A Healthy Start: Spokane's Future

Maternal and Infant Health

SPOKANE REGIONAL HEALTH DISTRICT

A Healthy Start: Spokane's Future

Maternal and Infant Health

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Dear Spokane County Providers:

Children are our most valuable asset and their health is closely tied to the health of our community. Not all children in Spokane County are healthy, nor do all live in resilient, positive families. As described in this Maternal and Infant Health (MIH) report, *A Healthy Start: Spokane's Future*, Spokane County has many MIH issues, such as high rates of smoking during pregnancy, intimate partner violence, and child abuse and neglect. Many of Spokane County's problems are getting worse and our rates are higher than state rates. Additionally, many of these rates are disproportionately worse for women and children on Medicaid and racial minorities, especially African Americans and Native Americans. To reverse these trends, we must address the root causes of these problems, such as housing, education, unemployment, and poverty.

Spokane Regional Health District envisions a community in which every resident has a livable wage, safe, adequate housing, access to quality health care, and a good education starting with preschool. In order to achieve this vision, we must critically examine the data in this report and as a community implement policies that address the needs of all pregnant women, support the healthy growth of children, and provide a continuum of care for our most vulnerable families. These investments in prevention will pay off. Correcting the damage later is far more costly and less likely to succeed. Policies that support healthy families translates into children developing and becoming healthier, more productive adults and that is good for all of us.

This report, *A Healthy Start: Spokane's Future*, provides valuable information about the health status of our maternal and infant populations in Spokane County. It should be used as a springboard to action to address the inequities and disparities that exist within our community. We must come together as a community to explore policy options that will provide equal opportunity for all children of Spokane County, regardless of the neighborhood in which they live or the economic and educational background of his or her parents. I invite you to join me in working to achieve this vision.

Sincerely,

Elaine Conley, RN, MPH

Director, Community and Family Services

Contents

Introduction

Maternal and child health issues remain a focus of public health's prevention and intervention efforts. An infant's health begins well before a woman becomes pregnant. Various risk factors during pregnancy affect the health of the mother and of the newborn.

This publication, *A Healthy Start: Spokane's Future*, examines and explores the health and well-being of pregnant mothers and infants for Spokane County. The information in this report was compiled for individuals and organizations in the community who work to improve the issues described in this report.

Although the data is comprehensive and can be used as a platform to determine the status of health and well-being for pregnant mothers and for infants in Spokane County, additional questions and concerns will be inherent. This will require further review of data, exploration of possible causes and effects, and additional assessments on risk factors that may influence health outcomes for mothers and their newborns.

Key Findings for Spokane County

An infant who is born healthy is very likely to grow and develop appropriately. This report describes many factors that influence both the health of the mother and of the infant.

Maternal Health

- There are nearly 6,000 births to Spokane County women each year.
- The fertility rate is defined as the number of live births per 1,000 women of child-bearing age. Since 2000, the fertility rate decreased among teens and increased among women 30-39 years of age.
- Approximately one-third of births were to unmarried women. The unmarried birth rate increased since 2000 and was significantly higher for Spokane County compared to Washington State.
- In Spokane County most births were to women with insurance, with almost half of births to women on Medicaid. The proportion of births paid for by Medicaid increased since 2000.
- Infections during pregnancy pose health risks for the mother and infant. Nearly 1 in 10 births were to a woman with any infection during the pregnancy.
- In Spokane County and Washington State an infant born preterm is at increased risk for health problems. Women with a prior preterm birth were more than 4 times more likely to experience a preterm birth with their current pregnancy.
- Maternal smoking is associated with poor birth outcomes. Women who smoked during pregnancy were more likely to have a preterm birth, a low birth weight infant, or an infant death. The maternal smoking rate for Spokane County is twice the rate of Washington State and has been increasing over time while the state rate has been decreasing.
- The vast majority of Spokane County births were to women who began prenatal care in the first trimester (88%). However, this is less than the Healthy People 2010 goal of 90% or higher. There has been a downward trend over time. Women with prenatal care beginning in the first trimester were significantly less likely to have a low birth weight infant or a preterm birth.
- More than one-third of births in Spokane County and Washington State were unintended; these were more likely to occur among younger women and those on Medicaid.
- About 1 in 10 births were to women with less than a high school education.
- More than a quarter of births in Spokane County and Washington State were delivered by cesarean section, and cesarean deliveries increased as age increased.

Infant Health

- In Spokane County and Washington State approximately 1 in 10 births were preterm. Preterm infants were 15 times more likely to die before their first birthday than full-term infants.
- Low birth weight infants (< 5.5 pounds) in Spokane County and Washington State were more than 21 times more likely to die before their first birthday. Rates of low birth weight infants were highest among women 15-19 and 40-49 years of age.
- An average of 40 infants per year in Spokane County had a birth defect identified in the first 24 hours. More than half of the congenital anomalies were orofacial clefts and chromosomal disorders.
- In Spokane County 13% of births had a condition requiring medical attention in the first 24 hours. The majority of those were admitted to the newborn intensive care unit. Low birth weight, preterm birth, and a congenital anomaly increased the likelihood of being admitted to the newborn intensive care unit (NICU).
- The average length of stay in a hospital for a newborn is 3 days.
- Five percent of all child abuse cases were among children 0-1 year of age. From 2001 to 2007, there was approximately a 7% increase each year in child abuse cases among this age group. The most common type of abuse was physical neglect.
- The infant mortality rate for Spokane County was 5.9 per 1,000 live births. Of the infant deaths, 60% died in the first 28 days. For Washington State this rate was highest for mothers 15-19 and 40-49 years of age. Blacks and Native Americans/Alaska Natives had higher infant mortality rates than Whites. The leading cause of death for infants was birth defects.
- The average cost of hospitalization for a healthy newborn was $1,365 versus $36,724 for an unhealthy newborn.
- For Spokane County and Washington State, Sudden Infant Death Syndrome (SIDS) is the second leading cause of infant mortality, accounting for about 15% of all infant deaths. In Washington State, SIDS was 2.4 times greater among Native American/Alaskan Native infants and 1.7 times greater among Black infants when compared to White infants.
- For both Spokane County and Washington State, 9 out of 10 women breastfed or pumped milk to feed their infant. Of those women who started breastfeeding, more than half were still breastfeeding 2-4 months after the birth. However, Spokane County women were 45% less likely to continue breastfeeding when compared to women statewide.

Methodology

Organization of Report

This report is divided into two sections: maternal concerns during pregnancy (maternal health) and the health of the infant (infant health). Health characteristics in each section were examined by various demographics, over time, and in comparison to Washington State when available and appropriate. For some data, comparisons were made to Clark and Snohomish counties because they are similar to Spokane County in population and have a mix of urban and rural communities. A data table of the indicators is available in Appendix A. Selected topics were mapped at the neighborhood level for Spokane County and are available in Appendix B.

Inclusion Criteria

A literature search was conducted to identify important topics related to pregnancy, birth outcomes, and infant health. Spokane Regional Health District staff reviewed this list of topics and added additional topics they felt were relevant to maternal and infant health. The list was restricted to topics that related to pregnancy, birth outcomes, and infant health up to one year. Additionally, sources for reliable population-based data needed to be available at the county level for the topic to be included. Desired topics that did not have a data source included Fetal Alcohol Syndrome (FAS), oral health and periodontal disease among pregnant women, preconception health care, health care after birth, immunizations, and infant hearing loss or deafness.

Data Sources

Birth certificates include information on the mother and infant. The data is available through the Washington State Department of Health (DOH). Birth certificates for Washington State changed in 2003 with some data no longer being collected and other data had definition or category changes. To overcome these differences over time, some topics were only evaluated from 2003 to 2006. For topics with a limited number of births with certain features, multiple years were aggregated to provide a more accurate description of the condition, or Washington State data was used only.

The Pregnancy Risk Assessment Monitoring System (PRAMS) is a survey of a sample of women who recently gave birth. The survey is conducted 2 to 4 months after delivery and collects information about factors prior to, during, and after the pregnancy. Since this data source only takes a sample of all births, multiple years were aggregated to increase the number of respondents. Years 2000 to 2006 were used to evaluate folic acid intake, unintended pregnancy, alcohol use, physical abuse, infant sleep position, and advice received from a health care worker. PRAMS is sponsored by Centers for Disease Control and Prevention and administered by DOH.

Infant mortality and cause of death data is available through DOH. Birth certificate data is linked with data from death certificates for infants who die in the first year after birth.

Data from 2007 birth certificates, death certificates, and PRAMS was not available at the time this report was developed.

Child abuse data for Spokane County was provided by the Washington State Department of Social and Health Services (DSHS). The data used for this report denotes cases of child maltreatment that were deemed to be founded after an investigation by Child Protective Service (CPS). This number was used as the numerator to calculate child abuse rates. The denominator was an estimated number of individuals in each age bracket identified on the CPS report. This number was estimated using data from Washington State, Office of Financial Management (OFM), Population Estimates by Age and Sex: 2001-2007.

Emergency room data was provided by the Inland Northwest Health Services (INHS) Meditech system. Data included records with ICD-9 codes for pregnant women or for child abuse in any of the first five diagnoses.

Data Analysis

Data regarding topics in this report were analyzed using VistaPHw (available through a partnership between DOH and Public Health Seattle King County), Stata version 10, or EpiInfo version 4.4.3. Differences in the data between geographic areas or between groups within a geographic area were identified using a chi-square or logistic regression test. Trend analysis for child abuse data was calculated using Jointpoint Regression Program 3.3.1. A p-value of <0.05 was used to determine if the findings were statistically significant. Confidence intervals were not listed for each data point in this report since statistical significance was determined using a p-value. The figures/tables provide 95% confidence intervals.

Maternal Health :: General Fertility Rates and Births

Age

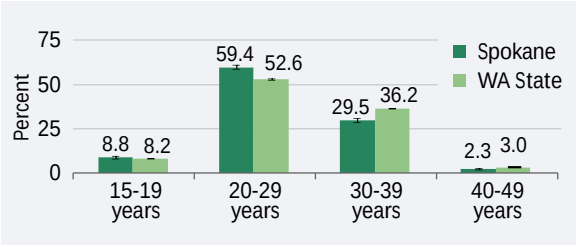
In 2006, there were 5,986 births in Spokane County. Three percent of births were multiple births. Spokane County had a higher proportion of births from mothers 20-29 years of age and a lower proportion of births from mothers 30-39 years of age compared to Washington State in 2006. There was no statistical difference among the proportion of births for age groups 15-19 years and 40-49 years between Spokane County and Washington State (Fig. 1). The occurrences of multiple births increased as maternal age increased (Table 1).

Fertility rate is defined as the number of live births per 1,000 women 15-49 years of age. Overall, Spokane County maintained a slightly lower general fertility rate from 2000 to 2006 than Washington State's rate. Age-specific fertility rates for women 15-19 years of age, 30-39 years of age, and 40-49 years of age for Spokane County were consistently lower than the state. However, women in the 20-29 years of age group had consistently higher fertility rates than the state's rates for the same time period. Since 2000, Spokane County experienced a significant downward trend in fertility rates among the 15-19 year old age group and a significant upward trend among the 30-39 year old age group (Table 2).

