and should not go in bed with the baby; and 51.4% reported that health care workers discussed the importance of the baby's crib or bed being placed in the mother's room.

Figure 14.7. Percent of Mothers Who Indicated Selected Sleep Safety Topics Were Covered by a Doctor, Nurse, or Other Health Care Worker by Race (weighted)



Analyses were done to determine whether the mother's behavior regarding safe sleep practices for her infant was influenced by information she reported that the healthcare provider discussed:

Placed on Back to Sleep (percentages not statistically different)**:**

92.1% of mothers who said their healthcare provider *talked* to them about the importance of their infant sleeping on their back reported putting their infant to sleep on their back.

88.6% of mothers who said their healthcare provider did *not talk* to them about the importance of their infant sleeping on their back reported putting their infant to sleep on their back.

Always Sleeps Alone (percentages not statistically different)**:**

37.2% of mothers who said their healthcare provider *talked* to them about the importance of their infant sleeping in a crib, bassinet or pack-n-play reported that their infant always slept alone.

36.0% of mothers who said their healthcare provider did *not talk* to them about the importance of their infant sleeping in a crib, bassinet or pack-n-play reported that their infant always slept alone.

Sleeps in Area Free of Objects (different at p=0.04)**:**

45.9% of mothers who said their healthcare provider *talked* to them about what should and should not go in the baby's bed reported that blankets, toys, cushions, pillows and bumper pads were not used.

34.7% of mothers who said their healthcare provider did *not talk* to them about what should and should not go in the baby's bed reported that blankets, toys, cushions, pillows and bumper pads were not used.

Infant Sleeps Alone in Same Room as Mother (Room-sharing) (different at $p<0.001$):

78.8% of mothers who said their healthcare provider *talked* to them about placing the baby's crib or bed in the mother's room reported that when the baby slept alone his or her crib or bed was in the mother's room.

62.4% of mothers who said their healthcare provider did *not talk* to them about placing the baby's crib or bed in the mother's room reported that when the baby slept alone his or her crib or bed was in the mother's room.

Summary

- 91.7% of South Dakota infants are placed to sleep on their back. This differed by race, with 92.0% and 93.6% of white and American Indian mothers placing their infant on their back compared to 86.2% of mothers of other races.
- There is a high rate of bed-sharing among South Dakota infants with only 37.2% of South Dakota mothers stating that their infant always sleeps in his or her own crib or bed. Only 22.0% of American Indian infants and 24.3% of infants of other race mothers always sleep in their own crib or bed compared to 41.5% of white infants.
- Only 44.7% of South Dakota mothers reported that their infant sleeps without blankets, toys, cushions, pillows or bumper pads despite recommendations that cribs should be free from these items.
- Room-sharing, a recent AAP recommendation, occurs with 71.0% of infants. Room-sharing is highest among mothers of other races (83.2%) and American Indian mothers (79.0%). Only 68.1% of white mothers room-share.
- Only 10.9% of South Dakota mothers meet all the four AAP recommendations for safe sleep that were asked about in the PRAMS-like survey.
- Mothers who were talked to by their healthcare provider about what should and should not go in an infant's crib or bed were more likely to have a sleep area free of blankets, cushions, etc. (45.9%) than mothers whose healthcare provider did not discuss this topic with them (34.7%).
- Mothers who were talked to by their healthcare provider about placing the crib or bed in the mother's room were more likely to have the infant's crib in her room (78.8%) than mothers whose healthcare provider did not discuss this topic with them (62.4%).

References

1. Hauck FR, Moore CM, Herman SM, Donovan M, Kalelkar M, Christoffel KK, Hoffman HJ, Rowley D. The contribution of prone sleeping position to the racial disparity in sudden infant death syndrome: The Chicago Infant Mortality Study. *Pediatrics* 110:772-780, 2002.
2. https://www.healthypeople.gov/2020/topics-objectives/topic/maternal-infant-and-child-health/objectives, accessed July, 2017
3. http://www.cdc.gov/sids/aboutsuidandsids.htm, accessed July, 2017
4. SIDS and other sleep-related infant deaths: Updated 2016 recommendations for a safe infant sleeping environment. Task Force on Sudden Infant Death. *Pediatrics* 138:e20162938, 2016.

Stress, Domestic Abuse & Social Supports

Chapter 15
Stress, Domestic Abuse, and Social Supports

Quotes from 2016 PRAMS mothers:

"My experience at the time [of] my pregnancy was a lot of fear and worry because of my age, single mother, and feeling alone a lot of the time with no support. I am glad it's over with and my baby is healthy and happy."

"With a baby, I can't work a second job because then I'd need to pay for childcare. We can't afford childcare. I am broke and lonely, hardly the best way for a new parent to be."

Background & Public Health Implications

Research suggests *stress* during pregnancy is linked to adverse health outcomes for both mother and infant. Stressful life events during pregnancy increase the risk for adverse health outcomes such as preterm delivery, low birth weight, and other developmental deficits (1-4). In relation to life stressors during pregnancy, *domestic abuse* is a particular area of concern in terms of adverse outcomes. Domestic abuse during pregnancy is linked to negative effects on maternal health, such as inconsistent access to prenatal care, insufficient weight gain, substance use, inadequate nutrition, and mental health concerns (5-7). Effects of domestic abuse on neonatal health include insufficient size for gestational age, preterm birth, low birth weight, and an increased risk of mortality (8-10).

Social support can generally be explained as resources from others which fulfill a person's emotional and logistical needs. The amount of social support a woman receives before, during, and after pregnancy can influence the outcome of the pregnancy, affecting both maternal and infant health. Research indicates social support may act as a buffer against stress and thereby reduces adverse effects of stress (11-12). Receiving satisfactory social support is associated with better health outcomes, such as lower risks of preterm birth, depression, and anxiety (13-14). Additionally, social support is a mechanism for influencing healthy behavioral changes, such as a reduction in substance use, increased confidence in parenting abilities, and an increased use of prenatal healthcare services (15-18).

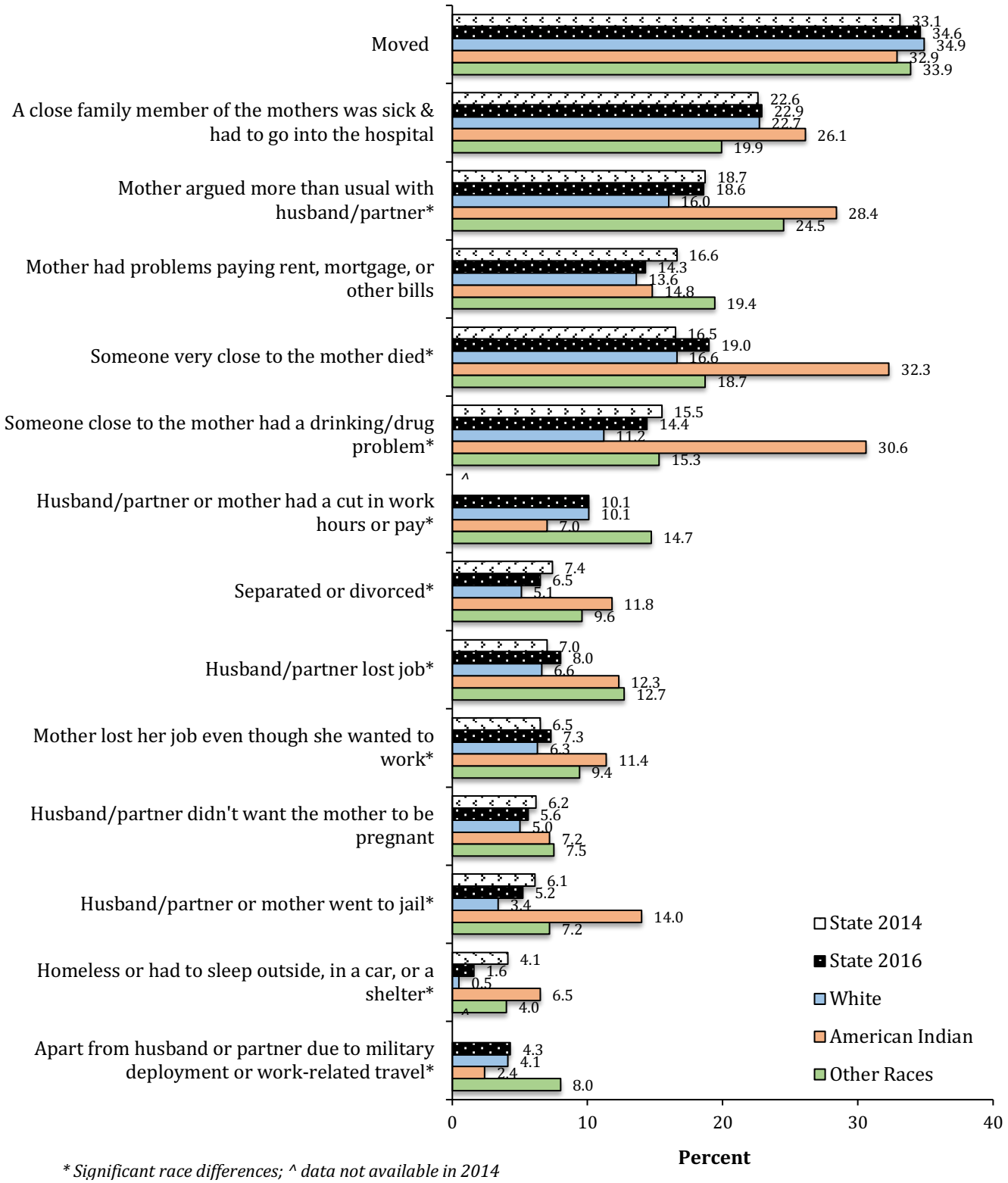
What's Happening in South Dakota

Stressful Events the Year Before Pregnancy

Pregnancy can be an incredibly stressful life event for a woman. Expectant mothers may have concerns about bodily changes, concerns over the health of the fetus, questions about one's ability to parent, as well as stress related to lifestyle changes once the baby is born. While such concerns are common and are generally positive in nature, managing stress levels during pregnancy is a crucial aspect for expectant mothers to consider.