Figure 1

Births by Maternal Age Group

Spokane County and Washington State, 2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Table 1

Percent of Births that Were Multiple Births

Spokane County and Washington State, 2006

Age	Spokane County	Washington State
15-19 years	1.9%	1.4%
20-29 years	2.6%	2.6%
30-39 years	3.9%	4.3%
40-49 years	5.8%	6.8%

Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Since 2000, the fertility rate decreased among teens and increased among women 30-39 years of age for Spokane County.

KEY FINDING

Table 2

General Fertility Rate and Age Specific Rates by Year

Spokane County and Washington State

Year	Region	General Fertility Rate^	Maternal Age (AGE SPECIFIC RATES+)			
			15-19 years	20-29 years	30-39 years	40-49 years
2000	Spokane County	52.7	38.4	112.0	58.9	3.7
	Washington State	53.1	39.1	107.8	63.9	4.4
2001	Spokane County	50.1	32.0	109.7	56.2	3.5
	Washington State	51.8	35.6	105.5	63.6	4.4
2002	Spokane County	51.2	31.8	112.0	57.2	4.4
	Washington State	51.2	33.0	103.5	64.8	4.6
2003	Spokane County	50.5	32.0	107.8	58.2	4.2
	Washington State	52.1	31.5	103.6	68.1	4.9
2004	Spokane County	50.7	29.0	107.3	60.8	3.7
	Washington State	52.8	31.2	104.3	69.3	4.8
2005	Spokane County	51.6	28.4	110.1	60.7	3.6
	Washington State	53.0	30.7	103.0	70.9	4.8
2006	Spokane County	54.6	30.6	113.9	64.0	4.1
	Washington State	55.0	31.8	105.0	73.3	5.3

Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics
^ The number of live births per 1,000 women 15 to 49 years of age
+The number of live births to women in a specified age range per 1,000 women in that age range

Race

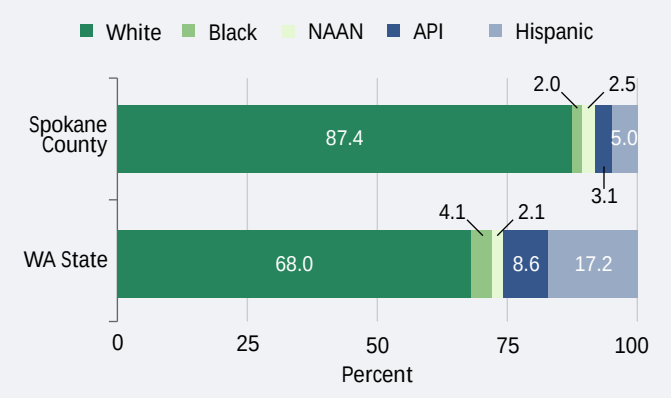
Since 2000, Spokane County consistently maintained higher fertility rates for Whites, Blacks, and Native Americans/Alaska Natives than the state's rates; however, Spokane County was consistently lower than the state for Asians/Pacific Islanders and Hispanics. Compared to Washington State's rate, in 2000-2006 Spokane County's fertility rate was 5.3% higher among Whites, 4.5% higher among Blacks, 15% higher among Native Americans/Alaska Natives, 6.6% lower among Asians/Pacific Islanders, and approximately 28% lower among Hispanics. Spokane County experienced significant upward trends for fertility rates among Whites and Hispanics since 2000 (Table 3).

In 2000-2006 for Spokane County, 87.4% of births were to White mothers as compared to the state's rate at 68.0%. Approximately one-third of births statewide were to non-White and Hispanic mothers. Hispanics comprised the largest proportion of minority births for both Spokane County and Washington State (Fig. 2).

Figure 2

Births by Maternal Race

Spokane County and Washington State, 2000-2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics
NAAN = Native American/Alaska Native API = Asian/Pacific Islander

'Teen Mothers by Neighborhood' topic map available in Appendix B.

Table 3

Race-Specific Fertility Rates by Year

Spokane County and Washington State

Year	Region	Race of Mother				
		White / NH	Black / NH	NAAN / NH	API / NH	Hispanic
2000	Spokane County	59.1	67.5	99.1	59.4	77.0
	Washington State	53.7	67.2	81.7	62.5	110.4
2001	Spokane County	55.5	80.8	85.2	73.3	80.2
	Washington State	52.0	64.9	75.9	63.8	117.2
2002	Spokane County	58.0	60.3	84.5	54.1	79.3
	Washington State	51.9	63.5	75.8	62.4	103.2
2003	Spokane County	57.9	71.1	76.9	52.4	82.7
	Washington State	52.2	60.7	67.8	60.2	110.2
2004	Spokane County	57.2	63.3	85.1	45.2	92.7
	Washington State	53.2	61.8	72.0	63.9	118.2
2005	Spokane County	58.1	72.2	86.2	54.0	101.8
	Washington State	53.1	64.5	67.5	65.4	123.5
2006	Spokane County	62.3	72.1	103.7	64.1	99.4
	Washington State	55.1	73.1	74.5	70.2	127.0

Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics
NH= Non-Hispanic NAAN = Native American/Alaska Native API = Asian/Pacific Islander

Education Level

For Spokane County in 2006, 1 in 4 births were to mothers with at least a 4-year college degree. Approximately 1 in 10 births were to women with less than a high school education. Compared to Washington State, Spokane County had a higher proportion of births to women with some education beyond high school (Fig. 3).

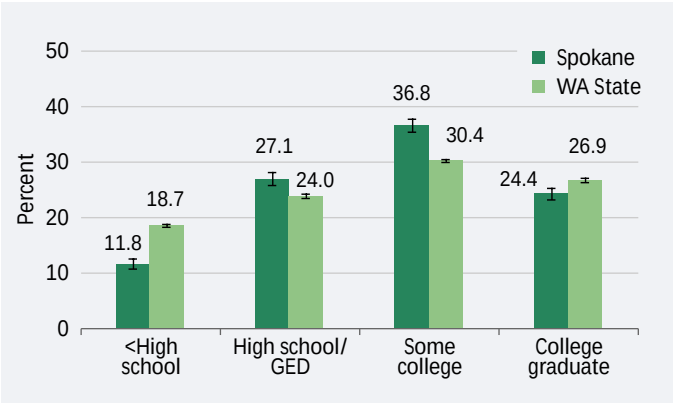
About 1 in 10 births in Spokane County were to women with less than a high school education.

KEY FINDING

Figure 3

Births by Maternal Education Level

Spokane County and Washington State, 2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Marital Status

Approximately one-third of births in 2006 were to unmarried women for both Spokane County and Washington State. The unmarried birth rate was significantly higher for Spokane County (35.4%) compared to Washington State (31.7%) (Table 4). Beginning in 2000, the percent of births to unmarried women has increased for both Spokane County (30.2%) and Washington State (28.3%).

Approximately one-third of births were to unmarried women. The unmarried birth rate increased since 2000 and was significantly higher for Spokane County compared to Washington State.

KEY FINDING

Table 4

Births to Unmarried Women

Spokane County and Washington State, 2006

	Spokane County	Washington State
Total births	35.4%	31.7%
15-19 years	84.9%	80.7%
20-29 years	37.9%	36.7%
30-39 years	17.0%	14.5%
40-49 years	11.8%	16.9%
White / NH	33.4%	26.7%
Black / NH	57.8%	52.9%
NAAN / NH	72.0%	69.3%
API / NH	24.4%	18.0%
Hispanic	48.2%	47.3%

Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics
NH= Non-Hispanic NAAN = Native American/Alaska Native API = Asian/Pacific Islander

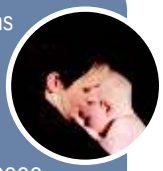
'Unmarried Mothers by Neighborhood' topic map available in Appendix B.

Maternal Health :: Service Utilization

Insurance, Medicaid, WIC (Women, Infants and Children)

A very small proportion of births were to women without insurance for both Spokane County and Washington State. Compared to Washington State, Spokane County had a significantly higher proportion of self-paid births in 2006 (1.3% and 1.7%, respectively). For both Spokane County and Washington State, there was no difference between age groups in insurance status.

In Spokane County most births were to women with insurance, with half of births to women on Medicaid. The proportion of births paid for by Medicaid increased since 2000.



KEY FINDING

In 2006, 46.2% of Spokane County births were to women with Medicaid as their primary insurance. Spokane County had a significantly higher proportion of births paid by Medicaid than did Washington State (39.1%), Clark County (27.6%), or Snohomish County (33.1%). The proportion of births paid by Medicaid significantly increased over time from 2000 to 2006 for both Spokane County and Washington State.

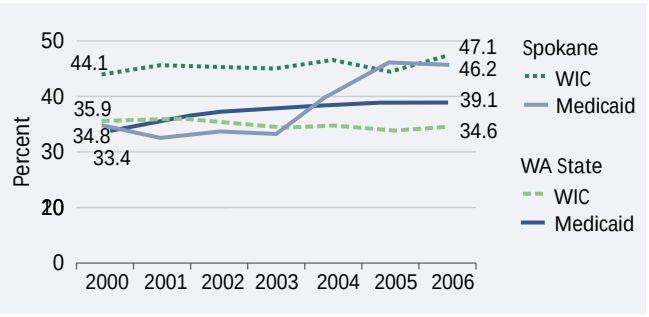
The Women, Infants, and Children Program, better known as WIC, serves low to moderate-income pregnant women and families with children younger than 5 years of age. WIC provides education and counseling on nutrition, breastfeeding, and accessing health care or other social services. Its goal is to encourage healthy diets for optimal growth and development. The WIC program has been shown to have many benefits. Pregnant women access prenatal care earlier in pregnancy and have fewer preterm births, low birth weight infants, and infant deaths. Children on WIC are more likely to have normal childhood growth.[1]

Nearly half of all the pregnant women for Spokane County received WIC services (47.1%) in 2006. Women for Spokane County were significantly more likely to use WIC services compared to Washington State (34.6%), Clark County (32.4%), or Snohomish County (27.6%). From 2000 to 2006, use of WIC services among pregnant women significantly increased for Spokane County, but decreased statewide (Fig. 4).

Figure 4

Use of Medicaid and WIC Among Women Giving Birth

Spokane County and Washington State



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Demographics

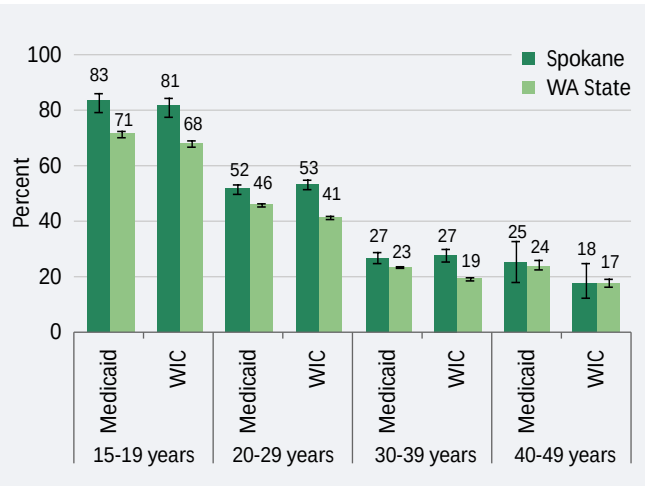
In 2006, use of Medicaid and WIC was highest among the youngest women and significantly decreased as age increased. Spokane County had higher utilization rates for both programs than Washington State for each age group except the oldest age group (Fig. 5).