The influence of stress upon maternal and neonatal health is related to the severity and duration of the stressor as well as the mother's coping strategy in response to the stress. From the 2016 SD PRAMS-like survey, estimates for the percent of South Dakota mothers who reported the occurrence of stressful events in the twelve months before delivery are shown in **Figures 15.1 & 15.2** by race.

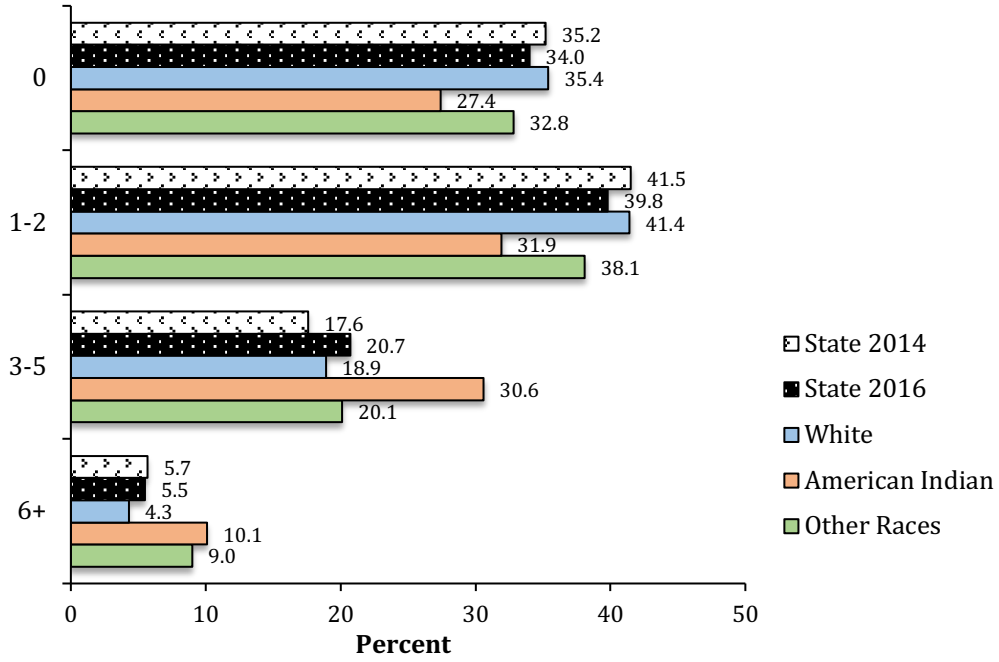
Figure 15.1. Percent of Mothers Reporting the Occurrence of Stressful Events in the 12 Months Before Delivery by Race and Year (weighted; more than one response could be checked)



** Significant race differences; ^ data not available in 2014*

American Indian mothers had the highest number of stressors, with 40.7% having three or more stressors compared to 29.1% and 23.2% of mothers of other races and white mothers, respectively.

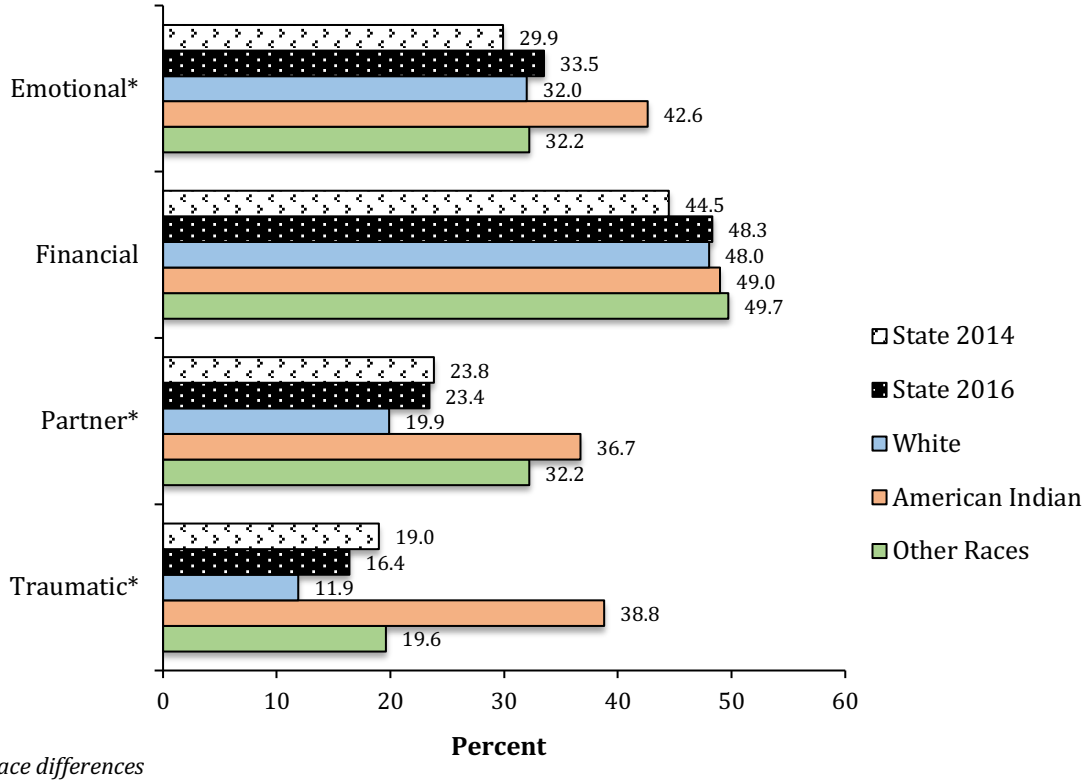
Figure 15.2. Total Number of Stressful Events Occurring in the 12 Months Before Delivery by Race and Year (weighted)



** Significant association between race and number of stressors. See Figure 15.1 for list of stressful events.*

The various types of stress are displayed in **Figure 15.3**, with financial stressors as the most reported type of stress followed by emotional stressors.

Figure 15.3. Percent of Mothers with Different Types of Stressful Events Occurring 12 Months Before Pregnancy by Race and Year [1] (weighted)

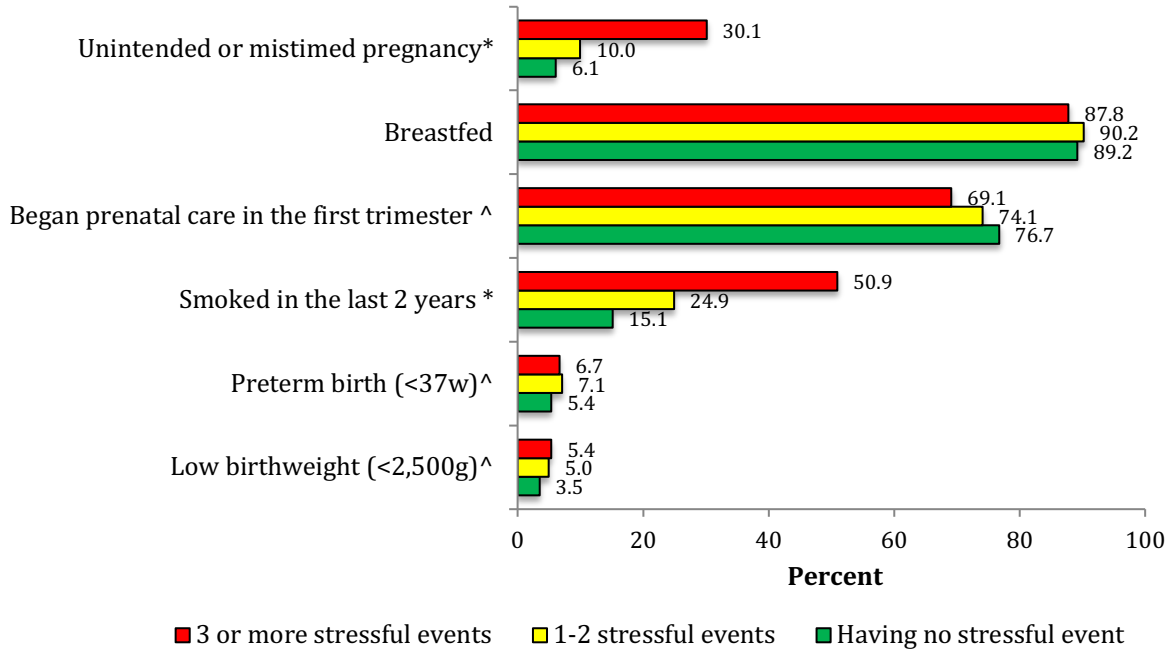


** Significant race differences*

[1] All stresses relate to the 12 months before pregnancy except partner stress which also includes physical abuse by husband or partner during pregnancy. **Emotional Stress** included 1) a close family member who was very sick and had to go to the hospital, 2) someone very close died, or 3) husband or partner was away for an extended period of time for military service or other work-related travel. **Financial Stress** included 1) moved to a new address, 2) husband or partner lost their job, 3) mother lost her job even though she wanted to go on working, 4) had a lot of bills that could not get paid, or 5) mother or husband or partner had a cut in pay or hours at work **Partner Stress** included 1) being separated or divorced from husband or partner, 2) arguing with husband or partner more than usual, 3) husband or partner not wanting mother to be pregnant, or 4) husband or partner pushing, hitting, slapping, kicking, choking or physically hurting the mother in any other way the 12 months before pregnancy or *during* pregnancy. **Traumatic Stress** included 1) being homeless, 2) husband or partner or mother going to jail, or 3) someone close to the mother having a problem with drinking or drugs. Groups based on definitions from Qobadi et al. (19), with the addition of husband or partners being away for an extended time being included under emotional stress.

Figure 15.4 shows stress, defined as at least one stressful event during pregnancy, was associated with intendedness of pregnancy and smoking in the last two years. A higher percentage of mothers with three or more stressful events had an unintended or mistimed pregnancy compared to mothers with 1-2 stressful events or no stressful events (30.1% vs. 10.0% and 6.1%, respectively), and 50.9% of mothers with 3 or more stressful events smoked in the last two years compared to 24.9% and 15.1% of mothers with 1-2 stressful events or not stressful events.

Figure 15.4. Intendedness of Pregnancy, Breastfeeding, Initiation of Prenatal Care, Smoking and Pregnancy Outcomes by Number of Stressful Events Occurring the 12 Months Before Pregnancy (weighted)



** Statistically significant; ^ Data from vital records*

Domestic Abuse Before, During and After Pregnancy

In 2016, 3.2% of South Dakota mothers reported that their husband or partner pushed, hit, slapped, kicked, choked or physically hurt them in any other way *before* pregnancy, and 2.7% reported this occurring *during* pregnancy.

The percent of mothers experiencing different types of abusive events and the numbers of abusive events are shown in **Figure 15.5 & 15.6**. In general, domestic abuse was reported more often *during* pregnancy and the husband or partner controlling daily activities was the most reported abusive event. Due to the small numbers of women reporting abuse, only statewide estimates are provided.

Figure 15.5. Domestic Abuse Events Occurring During and After Pregnancy (%) (weighted)

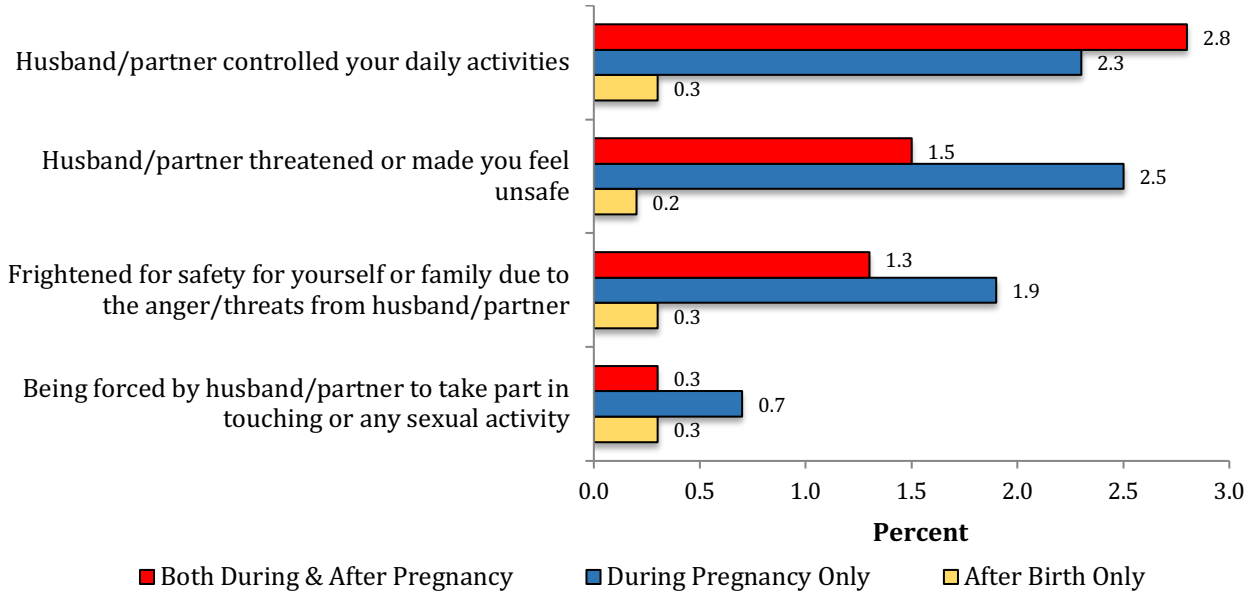
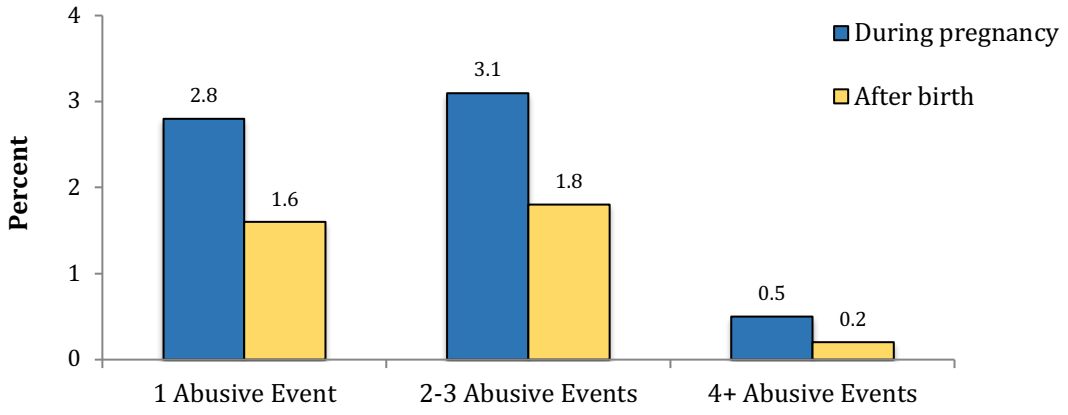


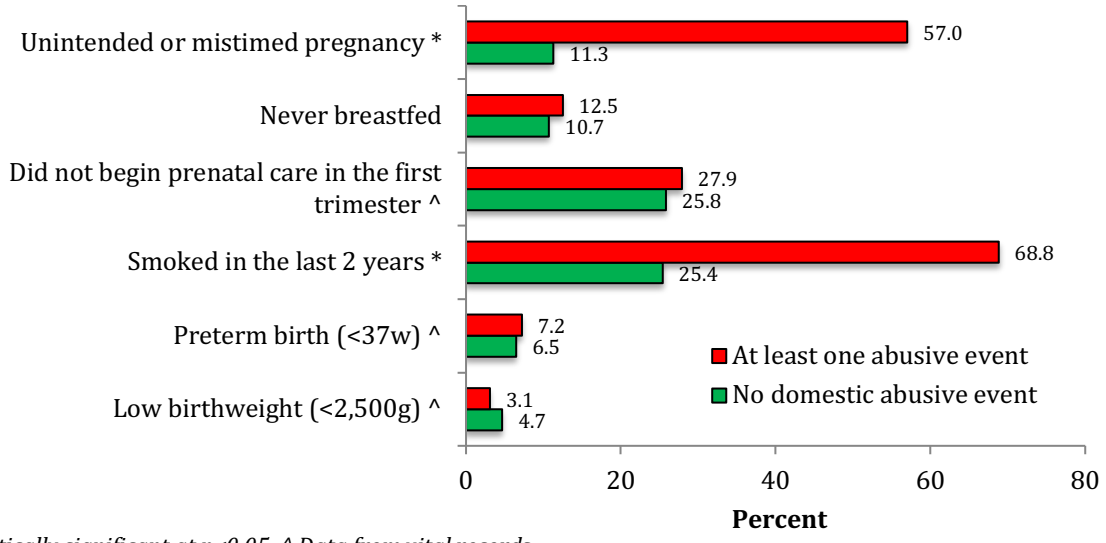
Figure 15.6. Percent of Mothers Experiencing Abusive Events Either During Pregnancy or After Birth[1] (weighted)



[1] Abusive events included 1) husband or partner threatening the mother or making her feel unsafe in some way, 2) the mother being frightened for the safety of herself or family because of the anger or threats of her husband or partner, 3) the husband or partner trying to control the mothers daily activities, and 4) the husband or partner forcing the mother to take part in touching or any sexual activity in which she did not want to participate.

The occurrence of domestic abuse during pregnancy was associated with unintended or mistimed pregnancy and smoking in the last two years (**Figure 15.7**). The rates of unintended or mistimed pregnancy, as well as smoking in the last two years, were significantly higher among mothers who reported an abusive event during pregnancy than mothers who did not.

Figure 15.7. Intendedness of Pregnancy, Breastfeeding, Initiation of Prenatal Care, Smoking and Pregnancy Outcomes by Domestic Abuse During Pregnancy (weighted)



** Statistically significant at p<0.05; ^ Data from vital records*

The percentages of women having three or more stressful events during pregnancy or having at least one abusive event either during or after pregnancy are shown in **Table 15.1** by demographic characteristics. The occurrence of three or more stressful events or having at least one abusive event during or after pregnancy was associated with one or more of the following demographic characteristics: American Indian race, younger, less educated, not married, Medicaid coverage, or lower household income.

Table 15.1. The Percent of Women Having Three or More Stressful Events During the 12 Months Before Pregnancy or Experiencing at Least One Abusive Event During or After Pregnancy by Demographic Characteristics [1] (weighted)