Medicaid and WIC are both income-dependent programs. For Spokane County and Washington State, women on Medicaid were more likely to use WIC services. However, a significantly higher proportion of Spokane County women on Medicaid (77.4%) used WIC services than the proportion seen statewide (65.6%) in 2006.

Figure 5

Use of Services by Maternal Age Group Among Women Giving Birth

Spokane County and Washington State, 2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

'Births Paid by Medicaid by Neighborhood' topic map available in Appendix B.

Emergency Room Visits

Demographics

In Spokane County from January 1999 to September 2008, there were 1,254 visits by pregnant women to the emergency room (ER). Three in five visits were by women 20-29 years of age and approximately 1 in 5 visits were by females 12-19 years of age. Three in five visits were by unmarried women and 4 in 5 visits were by White women.

There was a significant difference among age groups and marital status for pregnant women who visited the emergency room in Spokane County. Women 12-19 years of age were more likely to be unmarried than married, while women in their 30s and 40 years or older were more likely to be married than unmarried. There was no difference in marital status for women in their 20s who used the ER.

Women visiting the ER in Spokane County who were 12-29 years of age were more likely to have government medical insurance than women 30 years or older. Women 30 years or older were more likely to have private insurance than women 12-29 years of age.

Among pregnant women who visited an ER in Spokane County, type of insurance differed significantly between the married and unmarried women. Married pregnant women were three times more likely to have private insurance than women who were pregnant and unmarried. Women who were pregnant and unmarried were 2.5 times more likely to have government medical insurance than women who were pregnant and married. Government medical insurance includes: Medicaid (Healthy Options), Medicare, or Washington State Basic Health (Fig. 6).

Trend Over Time

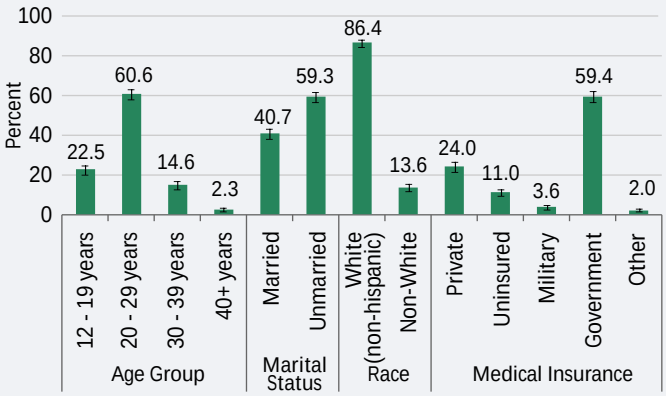
In Spokane County from 1999 to 2006, the rate of ER visits for pregnant women was highest among women 12-19 years of age and lowest among women in their 30s. With the exception of women 40 years of age and older, a significant decrease occurred in the rate of ER visits among pregnant women from 1999 to 2006 for all age groups, including the overall rate. Pregnant women 12-19 years of age and women in their 30s had 17% fewer ER visits per year; pregnant women in their 20s had approximately 14% fewer ER visits per year; and the overall rate for ER visits among pregnant women was 15% less per year (Figure 7).

The decline in the rate of emergency room visits among pregnant women may be attributed to the opening and utilization of primary care clinics that provide women's health services in Spokane County. From 2000 to 2006, nine additional Federally Qualified Health Centers or low-income health care clinics opened in Spokane County.

Figure 6

Pregnant Women Visiting an Emergency Room by Demographics

Spokane County, January 1999 – September 2008

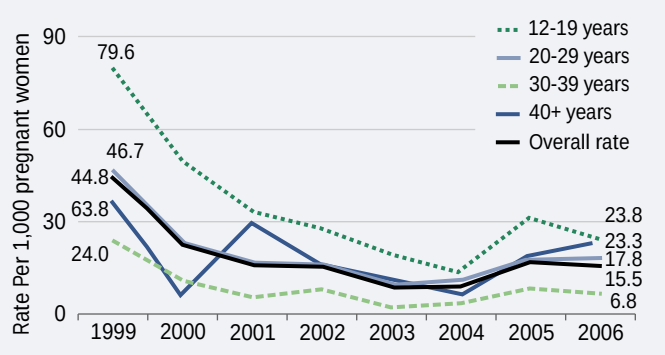


Source: Meditech System, Inland Northwest Health Services (INHS)

Figure 7

Emergency Room Visits Over Time by Maternal Age Group

Spokane County, 1999-2006



Source: Meditech System, Inland Northwest Health Services (INHS)

Reason for Visiting Emergency Room

The most common reason a pregnant woman visited the emergency room was for an injury; 1 in 5 of the ER visits. More than half of the ER visits for an injury were from a motor vehicle crash (22.1%), a fall (20.1%), or being struck by or against something (13.3%). Another 10.0% were seen for a cut or piercing injury and 9.6% were seen for overexertion. Intentional injuries accounted for approximately 1 in 10 of the ER visits for an injury; 6.0% from an assault and 2.4% for a suicide attempt. The remaining 16.5% of injury visits were for a variety of causes.

The next most common reasons a pregnant woman visited the emergency room were for symptoms of illness and pregnancy complications. Symptoms of illness are ill-defined physical conditions that are not connected to well-defined disease, such as a fever, cough, or nausea. Pregnancy complications include conditions such as bleeding, spontaneous abortion, hypertension, and conditions related to labor and delivery. More than half (52.2%) of the ER visits with a primary diagnosis of pregnancy complications were for either a hemorrhage or a pre-existing condition, like diabetes, that was complicating the pregnancy. Table 5 shows the distribution of other reasons pregnant women visited the ER. The leading causes for ER visits among pregnant women were similar for all age groups.

Approximately 1 in 10 pregnant women visiting an ER are admitted to the hospital. Table 6 shows the hospital admission levels by the primary ER diagnosis.

Table 5

Primary Reason For Visiting an Emergency Room, Pregnant Women

Spokane County, January 1999-September 2008

	Count	Percent
Injury	249	19.9
Symptoms of illness	186	14.9
Pregnancy complications	186	14.9
Pregnancy	132	10.6
Respiratory disease	62	5.0
Oral/dental	50	4.0
Genito/urinary disease	45	3.6
Other mental disorder	40	3.2
Exam/observation	39	3.1
Central nervous system disease	35	2.8
Digestive system disease	30	2.4
Communicable disease/prophylaxis	28	2.2
Skin disease	23	1.8
Asthma	22	1.8
Other musculoskeletal disease	21	1.7
Back pain	20	1.6
Eye or ear disorder	16	1.3
Infections	15	1.2
All psychoses	14	1.1
Other	38	0.0
TOTAL	1,251	100.0

Source: Meditech System, Inland Northwest Health Services (INHS)

Table 6

Hospital Admission After ER Visit Among Pregnant Women by ER Primary Diagnosis

Spokane County, January 1999-September 2008

	Percent Admitted	Total Count
All cancer	100	1
Appendicitis	100	2
Pregnancy induced hypertension	100	2
All psychoses	85.7	14
Asthma	40.9	22
Pregnancy complications	33.3	186
Other mental disorder	20.0	40
Pneumonia and influenza	20.0	5
Digestive system disease	10.0	30
Back pain	10.0	20
Skin disease	8.7	23
Aftercare/follow up	8.3	12
Exam/observation	7.7	39
Eye or ear disorder	6.3	16
Injury	4.8	249
Central nervous system disease	2.9	35
Symptoms of illness	2.7	186
Pregnancy	2.3	132
Genito/urinary disease	2.2	45
Oral/dental	2.0	50
Respiratory disease	1.6	62
Other	0.0	80
TOTAL	9.0	1,251

Source: Meditech System, Inland Northwest Health Services (INHS)

Maternal Mortality

Maternal deaths are defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy or its management, but not from accidental or incidental causes.[2] The major causes of maternal death are bacterial infection, variants of gestational hypertension including pre-eclampsia, obstetrical hemorrhage, ectopic pregnancy, and complications of abortions.

In the United States, the maternal mortality rate in 2005 was 15.1 per 100,000 live births. Maternal mortality was highest among women 35 years of age or older and was lowest among women 20 years of age or younger. Among racial groups, maternal death rates were highest among Black women (39.2 per 100,000) and lowest among Hispanic women (9.6 per 100,000). The maternal mortality rate for Black women was roughly 3.3 times the rate for White women (11.7 per 100,000).[3]

In 2000-2006, Spokane County's maternal mortality rate was 7.7 per 100,000 births. There was no significant difference in the maternal mortality rate between Spokane County and Washington State (9.8 per 100,000), Clark County (7.8 per 100,000), or Snohomish County (9.9 per 100,000).

Infections during pregnancy pose health risks for the mother and infant. Nearly 1 in 10 births for Spokane County were to a woman with any infection during pregnancy.

KEY FINDING

Infectious Diseases

During pregnancy, there are infections that may cause the woman to become ill, complicate the pregnancy, or place the baby at risk for illness. Information about infections during pregnancy were collected for gonorrhea, syphilis, herpes simplex virus (HSV), chlamydia, hepatitis B, hepatitis C, HIV infection, and "other" infections.

All Infections

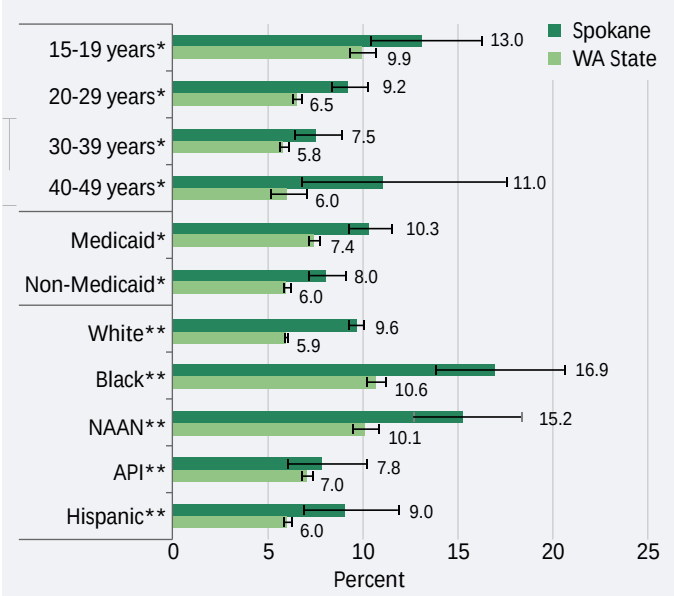
In 2006, Spokane County had a significantly higher proportion of births to women with an infection compared to Washington State; 9.1% and 6.5%, respectively. The proportions have been stable since 2003.

Occurrence of an infection during pregnancy decreased as age increased for both Spokane County and Washington State in 2006. Women on Medicaid were more likely to have an infection when compared to women not on Medicaid; 31% higher for Spokane County and 25% higher for Washington State. In 2003-2006, there were differences by race in the proportion of births with a maternal infection during pregnancy for both Spokane County and Washington State. Compared to White women, Black and Native American/Alaska Native women were more likely to have an infection during pregnancy. Statewide, Asian/Pacific Islander women were also at an increased risk (Fig. 8).