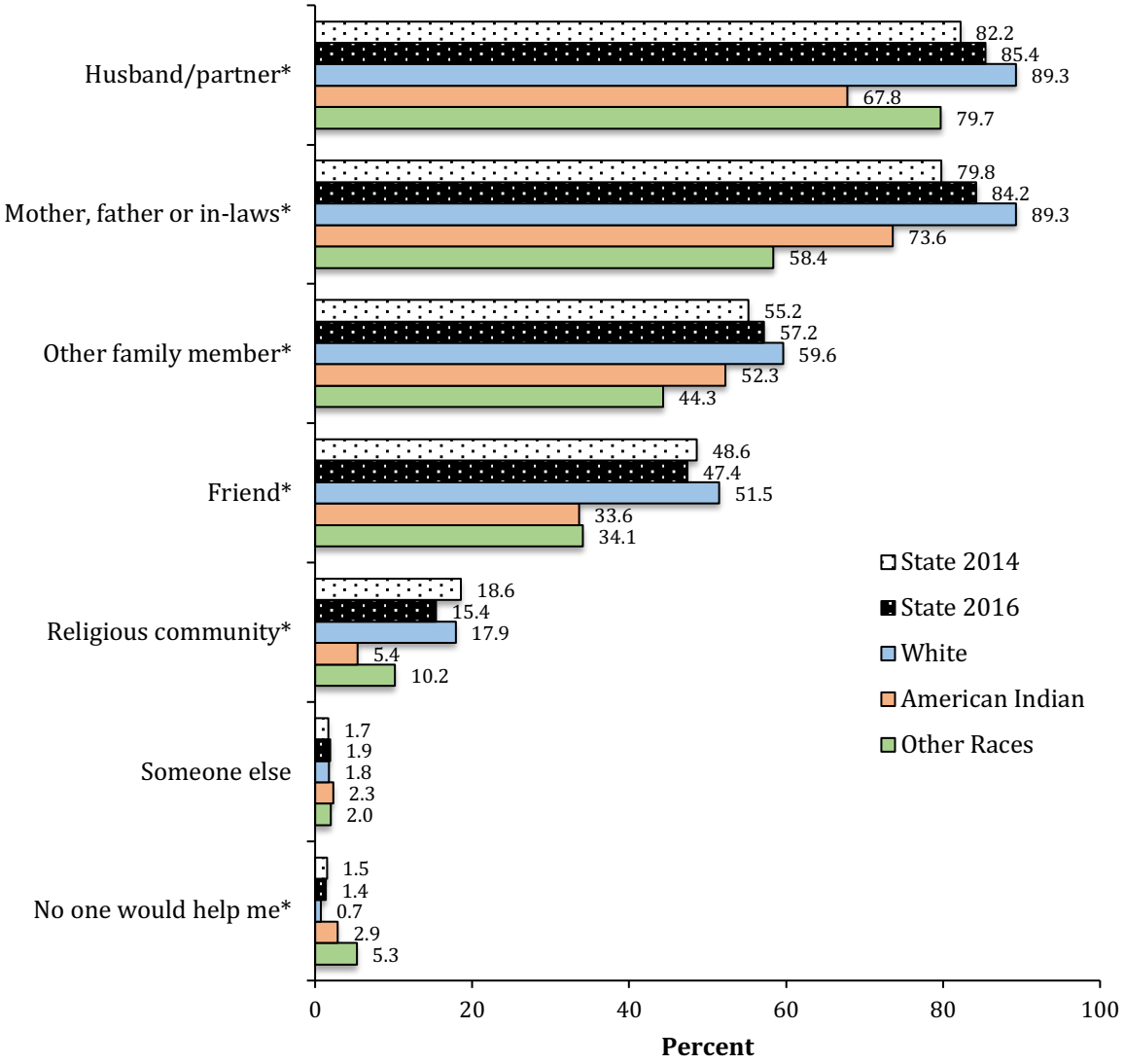
		At Least One Abusive Event:	
	3+ Stressful Events[1,2]	During Pregnancy	After Pregnancy
Race	**P<0.001 [3]**	**P<0.001**	**P<0.001**
White	23.2% [19.5, 26.8]	4.8% [2.8, 6.7]	2.4% [1.0, 3.7]
American Indian	40.8% [35.8, 45.8]	14.4% [10.8, 18.0]	9.8% [6.8, 12.9]
Other Races	29.2% [24.4, 33.9]	8.3% [5.4, 11.3]	5.5% [3.1, 7.9]
Ethnicity	**Not significant**	**Not significant**	**Not significant**
Hispanic	31.4% [17.7, 45.1]	8.7% [0.6, 16.7]	7.1% [0, 15.0]
Non-Hispanic	26.0% [23.0, 29.0]	6.4% [4.7, 8.0]	3.5% [2.4, 4.7]
Age (years)	**P<0.001**	**P=0.01**	**P<0.001**
<20	42.1% [30.4, 53.8]	14.2% [6.7, 21.6]	10.0% [3.1, 16.9]
20-24	38.6% [31.5, 45.6]	10.4% [6.1, 14.7]	7.3% [3.8, 10.8]
25-29	22.1% [17.4, 26.8]	4.0% [1.7, 6.2]	2.2% [0.6, 3.7]
30-34	19.0% [13.9, 24.1]	4.9% [2.1, 7.6]	2.2% [0.5, 4.0]
≥35	24.1% [15.2, 33.1]	6.2% [0.8, 11.5]	1.6% [0.2, 2.9]
Maternal Education	**P<0.001**	**P<0.001**	**P<0.001**
<High School	40.4% [32.4, 48.4]	15.7% [9.3, 22.1]	9.6% [4.9, 14.3]
High School	33.4% [26.4, 40.4]	7.2% [3.7, 10.7]	4.6% [1.8, 7.3]
>High School	21.2% [17.9, 24.6]	4.3% [2.6, 6.0]	2.3% [1.1, 3.5]
Marital Status	**P<0.001**	**P<0.001**	**P<0.001**
Married	17.5% [14.2, 20.7]	2.3% [1.1, 3.6]	1.7% [0.6, 2.7]
Unmarried	42.0% [36.7, 47.3]	14.0% [10.2, 17.8]	7.4% [4.8, 10.0]
Insurance Before Pregnancy [3]	**P<0.001**	**P<0.001**	**P<0.001**
Private (direct purchase)	28.0% [14.5, 41.5]	8.5% [0.3, 16.6]	1.2% [0, 2.7]
Job-based	19.3% [15.6, 22.9]	2.1% [0.8, 3.5]	1.2% [0.3, 2.1]
Medicaid	42.2% [34.1, 50.3]	18.5% [11.7, 25.4]	9.9% [5.2, 14.6]
Medicare	27.8% [5.8, 49.8]	2.2% [0, 6.2]	2.3% [0, 6.3]
Other	25.8% [13.6, 38.0]	6.9% [0, 14.3]	4.7% [0, 10.8]
Uninsured	40.5% [32.8, 47.6]	13.2% [7.8, 18.5]	8.9% [4.3, 13.4]
Annual Household Income	**P<0.001**	**P<0.001**	**P<0.001 [4]**
$0 to $15,000	50.4% [43.9, 56.9]	21.1% [15.2, 27.1]	12.1% [7.5, 16.6]
$15,001 to $26,000	34.6% [25.8, 43.3]	7.4% [2.8, 12.0]	3.7% [1.0, 6.5]
$26,001 to $44,000	28.5% [20.9, 36.1]	4.9% [1.2, 8.5]	3.5% [0.6, 6.5]
$44,001 to $67,000	19.1% [12.4, 25.9]	2.1% [0, 4.5]	1.2% [0, 2.9]
$67,001+	10.2% [6.2, 14.2]	0.7% [0, 1.8]	0%
Region	**Not significant**	**Not significant**	**P=0.04**
Central	21.2% [14.2, 28.2]	5.0% [1.9, 8.1]	2.4% [0.6, 4.2]
Northeast	28.1% [21.0, 35.3]	5.7% [1.7, 9.7]	1.1% [0, 2.6]
Rapid City MSA	34.9% [26.7, 43.2]	10.7% [5.2, 16.3]	6.3% [2.3, 10.3]
Sioux Falls MSA	21.7% [16.4, 26.9]	4.4% [1.7, 7.2]	2.9% [0.7, 5.2]
Southeast	24.0% [14.6, 33.4]	5.3% [0.2, 10.3]	4.8% [0, 9.8]
West	30.7% [23.9, 37.5]	10.2% [6.8, 13.6]	7.2% [4.3, 10.0]

[1] 95% confidence intervals
[2] P-Values are for a chi-square test of association; stressful events was coded as 0, 1-2, or 3+. Abusive events coded as yes/no.
[3] If more than one type of insurance was selected, a hierarchy was established to report the individual's insurance status. The hierarchy, in order, was: Private; Job-based (includes self or as a dependent); Other (includes military, VA, Champus & TriCare or Other); Medicaid; Medicare; Uninsured (includes IHS). For example, if an individual selected both 'Private' and 'Medicaid', the individual's insurance status was reported as 'Private'.
[4] Income $67,000+ were omitted when performing chi-square.

Social Supports After Delivery

A large percent of women had social support since the birth of their child. The main source of social support was the family. Of South Dakota mothers, 85.5% reported being able to get help from their husband or partner, and 84.3% of mothers reported being able to get help from their parents or in-laws if needed (**Figure 15.8**). A small percent (1.4%) of mothers reported having no one who could help them. A greater percent of white mothers reported having support than American Indian mothers and mothers of other races.

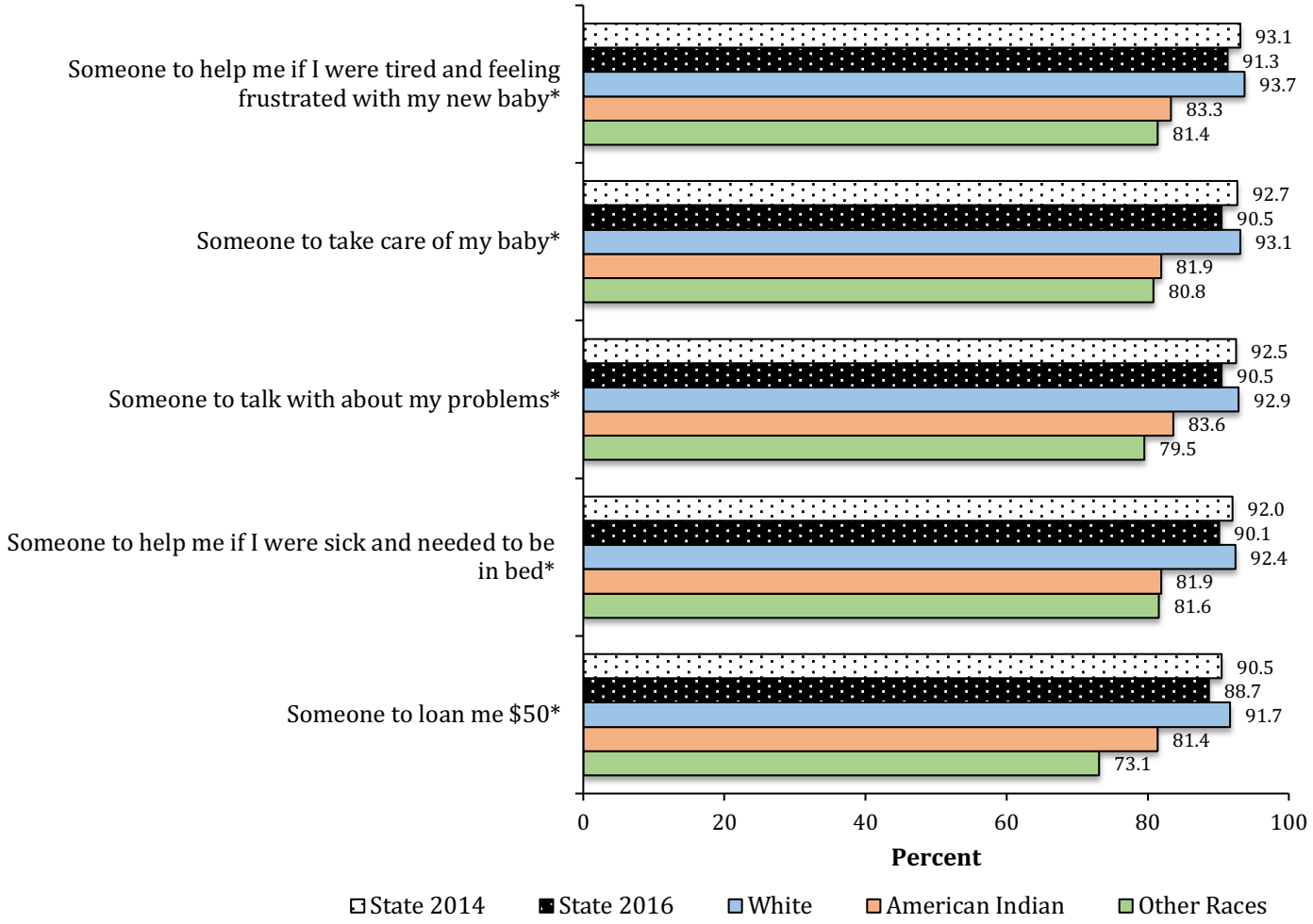
Figure 15.8. Percent of Mothers Reporting a Source of Social Support by Race and Year (weighted, mothers could check more than one source)