Figure 8

Infection During Pregnancy by Demographics

Spokane County and Washington State



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

*2006 **2003-2006

NAAN = Native American/Alaska Native API = Asian/Pacific Islander

Sexually Transmitted Diseases

Sexually transmitted diseases cause the same consequences in pregnant women as they do in women who are not pregnant. However, there are additional STD-related risks for pregnant women including early onset of labor, premature rupture of the membranes surrounding the baby in the uterus, and a uterine infection after delivery. STDs can be passed to the baby from the pregnant woman. Depending on the specific STD, the infant can become infected before birth, during birth and/or through breastmilk.

Sexually Transmitted Diseases *continued...*

Harmful effects of an STD in a baby include low birth weight, eye infection, pneumonia, sepsis, blindness, deafness, and neurologic damage. STDs can be treated during pregnancy and women should ask their doctor about testing if the provider does not routinely perform the tests.[4]

Among women with a reported infection in 2003-2006, Spokane County had a significantly higher proportion with gonorrhea or chlamydia when compared to Washington State. There was no difference in the proportion with syphilis (Table 7). Approximately 75% of maternal infections for Washington State are due to herpes simplex virus (HSV) (33.7%) and "Other" infections (39.0%).

Table 7

Maternal Infections

Spokane County and Washington State, 2003-2006

	Spokane County		Washington State	
	Count	Percent	Count	Percent
Total infections	2,170	100.0	20,042	100.0
Chlamydia	752	34.7	3,673	18.3
Gonorrhea	71	3.3	255	1.3
Hepatitis B	47	2.2	1,030	5.1
Syphilis	6	0.3	70	0.3

Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Hepatitis B

Hepatitis B infection can pass from a mother to her infant during birth. Up to 90% of infants infected with hepatitis B progress to a chronic infection. The hepatitis B virus attacks the liver and can lead to cirrhosis and liver cancer in individuals with a chronic infection.[5] However, if a baby is given appropriate preventive medication and a vaccination immediately after birth, more than 85% of infections can be prevented.[6] Hepatitis B testing is therefore a standard part of medical care for pregnant women.[7]

For Spokane County in 2003-2006, 2.2% of women with a reported infection had hepatitis B. This averaged to 12 births per year to women with a hepatitis B infection. This accounted for 2 out of 1,000 births during these years. Comparatively, statewide the risk of a pregnant women having hepatitis B was 1.5 times greater than for Spokane County. For Washington State, 3 out of 1,000 births were to women with a hepatitis B infection.

Cesarean Section (C-section)

Delivery by cesarean section increased from 2000 to 2006. More than a quarter of births in 2006 were delivered by cesarean section for both Spokane County and Washington State. There was no difference between Spokane County and Washington State in the proportion of cesarean deliveries (Fig. 9).

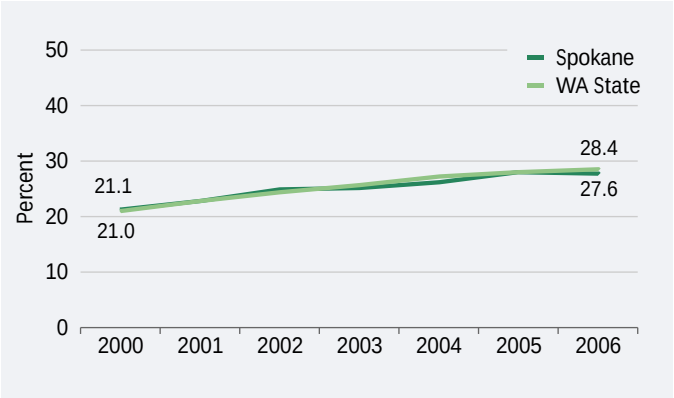
More than a quarter of births in Spokane County and Washington State were delivered by cesarean section, and cesarean deliveries increased as age increased.

KEY FINDING

Figure 9

Cesarean Section Deliveries

Spokane County and Washington State



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

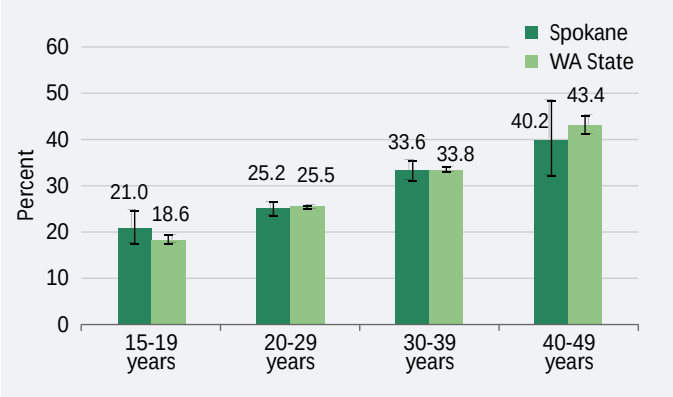
Demographics

The proportion of cesarean deliveries increased as age increased. In 2006, cesarean deliveries accounted for one-third of births among women 30 years of age or older, but for only a quarter of births among women younger than 30 years of age. A significantly lower proportion of women on Medicaid delivered by cesarean section (26%) compared to women not on Medicaid (29%) (Fig.10). There were no differences in the proportion of cesarean deliveries in 2006 between Spokane County and Washington State by age group or Medicaid status.

Figure 10

Cesarean Section Deliveries by Maternal Age Group

Spokane County and Washington State, 2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Delivery by cesarean section for each race was examined using 2000 to 2006 combined data. For Spokane County when compared to White women, Black women were more likely to deliver by cesarean section, but there was no significant difference for other races. Statewide when compared to White women, Black and Asian/Pacific Islander women were both more likely to deliver by cesarean section. Both Native American/Alaska Native and Hispanic women were less likely than White women to deliver by cesarean section (Table 8).

Outcomes

Women delivering multiple infants were significantly more likely to deliver by cesarean section. In 2006, multiple births were 7.8 times more likely to be delivered by cesarean section for Spokane County and 5.4 times more likely statewide. The proportion of multiples being delivered by cesarean section increased from 2000 to 2006 (Table 9).

Table 8

Delivery by C-Section by Maternal Race

Spokane County and Washington State

	Spokane County 2000-2006	WA State 2000-2006
White	24.9%	25.5%
Black	29.4%	29.1%
NAAN	24.3%	23.0%
API	26.0%	26.5%
Hispanic	26.8%	23.1%

Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

NAAN = Native American/Alaska Native API = Asian/Pacific Islander

Table 9

Delivery Method by Plurality of Pregnancy and Geography

Spokane County and Washington State

Type of Delivery	Year	Spokane County		Washington State	
		Singleton	Multiple	Singleton	Multiple
Vaginal	2000	80.5%	36.9%	79.9%	48.0%
	2006	73.8%	26.4%	72.8%	33.2%
Cesarean	2000	19.5%	63.1%	20.1%	52.0%
	2006	26.2%	73.6%	27.2%	66.8%

Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Diabetes

A woman with diabetes may have a larger than average baby. High blood sugar in the baby causes it to make more insulin, thereby generating extra calories that are stored as fat. Because of the large size, there may be delivery complications for both the mother and the baby.[8]

In Spokane County, approximately 1 in 20 births or 5.5% in 2006 were to women with diabetes. The prevalence of pregnant women with diabetes for Spokane County was similar to Washington State (5.8%), higher than Clark County (4.9%), and lower than Snohomish County (6.2%). Diabetic pregnancies increased significantly from 2000 to 2006 for both Spokane County and Washington State (Fig. 11).

Demographics

The risk of diabetes increased with maternal age in 2006 for both Spokane County and Washington State. Compared to women 20-29 years of age, women 30-39 years of age were nearly 2 times more likely and women 40-49 years of age were more than 3 times more likely to have diabetes. There was no significant difference between women 15-19 or 20-29 years of age for Spokane County. But statewide, women 15-19 years of age were half as likely to have diabetes compared to women 20-29 years of age (Fig. 12).

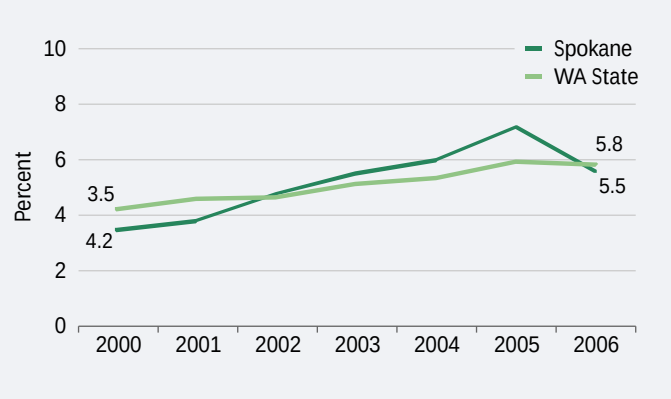
Diabetes as a risk factor by race was examined using 2000 to 2006 combined. For both Spokane County and Washington State, non-Whites except for Hispanics were more likely than Whites to have diabetes as a risk factor during their pregnancy (Fig. 12).

In 2006, there was no difference between women on Medicaid (5.6%) and women not on Medicaid (5.5%) in the proportion with diabetes for Spokane County. Statewide, women on Medicaid were 12% more likely to have diabetes than women not on Medicaid (6.1% and 5.5%, respectively).

Figure 11

Births to Women With Maternal Diabetes

Spokane County and Washington State

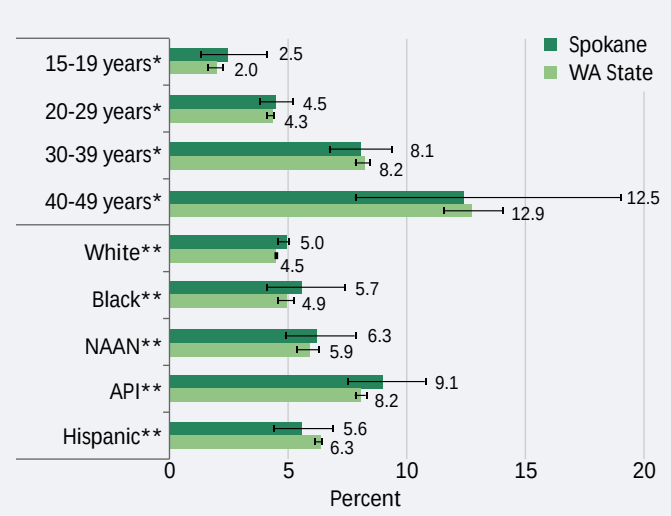


Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Figure 12

Maternal Diabetes by Maternal Age Group and Race

Spokane County and Washington State



Source: Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics
*2006 **2000-2006
NAAN = Native American/Alaska Native API = Asian/Pacific Islander

Previous Preterm Birth

Preterm birth is defined as a gestational age of less than 37 weeks. Women who have had a previous preterm birth are more likely to have another preterm birth when compared to women without a history of preterm birth.[9, 10, 11] Preterm infants often experience long-term health problems.[12, 13] Previous preterm birth was evaluated only among women for whom the current birth was not their first.

In 2006, 5.1% of births for Spokane County were to women with a history of a preterm birth. Statewide, the proportion was significantly lower at 3.7%. The proportion of women giving birth who had previously had a preterm birth increased significantly from 2000 to 2006 for both Spokane County and Washington State (Fig. 13).