** Significant race differences*

More than 88% of mothers reported that they felt they had different kinds of help available if they were to need it, including financial support, someone to help them if needed, and psychological supports (**Figure 15.9**). A higher percentage of white mothers reported they had help available than American Indian mothers and mothers of other races.

Figure 15.9. Percent of Mothers Reporting the Type of Help Available Following the Birth if They Were to Need It by Race and Year (weighted, mothers could check more than one source)



** Significant race differences*

Summary

Stressful events the year prior to giving birth

- In 2016, 66.0% of mothers reported at least one stressful life event, with 26.2% reporting three or more stressors. American Indian mothers had the highest number of stressors, with 40.7% having three or more stressors compared to 29.1% and 23.2% of mothers of other races and white mothers, respectively.
- Financial stresses were the most common type of stress (48.3%), followed by emotional stresses (33.6%).
- Unintended or mistimed pregnancies were more common among mothers with three or more stressors compared to no stressors (30.1% vs. 6.1% respectively), as was smoking in the past two years (50.9% vs. 15.1%).
- Having three or more stressors was associated with the following population characteristics: being American Indian, a young maternal age, less maternal education, being unmarried, having a low household income, and either being uninsured or a Medicaid recipient.

Domestic abuse before, during and after pregnancy

- In 2016, 3.2% of South Dakota mothers were physically hurt by their husband or partner before pregnancy and 2.7% were hurt during pregnancy.
- Domestic abuse was reported more often *during* pregnancy than after pregnancy. Abusive events during, after or both during and after the pregnancy included being controlled by the husband or partner (5.4%), the husband or partner making the mother feel unsafe (4.2%), the mother being frightened for her safety or her family's safety due to anger or threats from the husband or partner (3.5%), and the mother being forced to take part in touching or any sexual activity (1.3%).
- 2.8% of mothers reporting one abusive event during pregnancy, 3.1% reporting 2-3 abusive events, and 0.5% reporting four or more abusive events during pregnancy.
- Unintended or mistimed pregnancies were more common among mothers with at least one abusive event during pregnancy compared to mothers reporting no abusive events (57.1% vs. 11.3%), as was smoking in the last two years (68.5% vs. 25.4%).
- Having at least one abusive event either during pregnancy or after pregnancy was associated with: being American Indian, a young maternal age, less maternal education, being unmarried, having a low household income, and either being uninsured or a Medicaid recipient.

Social supports after delivery

- The main source of social support was the family with 85.5% of mothers reporting they could get help from their husband or partner, and 84.3% of mothers reporting being able to get help from their parents or in-laws. A higher percentage of white mothers reported having sources of social support than American Indian mothers and mothers of other races.
- 1.4% of mothers reported having no one who would help them. A higher percent of mothers of other races had no one who would help than American Indian mothers and white mothers (5.3% vs. 2.9% and 0.7%).
- More than 88% of the mothers reported to have help available if they were to need it, including financial support, someone to help them if needed, and psychological support. A higher percentage of white mothers reported having someone to help them than American Indian mothers and mothers of other races.

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Adverse Childhood Experiences (ACEs)

Chapter 16
Adverse Childhood Experiences (ACEs)

Quote from a 2016 SD PRAMS Mother:

"I just want to add that even though I didn't have the best childhood, I want my children to grow up and live a good life. I will do my best to make sure of it. I like how this survey cares enough to ask these questions."

Background & Public Health Implications

Adverse childhood experiences (ACEs) refer to early life experiences and can be categorized into three areas: 1.) abuse, 2.) neglect, and 3.) household dysfunction. For the 2016 PRAMS survey, there are three questions related to abuse (physical, sexual, and emotional), two related to neglect (emotional and physical), and five related to household dysfunction (substance abuse in the household, parental separation or divorce, household mental illness, violence toward the mother, and incarceration of a household member). The sum of the positive answers is the ACE score.

The original ACE Study was based at Kaiser Permanente's San Diego Health Appraisal Clinic and was conducted in collaboration with the Centers for Disease Control and Prevention (CDC) (1). Data were collected via the completion of a questionnaire that included both psychological and physical findings. The study was conducted to understand and describe the correlation of ACEs to adult medical and public health issues including: disease risk and incidence, quality of life, utilization of health care services, and mortality. Data from studies indicates that ACEs are common among adults, and that having even one adverse experience correlates to higher risk for other adverse experiences (1, 2). Positive relationships have been reported between ACE scores and adult health risk behaviors and diseases including alcoholism, drug abuse, smoking, poor self-rated health, fifty or more sexual partners, sexually transmitted diseases, physical inactivity, suicide attempt, adult depression, obesity, ischemic heart disease, cancer, chronic lung disease, skeletal fractures, and liver disease (1-4).

What is happening in South Dakota

ACE scores for the 2016 SD PRAMS-like survey could not be obtained for 83 (7.3%) of the mothers: 76 refused to respond to any of the questions and 7 mothers were missing responses for six to nine of the ten questions. These individuals were not included in any of the analyses regarding ACE scores.

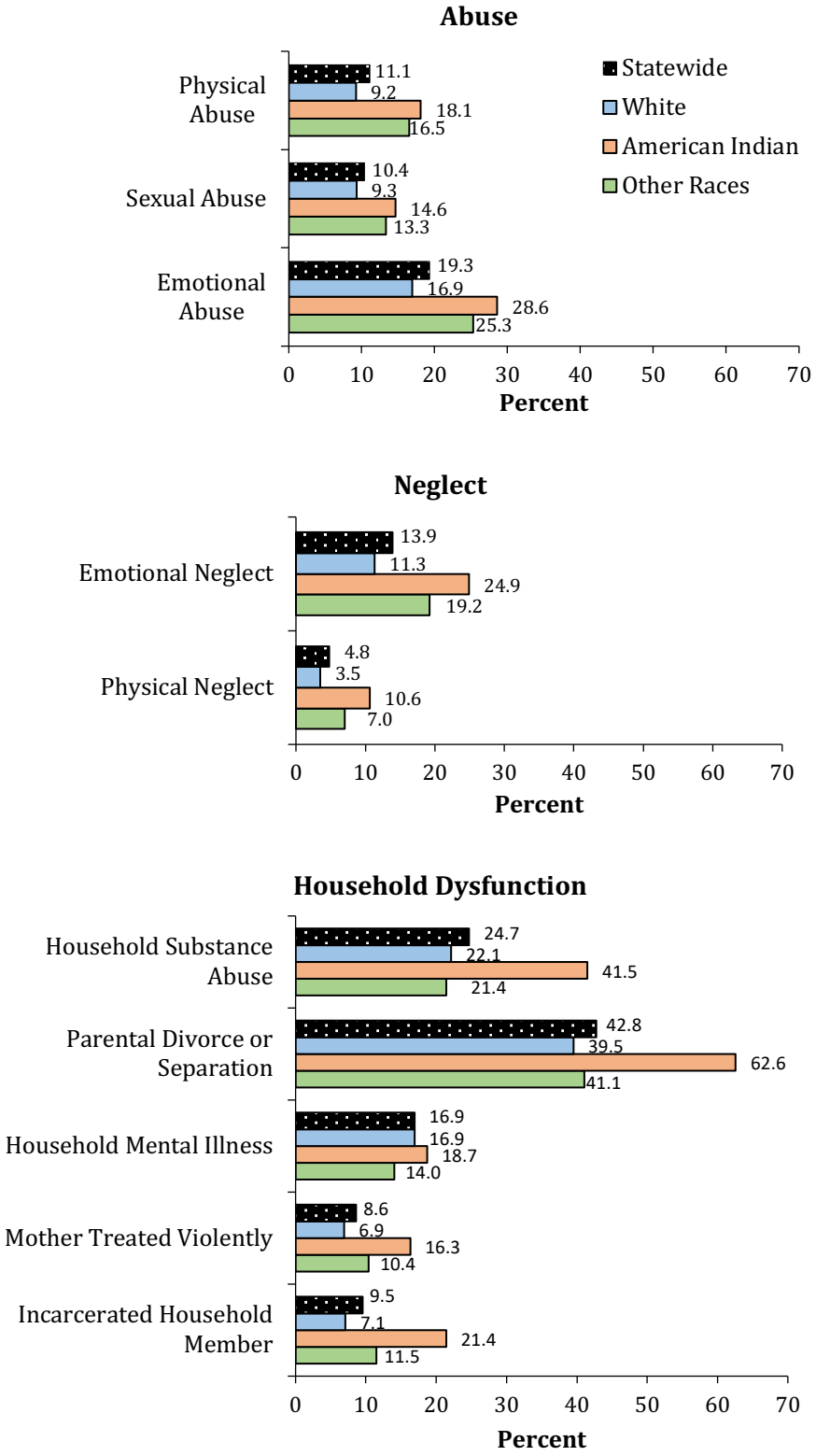
Statewide, 16.0% of South Dakota mothers had ACE scores of 4 or greater. **Table 16.1** provides demographic characteristics of mothers who had an ACE score of 4 or greater. Demographic characteristics associated with high ACE scores included: American Indian mothers, young mothers, less educated mothers, unmarried mothers, and mothers from lower income households. Mothers on Medicaid or who were uninsured also had a higher percentage with high ACE scores of 4 or greater. **Figure 16.1** summarizes the results for individual adverse experiences by race. There were significant race differences in all adverse childhood experiences except household mental illness.