Demographics

Adjusting for the number of prior births, in Spokane County and statewide, there was no significant difference by age group in the proportion of 2006 births in which the woman had a prior preterm birth. For Spokane County in 2006, women on Medicaid were 2 times more likely to have a history of preterm birth (6.9%) compared to women not on Medicaid (3.5%). Statewide though, there was no significant difference in having a prior preterm birth between women on Medicaid (3.7%) and women not on Medicaid (3.6%).

In 2006, women with a prior preterm birth were significantly more likely for their current birth to be preterm. The risk of a woman having a preterm birth was 4.1 times greater for Spokane County and 4.8 times greater statewide if she had previously had a preterm birth (Fig. 14).

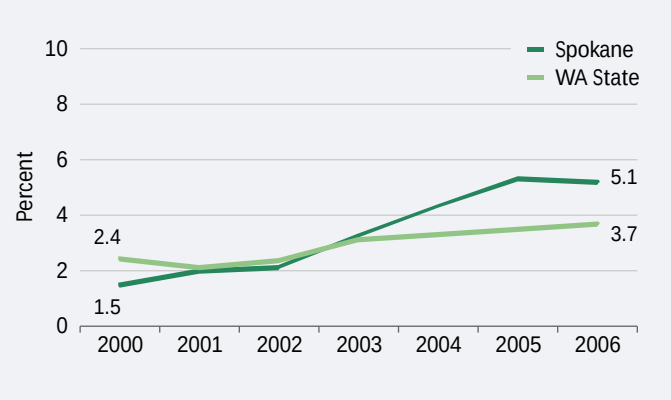
In Spokane County and Washington State an infant born preterm is at increased risk for health problems. Women with a prior preterm birth were more than 4 times more likely to experience a preterm birth with their current pregnancy.

KEY FINDING

Figure 13

Births With a Maternal History of Preterm Birth

Spokane County and Washington State

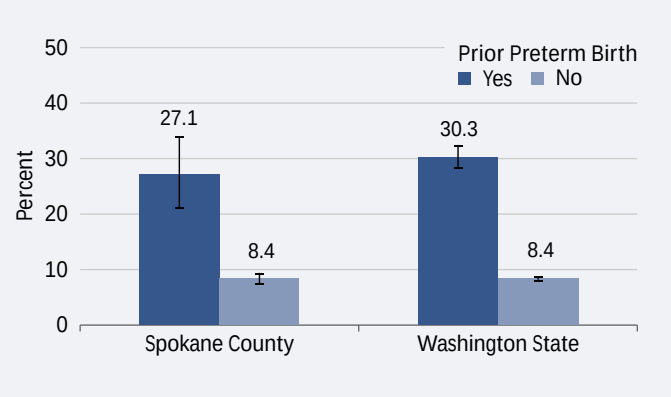


Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Figure 14

Preterm Births by Maternal History of Preterm Birth

Spokane County and Washington State, 2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Previous Other Poor Pregnancy Outcomes

Previous "other" poor pregnancy outcomes were evaluated only among women for whom the current birth was not their first. "Other" poor pregnancy outcomes include the following: perinatal death, small for gestational age, and intrauterine growth restriction. Perinatal death refers to a death within the first 4 weeks after birth or a stillborn infant[14]. Small for gestational age and intrauterine growth restriction refers to an infant whose weight is below the 10th percentile on the intrauterine growth curve for the infant's gestational age[15].

Among women who were on their second or subsequent pregnancy in 2006, 3.0% for Spokane County reported having a previous "other" poor pregnancy outcome. The statewide proportion (2.2%) was significantly lower. The proportion for Spokane County has remained stable since 2003, but increased statewide from 1.9% to 2.2%.

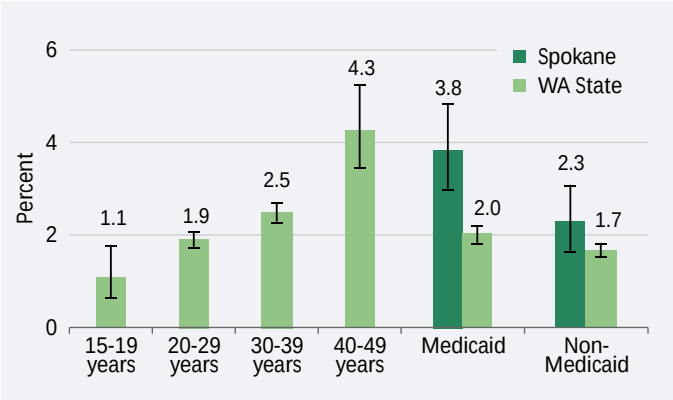
Demographics

For Washington State in 2006, the likelihood of having a prior "other" poor pregnancy outcome increased as maternal age increased (Fig. 15). After adjusting for the number of prior births, maternal age was still a risk factor. Women on Medicaid were at an increased risk for a prior "other" poor pregnancy outcome compared to women not on Medicaid for Spokane County and Washington State in 2006.

Figure 15

"Other" Prior Poor Pregnancy Outcome by Maternal Age Group and Medicaid Status

Spokane County and Washington State, 2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics
"Other" includes perinatal death, small for gestational age, and intrauterine growth restriction

High Blood Pressure

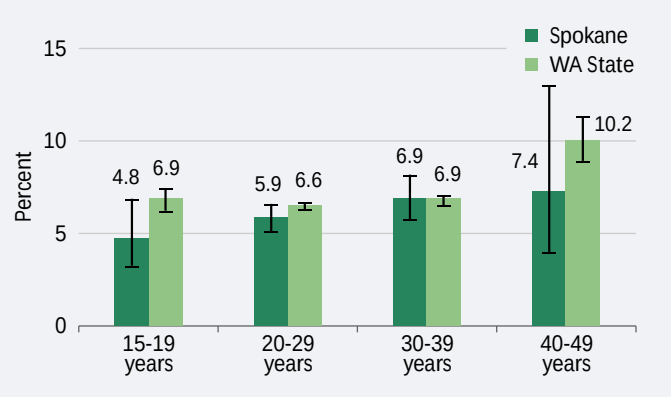
High blood pressure may cause kidney damage in a pregnant woman and cause low birth weight and preterm delivery.[16] In 2006, the proportion of mothers with high blood pressure was statistically lower for Spokane County (6.1%) than for Washington State (6.8%). The proportion of mothers with high blood pressure was stable from 2000 to 2006 for both Spokane County and Washington State.

In 2006, the likelihood of a pregnant woman having high blood pressure increased with age for both Spokane County and Washington State (Fig. 16). High blood pressure as a risk factor by race was examined by combining 2000 to 2006. For Spokane County, women who were Asian/Pacific Islander (4.2%) or Hispanic (5.9%) were less likely to have high blood pressure during pregnancy than White women (7.0%). Statewide, only Asian/Pacific Islander women (4.7%) had a decreased risk when compared to White women (7.4%). There was no difference among other races when compared to Whites. For Spokane County in 2006, there was no difference in high blood pressure between women on Medicaid and women not on Medicaid. Statewide, women on Medicaid (6.0%) were less likely to have high blood pressure compared to women not on Medicaid (7.3%).

Figure 16

Births With Maternal High Blood Pressure by Maternal Age Group

Spokane County and Washington State, 2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Group B Strep

Group B streptococcus (group B strep) is bacteria normally found in the body of many people and it may not cause any symptoms or illness. Approximately one-quarter of pregnant women are positive for group B strep. Colonization of the bacteria in the vagina is not a sexually transmitted disease. It is recommended that pregnant women be tested late in their pregnancy to determine if they are positive for group B strep.

The bacteria can be transmitted to a newborn during delivery and cause illness. Group B strep is the most common cause of life-threatening infections in newborns. It can cause sepsis, meningitis, and pneumonia. Intravenous antibiotics during labor can prevent most group B strep disease in newborns.[17]

County and State Data

In 2006, 20.1% of Spokane County births were to women with group B strep. The statewide proportion was significantly lower at 17.4%. The proportion of births with maternal group B strep increased significantly from 2003 to 2006 for both Spokane County and Washington State (Fig. 17).

Demographics

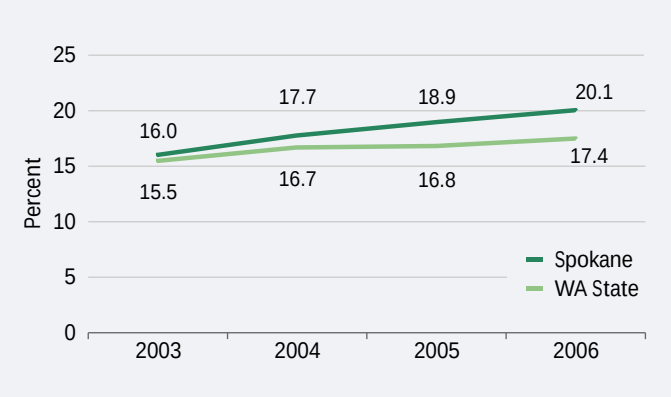
In 2006, there were no differences in the proportions of group B strep by age group for Spokane County or for Washington State. There was also no difference for Spokane County based on whether or not the mother was on Medicaid. Statewide, women on Medicaid were 23% less likely to have group B strep than women not on Medicaid.

Racial differences in group B strep were examined using 2000 to 2006 combined. For both Spokane County and Washington State, Black women were more likely to have group B strep when compared to White women. There were no significant differences for other races for Spokane County. Statewide, Native American/Alaska Native women, Asian/Pacific Islander women, and Hispanic women were less likely to have group B strep when compared to White women (Fig. 18).

Figure 17

Births With Maternal Group B Strep

Spokane County and Washington State

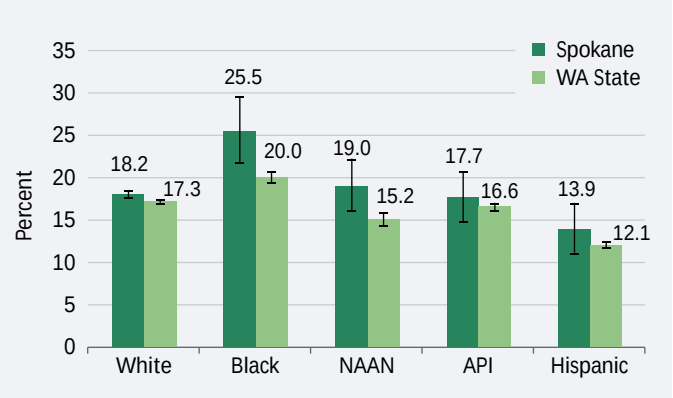


Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Figure 18

Group B Strep During Pregnancy by Maternal Race

Spokane County and Washington State, 2000-2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

NAAN = Native American/Alaska Native API = Asian/Pacific Islander

Maternal Health :: Behavioral Risks

Smoking

Smoking before and during pregnancy is the single most preventable cause of illness and death among mothers and infants. Maternal smoking can result in complications during the delivery for the mother and her newborn, and may result in adverse outcomes for the infant. Complications include low birth weight, preterm birth, ectopic pregnancy, miscarriage, stillbirths, slow fetal growth, placenta previa and abruption, severe vaginal bleeding, intrauterine growth restriction, sudden infant death syndrome (SIDS), and birth defects.[18, 19]

County and State Data

In 2006, Spokane County's smoking rate among pregnant women was 20.1% , which was approximately two times higher than Washington State's rate of 10.3%. For Spokane County, maternal smoking increased significantly from 2003 to 2006, while Washington State had a significant downward trend from 2000 to 2006. Spokane County has the 15th highest maternal smoking rate of the 39 counties for Washington State (Fig. 19).