Table 16.1. Percent of Mothers with ACE Scores of 4 or Greater by Demographic Characteristics (weighted) [1]

	% of Mothers with an ACE Score of 4+
Race	**P<0.001[2]**
White	13.4% [10.4, 16.4]
American Indian	28.3% [23.6, 33.0]
Other Races	19.1% [14.9, 23.3]
Ethnicity	**Not significant**
Hispanic	18.9% [7.8, 30.1]
Non-Hispanic	15.8% [13.4, 18.3]
Age (years)	**P<0.001**
<20	29.2% [18.3, 40.0]
20-24	19.8% [14.2, 25.3]
25-29	13.1% [9.2, 16.9]
30-34	14.2% [9.6, 18.7]
≥35	14.8% [7.4, 22.2]
Maternal Education	**P<0.001**
Less than High School	23.7% [16.8, 30.6]
High School	18.2% [12.5, 23.8]
More than High School	13.8% [10.9, 16.7]
Marital Status	**P<0.001**
Married	11.4% [8.7, 14.1]
Not Married	24.4% [19.8, 29.0]
Insurance Before Pregnancy[3]	**P<0.001**
Private (direct purchase)	6.8% [0, 13.8]
Job-based	12.8% [9.7, 16.0]
Medicaid	23.9% [17.3, 30.6]
Medicare	8.7% [0, 21.3]
Other	13.9% [4.2, 23.5]
Uninsured	28.2% [21.1, 35.3]
Annual Household Income	**P<0.001**
<$15,000	25.2% [19.6, 30.8]
$15,000- $26,000	15.3% [9.2, 21.5]
$26,001 - $44,000	21.6% [14.4, 28.8]
$44,001 - $67,000	11.8% [6.4, 17.2]
$67,001 or more	8.8% [5.0, 12.5]
Region	**P=0.05**
Central	18.0% [10.9, 25.1]
Northeast	17.6% [11.6, 23.7]
Rapid City MSA	13.3% [8.0, 18.5]
Sioux Falls MSA	13.8% [9.4, 18.3]
Southeast	17.1% [8.9, 25.3]
West	19.0% [13.4, 24.5]

[1] 95% confidence intervals
[2] P-values are for a chi-square test of association
[3] If more than one type of insurance was selected, a hierarchy was established to report the individual's insurance status. The hierarchy, in order, was: Private; Job-based (includes self or as a dependent); Other (includes military, VA, Champus & TriCare or Other); Medicaid; Medicare; Uninsured (includes IHS). For example, if an individual selected both 'Private' and 'Medicaid', the individual's insurance status was reported as 'Private'.

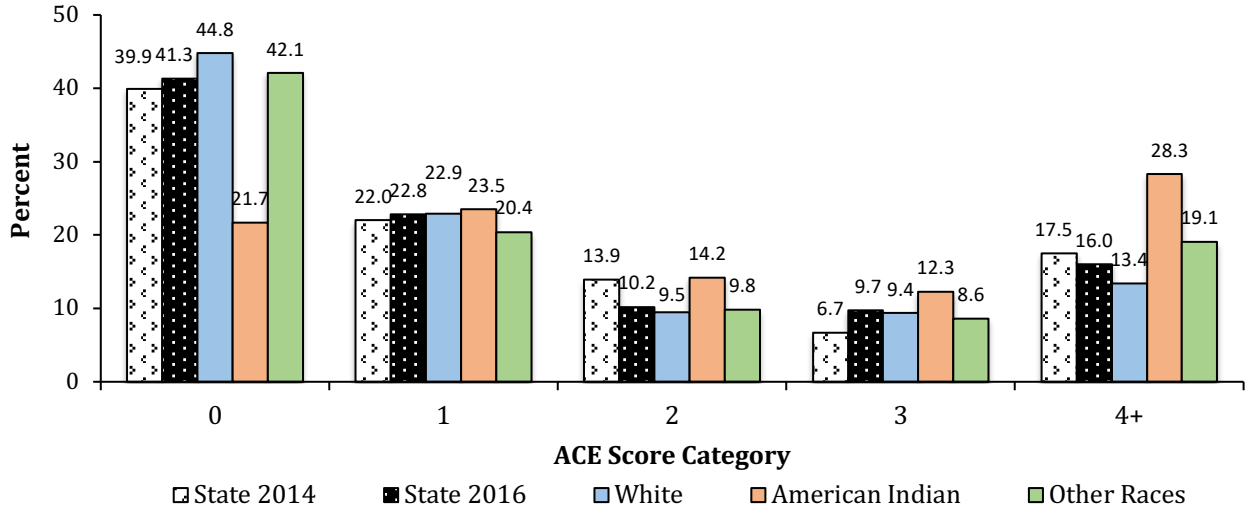
Figure 16.1. Percentages of 2016 SD PRAMS Mothers Experiencing Specific Adverse Childhood Experiences by Race (weighted)*



** All individual ACE scores except Household Mental Illness differed significantly by race, p<0.01.*

Statewide estimates for ACE score categories are shown in **Figure 16.2** along with the population percentages by race. There was a significant association between the distribution of ACE scores and race.

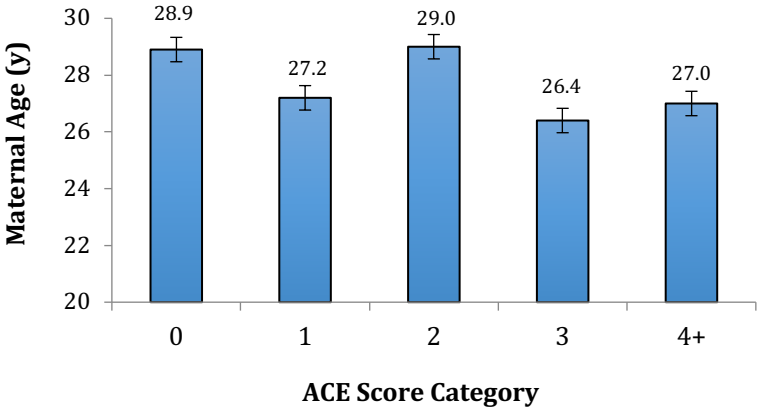
Figure 16.2. Percentages in ACE Score Categories by Race and Year (weighted)*



** Significant race differences in distribution of ACE scores (<0.001)*

The psychological and social consequences of adverse childhood experiences may impact maternal and newborn well-being. High ACE scores have been shown to be associated with increased teen pregnancy rates and high risk sexual behaviors, including pregnancy at a young age, early onset of intercourse, and high numbers of sexual partners (5,6). Among South Dakota mothers, maternal age was inversely associated with ACE score as either a categorical or a continuous variable (both, $p<0.01$; **Figure 16.3**) with higher ACE scores being associated with lower maternal age.

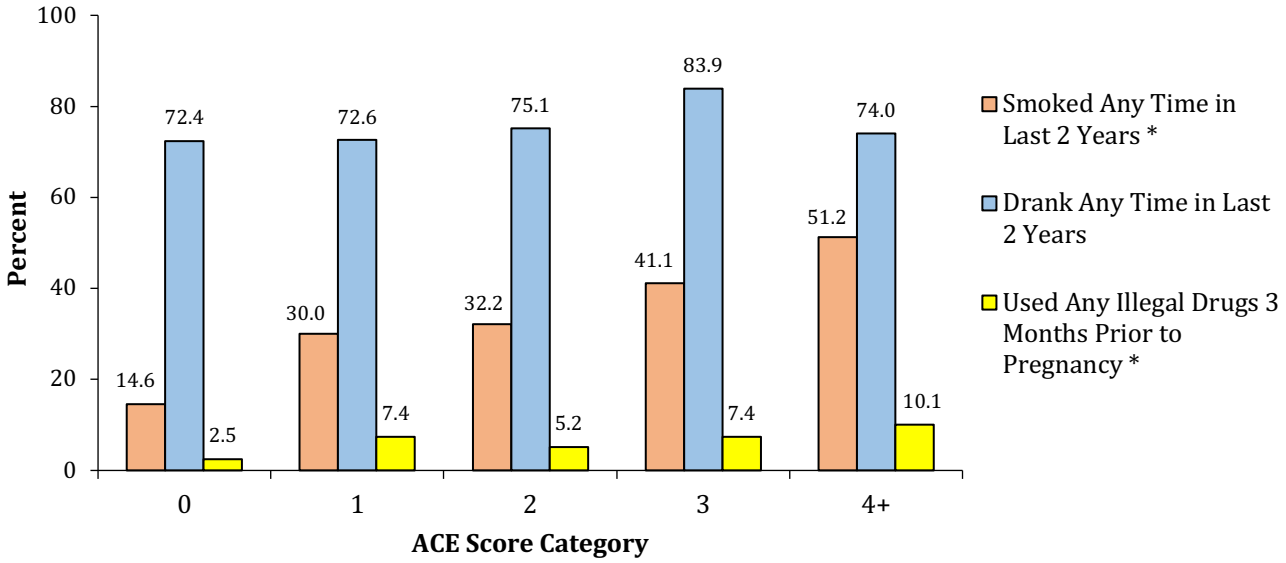
Figure 16.3. Average Maternal Age by ACE Score Category (weighted)*



** Significant association between maternal age and ACE scores*

Increased risky behaviors including smoking, alcohol use, and drug use have been shown to be associated with high ACE scores (4,7). A similar pattern of increased risky behaviors among mothers with higher ACE scores was seen with the 2016 SD PRAMS-like survey (**Figure 16.4**). Mothers with high ACE scores were more likely to have smoked in the last two years and to have used illegal drugs in the three months prior to pregnancy (both, p<0.01), but high ACE scores were not associated with drinking in the last two years.

Figure 16.4. Percent of Mothers Who Smoked or Drank in the Last Two Years or Used Any Illegal Drugs in the Three Months Prior to Pregnancy by ACE Score Categories (weighted)

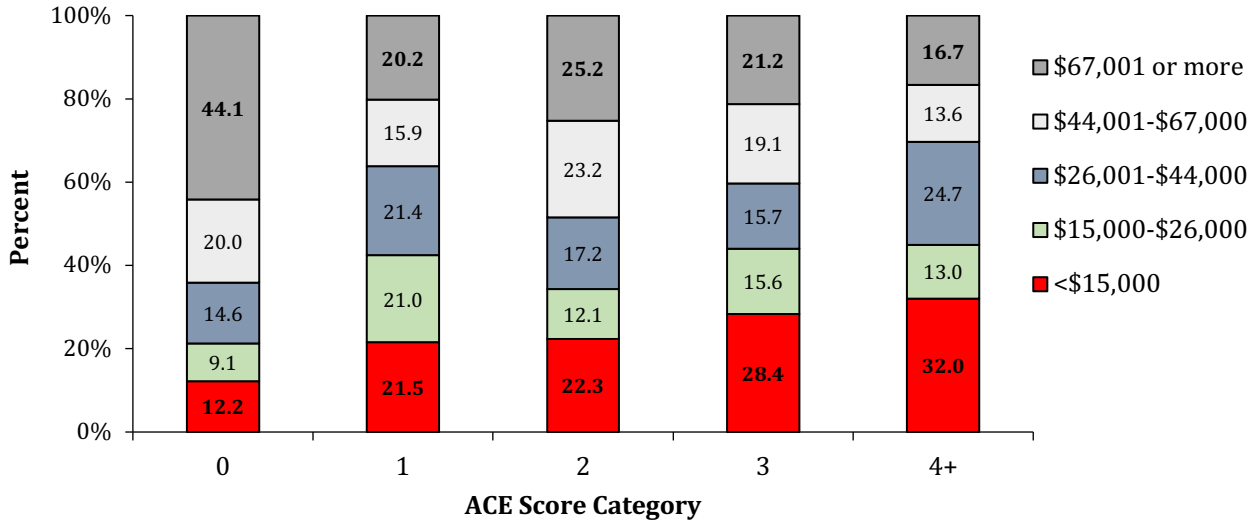


** Significantly associated with ACE Score category*

Annual household income also was associated with the ACE score categories. Mothers in the higher ACE score categories were more likely to have lower household incomes than mothers in the lower ACE score categories (**Figure 16.5**).

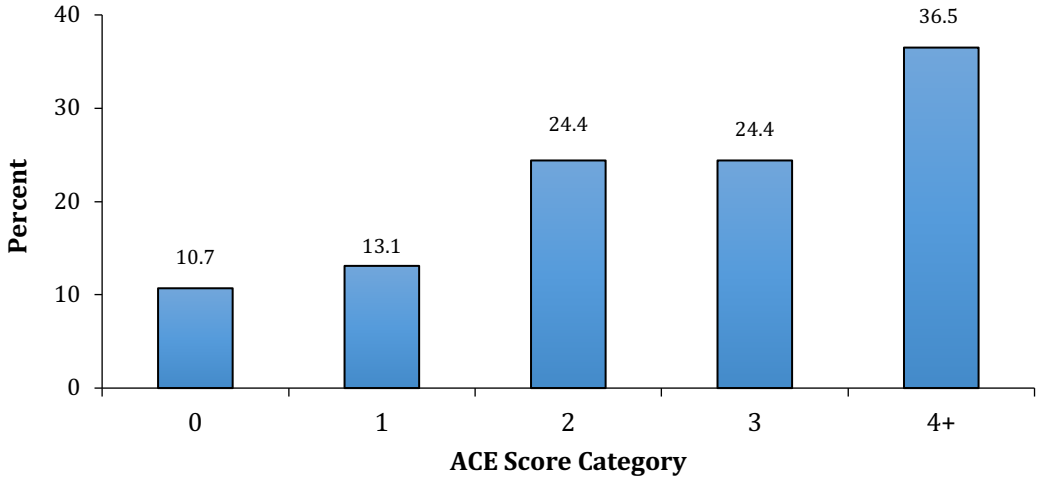
Depressive disorders have been reported to be two-to-three times more likely in women with a history of childhood abuse, indicating that ACEs can increase the risk of depression decades after their occurrence (8). Depression is linked to adverse outcomes in pregnancy and childhood. The previously validated PRAMS 3-D Index for postpartum depression (9) was used to determine the relationship between ACE score and symptoms of postpartum depression. **Figure 16.6** shows the prevalence of symptoms of postpartum depression for each ACE score category. As expected based on previous literature (10), postpartum depression was significantly associated with ACE scores (p<0.001).

Figure 16.5. Distribution of Household Income by ACE Score Categories (weighted)*



** Significantly associated with ACE Score category*

Figure 16.6. Prevalence of Postpartum Depression by ACE Score Categories (weighted)*



** Significantly associated with ACE Score category*

Summary

- 16.0% of 2016 South Dakota mothers experienced four or more adverse childhood experiences (ACEs).
- Percent of mothers with ACE scores of four or greater was higher in the following populations: American Indian mothers, younger mothers, less educated mothers, unmarried mothers, mothers who were uninsured or on Medicaid, and mothers in households with less income.
- The most frequent ACE was parental divorce or separation with 42.8% of mothers experiencing this as a child, followed by household substance abuse (24.7%); 10-19% of mothers experienced abuse as a child.
- Percent of mothers who smoked in the previous two years or used illicit drugs the three months prior to pregnancy increased with increasing ACE Scores: 14.6% of mothers with no ACEs smoked versus 51.2% of mothers with ACE scores of four or greater and 2.5% of mothers with no ACEs used illicit drugs versus 10.1% of mothers with ACE scores of four or greater.
- Household income decreased with increasing ACE scores: 21.3% of mothers with no ACEs had household incomes of less than $26,000/year versus 45.0% of mothers with ACE scores of four or greater.
- Prevalence of postpartum depression increased with increasing ACE scores, ranging from 10.7% among mothers with no ACEs to 36.5% among mothers with ACE scores of four or greater.

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Technical Appendix

Technical Appendix

South Dakota 2016 PRAMS-like Survey: Methods for Weighting

Sampling Fractions and Response Rates by Race *

	Strata			
	White	**American Indian**	**Other**[1]	**Totals**
Total Eligible Births	8,768	1,677	1,138	11,583
% of Eligible Births Sampled (N)	8.2% (715)	40.3% (675)	45.6% (519)	1,909
Response Rate [2] (response/sample)	72.7% (520/715)	49.0% (331/675)	56.5% (293/519)	59.3% (1144/1909)

[1] 'Other Races' (number sampled) included Asian (114), Black (169), Mixed Race (179), Pacific Islanders (5), and Unknown (52).

[2] Includes partial responses where mother answered at least one question but less than 70% (n=49).

[3] The overall weighted response rate was 67.6%†.

<u>Among those mothers who were eligible, did the random sample of mothers have similar demographic characteristics as the mothers who were not sampled?</u>

Population Distribution (N) of Mothers Sampled and Not Sampled by Race (columns total 100%)

	White (n=8,768)		**American Indian** (n=1,677)		**Other** (n=1,138)	
	Sampled (n=715)	**Not Sampled** (n=8,053)	**Sampled** (n=675)	**Not Sampled** (n=1002)	**Sampled** (n=519)	**Not Sampled** (n=619)
Maternal Age (y)						
< 25	24.1% (172)	21.9% (1760)	44.7% (302)	49.2% (493)	35.5% (184)	33.9% (210)
25+	75.9% (543)	78.1% (6293)	55.3% (373)	50.8% (509)	64.5% (335)	66.1% (409)
Significance	P=0.17		P=0.07		P=0.59	
Maternal Education						
< High School	9.1% (65)	7.3% (587)	39.2% (261)	43.1% (428)	29.0% (150)	30.2% (186)
High School	18.0% (129)	18.3% (1473)	27.9% (186)	28.1% (279)	31.5% (163)	31.8% (196)
> High School	72.9% (521)	74.4% (5983)	32.9% (219)	28.9% (287)	39.5% (204)	38.0% (234)
Significance	P=0.22		P=0.17		p=0.86	
Marital Status						
Married	74.4% (532)	73.5% (5916)	15.1% (102)	14.7% (147)	54.5% (283)	55.4% (343)
Other	25.6% (183)	26.5% (2135)	84.9% (572)	85.3% (855)	45.5% (236)	44.6% (276)
Significance	P=0.59		P=0.79		P=0.77	

* NOTE: bth_mram on the final birth file differed from bth_mram on the monthly files. The sample was originally based on bth_mram from the monthly files, but the mother's race (bth_mram) on the final birth file was what was used in all analyses. The changes in race distribution occurred with 0.3% of the records.

† Calculated as (72.7%*[8768/11853]) + (49.0%*[1677/11853]) + (56.5%*[1138/11583])

Population Distribution (N) of Mothers Sampled and Not Sampled by Race –*continued*

	White (n=8,768)		**American Indian** (n=1,677)		**Other** (n=1,138)	
	Sampled (n=715)	**Not Sampled** (n=8,053)	**Sampled** (n=675)	**Not Sampled** (n=1002)	**Sampled** (n=519)	**Not Sampled** (n=619)
Trimester Prenatal Care Began						
1st	77.4% (549)	80.0% (6392)	51.0% (338)	47.9% (464)	56.4% (290)	58.7% (357)
2nd, 3rd, or no PNC	22.6% (160)	20.0% (1603)	49.0% (325)	52.1% (505)	43.6% (224)	41.3% (251)
Significance	P=0.11		P=0.22		P=0.44	
Parity						
0	34.4% (246)	35.1% (2825)	25.6% (173)	25.5% (255)	33.5% (174)	33.1% (205)
1+	65.6% (469)	64.9% (5227)	74.4% (502)	74.6% (747)	66.5% (345)	66.9% (414)
Significance	P=0.72		P=0.93		P=0.88	
Hispanic						
No	95.7% (683)	95.6% (7696)	96.6% (652)	96.5% (966)	86.5% (449)	85.1% (526)
Yes	4.3% (31)	4.4% (356)	3.4% (23)	3.5% (35)	13.5% (70)	14.9% (92)
Significance	P=0.92		P=0.92		P=0.50	

* If demographics variables were unknown they were excluded from this table.