Demographics

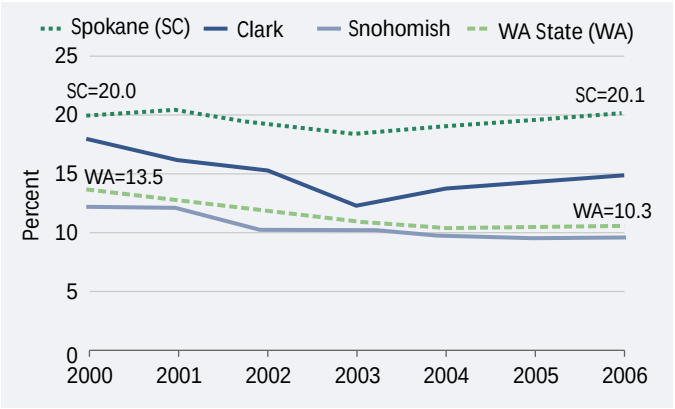
From 2000-2006, maternal smoking decreased as age increased for both Spokane County and Washington State. The maternal smoking rate for Spokane County was higher for each age group than Washington State's rates (Fig. 20).

Women on Medicaid were more likely to smoke during pregnancy when compared to women not on Medicaid. In 2006 for Spokane County, 31.7% of women on Medicaid smoked during pregnancy compared to 10.0% of women not on Medicaid. Statewide, 16.4% of women on Medicaid smoked during pregnancy compared to 6.6% of women not on Medicaid.

Figure 19

Smoking During Pregnancy

Spokane, Clark, and Snohomish Counties and Washington State



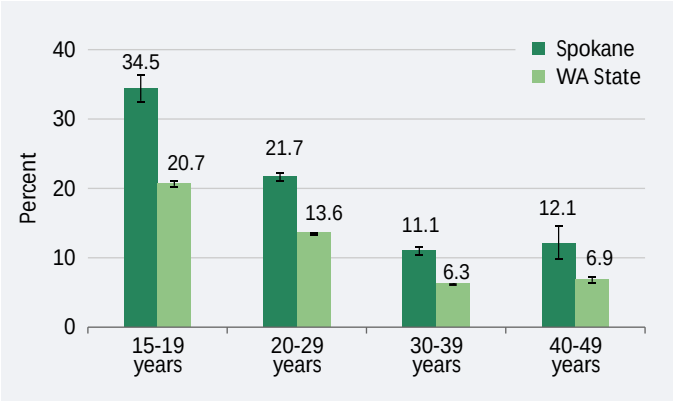
Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

'Maternal Smoking by Neighborhood' topic map available in Appendix B.

Figure 20

Smoking During Pregnancy by Maternal Age Group

Spokane County and Washington State, 2000-2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Women who smoked during pregnancy were more likely to have a preterm birth, a low birth weight infant, or an infant death. The maternal smoking rate for Spokane County is twice the rate of Washington State and has been increasing over time while the state rate has been decreasing.

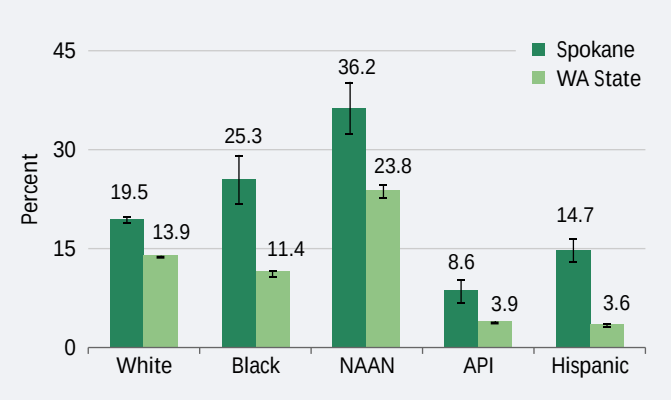
KEY FINDING

In 2000-2006, the rate of smoking among pregnant women was consistently higher among all racial groups for Spokane County than for Washington State. For Spokane County, when compared to White women, Black and Native American/Alaska Native women were more likely and Asian/Pacific Islander and Hispanic women were less likely to smoke during pregnancy. Statewide, Native Americans/Alaska Natives were more likely to smoke during pregnancy than White women and other races were less likely (Fig. 21).

Figure 21

Smoking During Pregnancy by Maternal Race

Spokane County and Washington State, 2000-2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

NAAN = Native American/Alaska Native API = Asian/Pacific Islander

Outcomes

For Spokane County and Washington State a significant difference was also observed in the occurrence of low birth weight and the incidence of premature births among women who smoked during their pregnancy when compared to women who did not smoke. In 2000-2006, women from Spokane County who smoked were 1.8 times more likely to have a low birth weight infant and statewide they were 1.6 times more likely than women who did not smoke. Also, in Spokane County and statewide in 2000-2006, women who smoked were 1.3 times more likely to have an infant born prematurely.

There was a significant difference in infant mortality for both Spokane County and Washington State among women who smoked during their pregnancy compared to women who did not smoke. In 2000-2005 for both Spokane County and Washington State, women who smoked during their pregnancy were two times more likely to have an infant death.

Risk Factors

In 2000-2006, for Spokane County and Washington State, the likelihood of beginning prenatal care in the first trimester was substantially less for women who smoked when compared to women who did not smoke.

Prenatal Care

Prenatal care refers to the medical attention received by women before and during their pregnancy, specifically addressing the mother's well-being during her pregnancy and caring for the development of her baby. The goal of prenatal care is to detect potential problems early on in the pregnancy and to prevent potential complications.

Early prenatal care is a significant component in ensuring a good pregnancy outcome. Although it is recommended for women to begin prenatal care during the first trimester, some women seek prenatal care at a later stage in their pregnancy or not at all. Women who receive late or no prenatal care are at risk for having undetected complications of pregnancy that can result in severe maternal morbidity and mortality and in serious consequences to the unborn infant including low birth weight, premature birth, morbidity, and mortality.[20, 21]

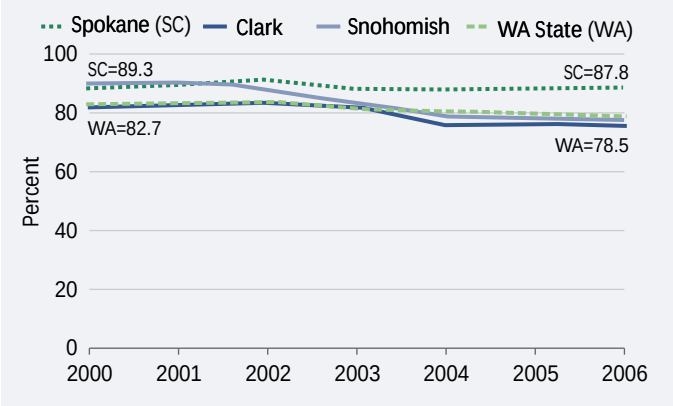
First Trimester Prenatal Care

In 2006, 87.8% of Spokane County births were born to women who began prenatal care within the first trimester. Spokane County had a higher proportion of women beginning prenatal care in the first trimester than Washington State (78.5%), Clark County (75.5%), and Snohomish County (77.8%). Among all counties for Washington State in 2006, Spokane County had the third highest rate for woman seeking prenatal care within the first trimester; however, this falls short of the national Healthy People 2010 goal of 90% or higher.[22] Since 2000, Spokane County experienced a significant downward trend for women beginning prenatal care in their first three months of pregnancy; this holds true for the state, Clark County, and Snohomish County (Fig. 22).

Figure 22

First Trimester Prenatal Care

Spokane, Clark, and Snohomish Counties and Washington State



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

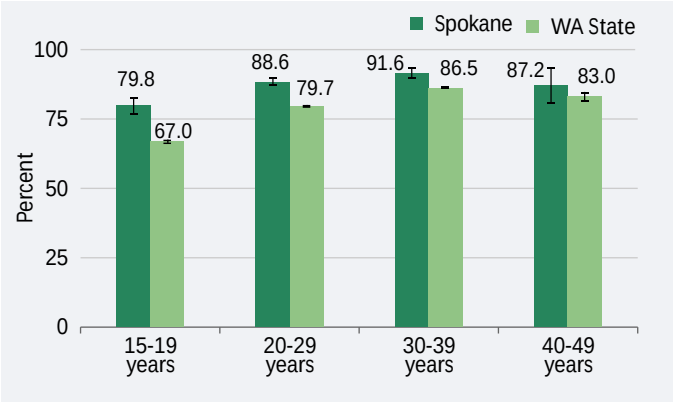
Demographics

The rate of first trimester prenatal care by age group for Spokane County was consistently higher than Washington State's rate for each age group from 2000 to 2006. The youngest age group had the lowest rate of first trimester prenatal care for both Spokane County and Washington State (Fig. 23).

Figure 23

First Trimester Prenatal Care by Maternal Age Group

Spokane County and Washington State, 2000-2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

The vast majority of Spokane County births were to women who began prenatal care in the first trimester (88%). However, this is less than the Healthy People 2010 goal of 90% or higher, and there has been a significant downward trend. Women with prenatal care beginning in the first trimester were significantly less likely to have a low birth weight infant or a preterm birth.

KEY FINDING

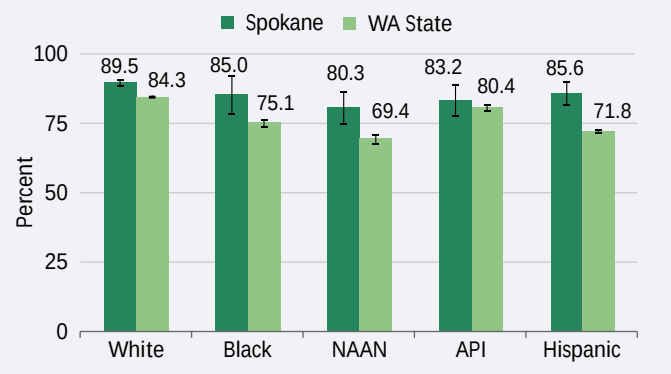
Since 2000, the proportion of births with first trimester prenatal care in Spokane County for each racial group was greater than the statewide proportion. White women had the highest overall rate, while Native American/Alaska Native women had the lowest overall rate. For Spokane County, all racial groups maintained rates above 80% (Fig. 24).

For both Spokane County and Washington State in 2006, women on Medicaid were nearly 3 times less likely to begin prenatal care in the first trimester. Among Spokane County women, 81.9% of those on Medicaid and 92.9% of those not on Medicaid began prenatal care in the first trimester. Statewide, 67.7% of women on Medicaid and 85.3% of women not on Medicaid began prenatal care in the first trimester.

Figure 24

First Trimester Prenatal Care by Maternal Race

Spokane County and Washington State, 2000-2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics
NAAN = Native American/Alaska Native API = Asian/Pacific Islander

Outcomes

During 2000-2006 women who received timely prenatal care were 50% less likely to have an infant death in Spokane County and 75% less likely to have an infant death in Washington State. Infant deaths occur infrequently (approximately 0.5% of births), but is the worst outcomes of a birth.

Risk Factors

There are many factors that affect the health of a pregnant woman and her unborn infant. Health care workers have an opportunity to address many of the issues during routine prenatal care visits. The proportion of women whose doctor, nurse, or other health care worker talked to them about maternal and infant health issues varied depending on the topic. Compared to Washington State, a significantly lower proportion of Spokane County women received prenatal counseling on birth control after pregnancy, HIV testing, and maternal smoking (Table 10).

Table 10

Healthcare Worker Talked About Maternal and Infant Health Topic During a Prenatal Care Visit

Spokane County and Washington State, 2000-2006

	Percent of Women	
	Spokane County	Washington State
Medicines that are safe to take during pregnancy	89.9	88.7
Doing tests to screen for birth defects or disease that run in the family	88.3	88.6
Breastfeeding	88.1	86.3
What to do if labor starts early	87.4	85.7
Birth control methods to use after pregnancy	79.8**	85.6
Getting a blood test for HIV	79.4**	84.7
How drinking alcohol during pregnancy could affect a baby	68.9	72.2
How smoking during pregnancy could affect a baby	65.1**	70.7
Using a seat belt during pregnancy	60.2	58.5
How using illegal drugs could affect a baby	57.5	63.1
Physical abuse to women by their husbands or partners	49.2	54.5

Source: Pregnancy Risk Assessment Monitoring System (PRAMS)
** Statistically significant difference between Spokane County and Washington State at p<0.05

Late or No Prenatal Care

Late prenatal care is defined as births where the pregnant mother began prenatal care in the third trimester. Late or no prenatal care significantly decreases the likelihood of a pregnant mother delivering a healthy infant of normal birth weight. In addition, late or no prenatal care postpones or eliminates the opportunity for healthcare providers to educate expectant mothers on high-risk behaviors and to detect and treat pregnancy-related conditions or complications that may affect fetal development.

County and State Data

During 2006 for Spokane County, the percent of births to women with late or no prenatal care was 3.1%. The likelihood of late or no prenatal care for Spokane County was approximately 1.6 times less than Washington State, nearly 1.4 times less than Clark County, and approximately 1.8 times less than Snohomish County. A significant upward trend was observed for both Spokane County and Washington State (Fig. 25).

Demographics

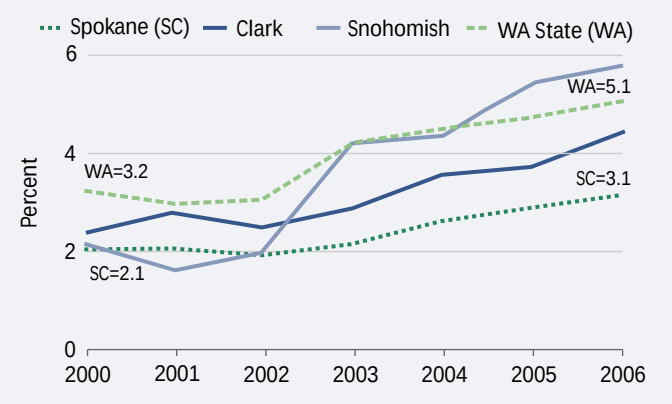
The rate of late or no prenatal care by age groups for Spokane County was consistently lower than Washington State from 2000 to 2006. For Spokane County and Washington State, women 15-19 years of age were more likely to seek late or receive no prenatal care when compared to older women (Fig. 26). For Spokane County from 2000 to 2006, there were significant upward trends in delayed prenatal or no prenatal care among women 15-19 years of age and women 20-29 years of age.

Spokane County had a consistently lower rate of late or no prenatal care among each racial group, with the exception of Asian/Pacific Islander women, from 2000 to 2006 than Washington State (Fig. 27). Rates for White women and Asian/Pacific Islander women for Spokane County had a significant upward trend. For Washington State, a significant upward trend was observed in women of all racial groups.

Figure 25

Late (3rd Trimester) or No Prenatal Care

Spokane, Clark, and Snohomish Counties and Washington State

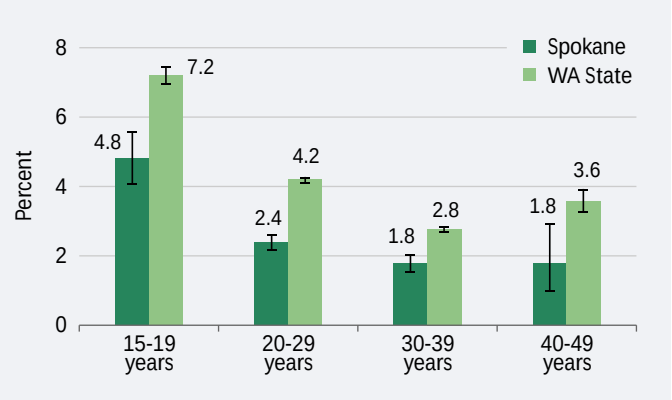


Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Figure 26

Late (3rd Trimester) or No Prenatal Care by Maternal Age Group

Spokane County and Washington State, 2000-2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

'Late or No Prenatal Care by Neighborhood' topic map available in Appendix B.

Outcomes

In 2000-2006, women in Spokane County who began prenatal care in the third trimester or did not receive any prenatal care were approximately two times more likely to have a low birth weight infant; statewide, they were 1.4 times more likely than women who began prenatal care prior to the third semester.

In 2000-2006, women in Spokane County who delayed their prenatal care until the third trimester or did not receive any prenatal care were 1.5 times more likely to have an infant born prematurely and statewide were 1.2 times more likely than women who began prenatal care prior to the third trimester.

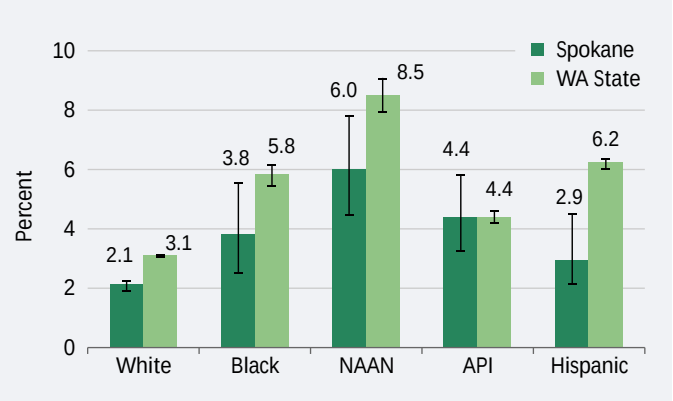
Risk Factors

In 2000-2006, women in Spokane County who smoked were approximately three times more likely than women who did not smoke and were 2.2 times more likely statewide to delay prenatal care until the third trimester or not to receive any prenatal care.

Figure 27

Late (3rd Trimester) or No Prenatal Care by Maternal Race

Spokane County and Washington State, 2000-2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics
NAAN = Native American/Alaska Native API = Asian/Pacific Islander

Folic Acid

Folic acid is a B vitamin used by the body to make new cells. Adequate folic acid intake helps prevent neural tube defects in an infant. These defects may develop in the first weeks of pregnancy before a woman may know she is pregnant. Taking 400 µg daily through a multivitamin or other means can reduce the risk of a neural tube defect by 50%.[23, 24]

County and State Data

In 2000-2006, less than half of women were taking a multivitamin in the 3 months before getting pregnant. There was no difference in the proportion between Spokane County (48.0%) and Washington State (45.9%).

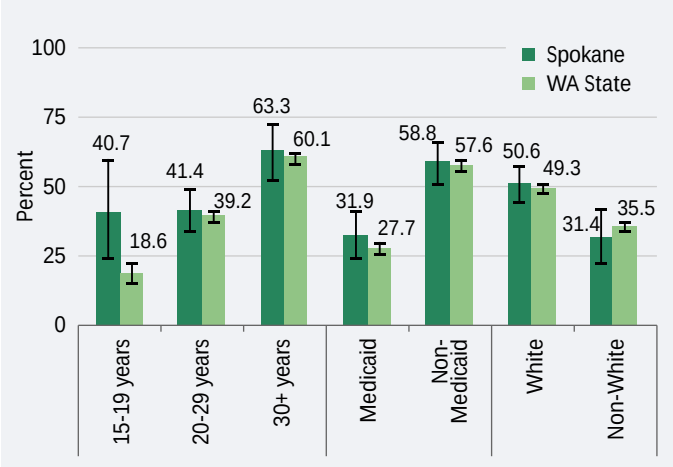
Demographics

Maternal age, Medicaid status, and race were associated with women taking a multivitamin for both Spokane County and Washington State. The likelihood of a woman taking a multivitamin before becoming pregnant increased as age increased. Women on Medicaid were more than 3 times less likely than women not on Medicaid to have been taking a multivitamin in the three months prior to becoming pregnant. The proportions for Spokane County and Washington State were similar. Non-White women were approximately 2 times less likely than White women to have taken a multivitamin prior to becoming pregnant. There was no difference by race between Spokane County and Washington State in pre-pregnancy multivitamin use (Fig. 28).

Figure 28

Pre-Pregnancy Multivitamin Use by Demographics

Spokane County and Washington State, 2000-2006



Source: Pregnancy Risk Assessment Monitoring System (PRAMS)

Alcohol Use

Alcohol use during pregnancy may cause birth defects or developmental disabilities, known as fetal alcohol spectrum disorders (FASDs). There is no known amount of alcohol that is safe to drink while pregnant, nor is there a time during pregnancy when it is safe to drink. Recommendations are for women who are planning a pregnancy or are pregnant to abstain from alcohol.[25]

Alcohol During Pregnancy

In 2000-2006, less than 1 in 10 births were to women who drank alcohol in the last trimester of pregnancy. The difference between Spokane County (8.4%) and Washington State (7.8%) was not significant.

Demographics

Maternal age, Medicaid status, and race were associated with maternal alcohol use in the last trimester among Washington State women.

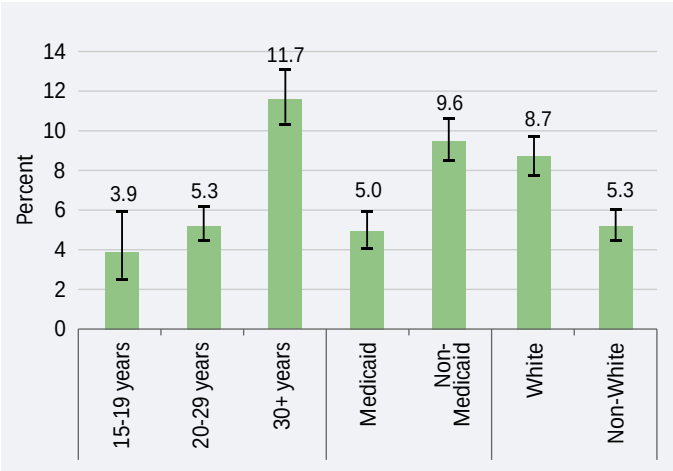
Statewide, alcohol use increased as maternal age increased. Women on Medicaid were 2 times less likely to use alcohol in the last trimester. White women were 70% more likely than non-White women to use alcohol in the last trimester (Fig. 29).

There were no significant associations among Spokane County women.