<u>Conclusion</u>: Among eligible births, the random sample of mothers that was obtained had similar demographic characteristics as the mothers who were not sampled.

Were there any demographic characteristics that were associated with response rates within each race?

Response Rates (N) in Different Demographic Populations by Race (columns total 100%)

	White		American Indian		Other	
	Completed (n=520)	**No Response (n=195)**	**Completed (n=331)**	**No Response (n=343)**	**Completed (n=293)**	**No Response (n=226)**
Maternal Age (y)						
< 25	22.3% (116)	28.7% (56)	39.0% (129)	50.3% (173)	35.5% (104)	35.4% (80)
25+	77.7% (404)	71.3% (139)	61.0% (202)	49.7% (171)	64.5% (189)	64.6% (146)
Significance	P=0.07		P=0.003		P=0.98	
Maternal Education						
< High School	7.7% (40)	12.8% (25)	34.3% (112)	43.8% (149)	28.5% (83)	29.7% (67)
High School	16.4% (85)	22.6% (44)	27.0% (88)	28.8% (98)	29.2% (85)	34.5% (78)
> High School	75.9% (395)	64.6% (126)	38.7% (126)	27.4% (93)	42.3% (123)	35.8% (81)
Significance	P=0.008		P=0.005		p=0.28	
Marital Status						
Married	77.7% (404)	65.6% (128)	16.0% (53)	14.3% (49)	59.7% (175)	47.8% (108)
Other	22.3% (116)	34.4% (67)	84.0% (278)	85.7% (294)	40.3% (118)	52.2% (118)
Significance	P=0.001		P=0.53		P=0.007	
Trimester Prenatal Care Began						
1st	79.6% (411)	71.5% (138)	57.5% (188)	44.6% (150)	60.0% (174)	52.2% (116)
2nd, 3rd, or no PNC	20.4% (105)	28.5% (55)	42.5% (139)	55.4% (186)	40.0% (118)	47.8% (106)
Significance	P=0.03		P<0.001		P=0.10	
Parity						
0	36.3% (189)	29.2% (57)	27.5% (91)	23.8% (82)	36.6% (107)	29.8% (67)
1+	63.7% (331)	70.8% (138)	72.5% (240)	76.2% (262)	63.4% (185)	70.2% (158)
Significance	P=0.07		P=0.28		P=0.10	
Hispanic						
No	96.2% (499)	94.4% (184)	96.4% (319)	96.8% (333)	86.7% (254)	86.3% (195)
Yes	3.8% (20)	5.6% (11)	3.6% (12)	3.2% (11)	13.3% (39)	13.7% (31)
Significance	P=0.30		P=0.76		P=0.89	

* If demographics variables were unknown they were excluded from this table.

***Conclusion**: There were differences in demographic characteristics of mothers who responded compared to those who did not, and these differed by race. Characteristics that were significant at p<0.10 were included in a logistic regression analysis to determine which characteristics were independently associated with survey response.*

VARIABLES TO WEIGHT BASED ON RESPONSE RATES: *(USED BTH_COMPLETE_SAMPLE)*

Whites: Logistic regression was performed with response/non-response as the outcome and with maternal age, education marital status, trimester prenatal care began, and parity as predictors. Maternal age (p=0.89), education (p=0.36) and trimester prenatal care began (p=0.06) were not significant, while parity and marital status were independently associated with response (p=0.03 and p=0.01, respectively). Use **PARITY** and **MARITAL STATUS**.

Strata of White Mothers: Response Rates		
Parity	**Marital Status**	**Response Rate (responded/total)**
Nulliparous (n=0)	Married	79.4% (123/155)
	Other	72.5% (66/91)
Other[1]	Married	74.5% (281/377)
	Other[1]	54.4% (50/92)

[1] 'Other' includes all other categories than the one listed, including missing data.

American Indians: Logistic regression was performed with response/non-response as the outcome and with maternal age, education and trimester prenatal care began as predictors. Trimester prenatal care began (p=0.002), maternal age (p=0.04), and maternal education (2 levels, p=0.054) were independent predictors of response. However, there were small numbers when the response was categorized according to all three variables (4 of 16 cells had n<25) so maternal education was omitted and trimester prenatal began (p=0.001) and maternal age (p=0.007) became more significant predictors of response. Use **TRIMESTER PNC BEGAN** and **MATERNAL AGE**

Strata of American Indian Mothers: Response Rates		
Trimester PNC Began	**Maternal Age (y)**	**Response Rate (responded/total)**
First	< 25	47.9% (68/142)
	25+	61.2% (120/196)
Other[1]	< 25	38.1% (61/160)
	25+	46.3% (82/177)

[1] 'Other' includes all other categories than the one listed, including missing data.

Other Races: Logistic regression was performed with response/non-response as the outcome and with trimester prenatal care began and marital status as predictors. Marital status remained a significant predictor of response (p=0.009), whereas trimester prenatal care began was no longer significant when marital status was included (p=0.09). Use **MARITAL STATUS**.

Strata of Mothers of Other Races: Response Rates	
Marital Status	**Response Rate (responded/total)**
Married	61.8% (175/283)
Other[1]	50.0% (118/236)

[1] 'Other' includes all other categories than the one listed, including missing data.

VARIABLES TO WEIGHT DUE TO OMISSIONS IN SAMPLING FRAME, OR NON-COVERAGE RATE:

In addition to obtaining weights that take into account the sampling strata and non-responses, it also is necessary to determine whether there were omissions in the sampling frame that need to be considered. The two omissions for the 2016 SD PRAMS-like survey were omission of mothers <14 years of age and records that were registered with the Office of Vital Records after four months (120 days). There was only one mother aged <14 years and there were 15 births that would have been eligible to be included but were not registered. These represent small numbers and no adjustment was made for omission in the sampling frame. These 16 births are not included in the number of eligible births.

CALCULATION OF FINAL WEIGHTS

The final weights included the sampling strata weights (Ws[i]) and the non-response weights (Wn[ij]) and the calculation of these are given below.

SAMPLING WEIGHT: Ws[i]=N[i]/n[i]

Race	sampled (n[i])	eligible (N[i])	Ws[i]
White	715	8,768	12.2629
Amer Indian	675	1,677	2.4844
Other	519	1,138	2.1927
totals	1,909	11,583	

Where N = number of eligible births and n= number of sampled births. The sampling weight can be interpreted as every white mother representing 12.3 White mothers in the state, whereas every American Indian mother represents 2.5 American Indian mothers in the state.

NON-RESPONSE WEIGHT: Wn[ij]=n[ij]/r[ij]

Race	Parity	Marital Status	Trimester PNC Began	Maternal Age	responded (r[ij])	sampled (n[ij])	Wn[i]
White	0	Married			123	155	1.2602
White	0	Other[1]			66	91	1.3788
White	Other[1]	Married			281	377	1.3416
White	Other[1]	Other[1]			50	92	1.8400
Total					*520*	*715*	
Amer Indian			1st	< 25	68	142	2.0882
Amer Indian			1st	25+	120	196	1.6333
Amer Indian			Other[1]	< 25	61	160	2.6230
Amer Indian			Other[1]	25+	82	177	2.1585
Total					*332*	*675*	
Other		Married			175	283	1.6171
Other		Other[1]			118	236	2.0000
Total					*293*	*519*	
Grand Total					*1,145*	*1,909*	

[1] 'Other' includes all other categories than the one listed, including missing data.

Where n= number of sampled births and r = number of mothers responding.

The sampling and response weights are combined to determine the final weight that is applied in the analysis of the data:

Calculations of Weights:

Race	Parity/ Tri PNC	Marital Status/ Mat Age	Ws[i]	Wn[i]	Final Weight*	Responded (n)	Sampled (N)	Ws[i]*N	Ws[i]* Wn[ij]*n
White	0	Married	12.2629	1.2602	15.4532	123	155	1900.7	1900.7
White	0	Other	12.2629	1.3788	16.9079	66	91	1115.9	1115.9
White	Other	Married	12.2629	1.3416	16.4524	281	377	4623.1	4623.1
White	Other	Other	12.2629	1.8400	22.5637	50	92	1128.2	1128.2
Amer Indian	1st	< 25	2.4844	2.0882	5.1880	68	142	352.8	352.8
Amer Indian	1st	25+	2.4844	1.6333	4.0579	120	196	486.9	486.9
Amer Indian	Other	< 25	2.4844	2.6230	6.5166	61	160	397.5	397.5
Amer Indian	Other	25+	2.4844	2.1585	5.3627	82	177	439.7	439.7
Other		Married	2.1927	1.6171	3.5459	175	283	620.5	620.5
Other		Other	2.1927	2.0000	4.3854	118	236	517.5	517.5
Totals						1,145	1,909	11,583	11,583

Tri PNC = trimester prenatal care began; Mat Age = maternal age (y); 'Other' for parity and marital status includes all other categories than the one listed, including missing data.

* Final weight = Ws[i]*Wn[ij]

Finite Population Correction Factor

Finite population correction (fpc) factor is used for both the standard error of the mean and the standard error of a proportion. The standard errors of the mean and of a proportion are based on the assumption that participants are selected with equal probability. This is nearly the case when the sample size is small relative to the population size (generally less than 5%). This is not the case with the SD PRAMS. In the SD 2016 PRAMS all three strata (White, American Indian, Other) were sampled at >5% and the sampling rate varied by strata.

In both SAS and Stata these fractions (# responded/# eligible) are entered within the appropriate procedure (i.e, proc surveyfreq) and the fpc is taken into account in the calculation of the standard errors, confidence intervals, significance testing, etc.

	n	N	Fraction (fpc)
White	520	8,768	0.0593
American Indian	331	1,677	0.1974
Other	293	1,138	0.2575