Figure 29

Alcohol Use in the Last Trimester by Demographics

Washington State, 2000-2006



Source: Pregnancy Risk Assessment Monitoring System (PRAMS)

Interpregnancy Interval

The interpregnancy interval (IPI) is the amount of time between pregnancies. It is calculated from the date of the last pregnancy outcome (birth, fetal death, or other) to the date of the last menstrual cycle. Women with a short (<18 months) or long (60+ months) IPI are more likely to experience a poor birth outcome, such as preterm birth, low birth weight, or small for gestational age. The risk of a poor birth outcome among women with a short IPI is on a gradient scale with a shorter interval (<6 month) having a higher risk than women with an interval of 6-18 months. Possible explanations for these associations are nutritional depletion for short intervals and physiological regression for long intervals.[26, 27, 28, 29, 30]

Interpregnancy intervals were categorized as short (< 18 months), medium (18-59 months), and long (60+ months). From 2000 to 2006, the interpregnancy intervals remained stable for Spokane County and Washington State. Among Spokane County births in 2006, 40.4% had a short IPI and 15.1% had a long IPI. Among statewide births in 2006, 38.3% had a short IPI and 15.8% had a long IPI. Spokane County had a 10% increased likelihood of a short IPI rate compared to Washington State. There was no difference between Spokane County and Washington State for medium or long IPI categories.

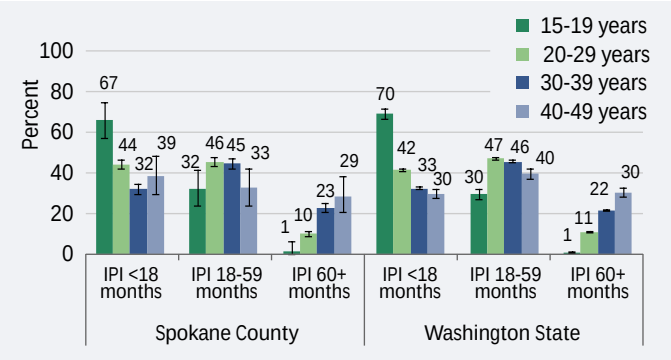
Demographics

Results by age group for IPI were similar between Spokane County and Washington State. Overall in 2006, the likelihood of a short IPI significantly decreased as maternal age increased. There was no linear association for a medium IPI and the likelihood of a long IPI increased as maternal age increased (Fig. 30).

When compared to women not using WIC (Women, Infants and Children) services in 2006, there was no difference in IPI for women using WIC for Spokane County. Statewide, women using WIC were less likely to have a medium IPI and more likely to have a long IPI than those not using WIC. There was no difference in a short IPI between women using WIC and women not using WIC for Washington State (Table 11).

Figure 30

Interpregnancy Interval (IPI) by Maternal Age Group
Spokane County and Washington State, 2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Table 11

Interpregnancy Interval (IPI) by Use of WIC Services
Spokane County and Washington State, 2006

	Spokane County		Washington State	
	WIC	No WIC	WIC	No WIC
IPI <18 months	41.6%	39.4%	38.7%	38.0%
IPI 18-59 months	43.5%	45.3%	44.4%	47.0%
IPI 60+ months	14.9%	15.3%	16.9%	15.0%

Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

'Short Interpregnancy Interval (IPI) by Neighborhood' topic map available in Appendix B.

Interpregnancy Interval *continued...*

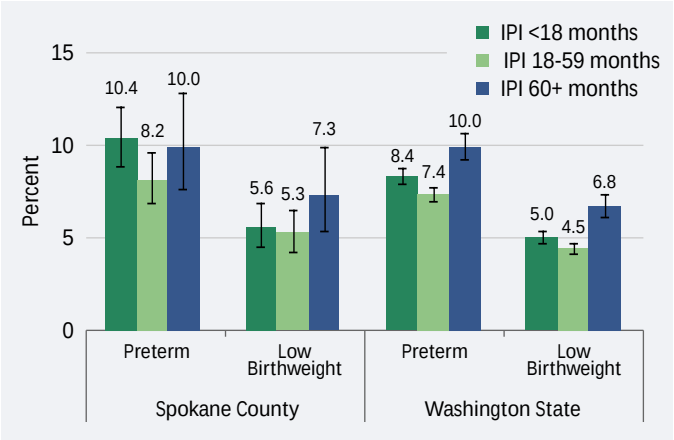
Outcomes

In 2006, women with a medium IPI had the lowest proportion of preterm birth and low birth weight infants. The difference between IPI lengths was not statistically significant for Spokane County, but statewide there were significant differences. Statewide compared to women with a medium IPI, women with a short IPI were 14% more likely to have a preterm birth and 13% more likely to have a low birth weight infant. Women with a long IPI were 38% more likely to have a preterm birth and 55% more likely to have a low birth weight infant (Fig. 31).

Figure 31

Birth Outcome by Interpregnancy Interval (IPI)

Spokane County and Washington State, 2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Intimate Partner Violence

Intimate partner violence increases the risk of poor health outcomes for both the mother and infant. Abused mothers are more likely to have a sexually transmitted disease, kidney or urinary tract infection, nausea, vomiting, dehydration, and an increased number of hospital visits. Additionally, the risk for maternal mortality is three times as high for abused mothers[31] compared to women who are not abused. Infants of abused women are at greater risk for infant mortality, having a low birth weight, being delivered prematurely, and requiring care in an intensive care unit.[32, 33, 34, 35]

When Abuse Occurred

In 2000-2006, 4.3% of Spokane County women and 3.6% of Washington State women who recently gave birth reported that they were physically abused by their husband or partner in the 12 months prior to becoming pregnant. Among those women who were abused prior to becoming pregnant, 53.3% for Spokane County and 49.4% statewide reported they were also abused during their pregnancy. Only 1% of women who were not abused prior to their pregnancy reported being physically abused during their pregnancy.

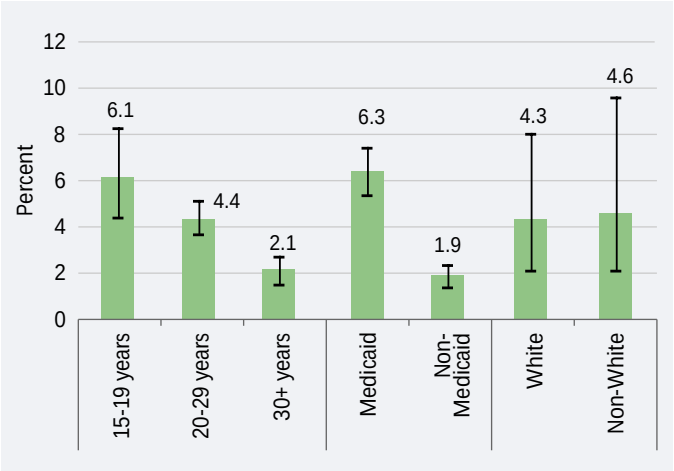
Demographics

Statewide, maternal age, Medicaid status, and race were associated with physical abuse in the 12 months before a woman became pregnant. The proportion of women who reported pre-pregnancy abuse decreased as maternal age increased. Women on Medicaid were 3.5 times more likely than women not on Medicaid to have been abused prior to becoming pregnant. Non-White women were 1.5 times more likely than White women to have been abused prior to their pregnancy (Fig. 32).

Figure 32

Physical Abuse by Husband or Partner in the 12 Months Before Pregnancy

Washington State, 2000-2006



Source: Pregnancy Risk Assessment Monitoring System (PRAMS)

Unintended Pregnancy

"An unintended pregnancy is a pregnancy that is either mistimed or unwanted at the time of conception[36]. Women who have had an unintended pregnancy are more likely to have another unintended pregnancy[37]. Unintended pregnancy is associated with behavioral risks and with adverse maternal and infant outcomes.[38, 39]

Demographics

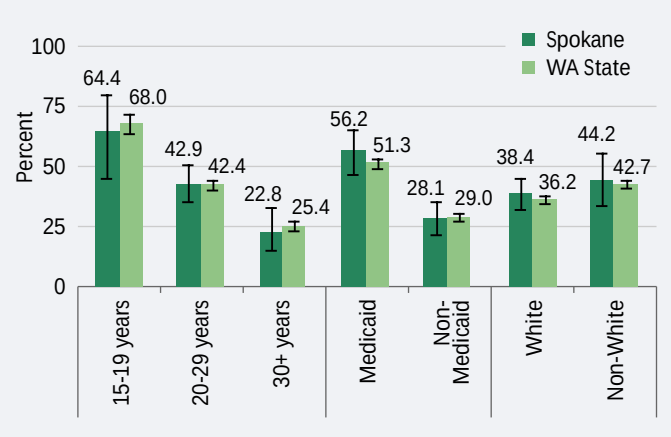
More than one-third of births in 2000-2006 were unintended for both Spokane County (39.1%) and Washington State (37.7%). Maternal age and Medicaid status were associated with unintended pregnancy for both Spokane County and Washington State. The proportion of births that were an unintended pregnancy decreased as maternal age increased. Women on Medicaid were 3.3 times more likely for Spokane County and 2.6 times more likely statewide to have an unintended pregnancy compared to non-Medicaid women. By race, an association with unintended pregnancy was only identified for the state. Statewide, non-White women were 30% more likely than White women to have an unintended pregnancy (Fig. 33).

Outcomes

In 2000-2006, women in Washington State with an unintended pregnancy were more likely to have maternal health risk factors than women with a planned pregnancy. They were two times less likely to breastfeed their infant, 3.6 times more likely to smoke during pregnancy, and 2.7 times more likely to experience physical abuse by their husband or partner during the pregnancy. There was no difference between women with an unintended pregnancy and women with a planned pregnancy for having a low birth weight infant (Fig. 34).

Figure 33

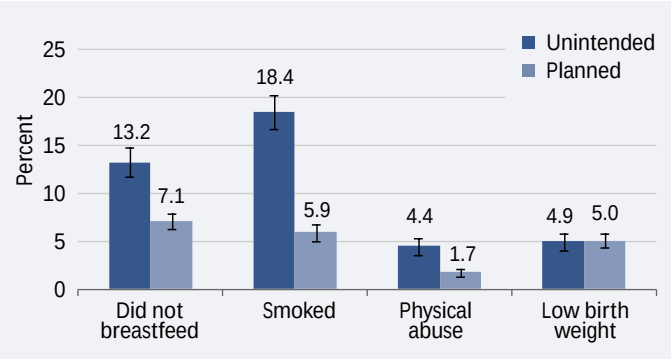
Unintended Pregnancy by Maternal Demographics
Spokane County and Washington State, 2000-2006



Source: Pregnancy Risk Assessment Monitoring System (PRAMS)

Figure 34

Pregnancy Risk Factors by Intent of Pregnancy
Washington State, 2000-2006



Source: Pregnancy Risk Assessment Monitoring System (PRAMS)

More than one-third of births in Spokane County and Washington State were unintended; these were more likely to occur among younger women and those on Medicaid.

KEY FINDING

Social Support

Good social support during pregnancy is associated with fewer complications in the woman and better birth outcomes for the infant. Positive effects include newborn health, infant birth weight, and gestational age.[40]

Having a social support system was determined using four scenarios. Social support was categorized as “good” if a woman had support for at least 3 out of the 4 scenarios. The scenarios were: had someone who could loan her $50; had someone to help her if she was sick and needed to be in bed; had someone to take her to a clinic or doctor's office if she needed a ride; and had someone to talk with about her problems.

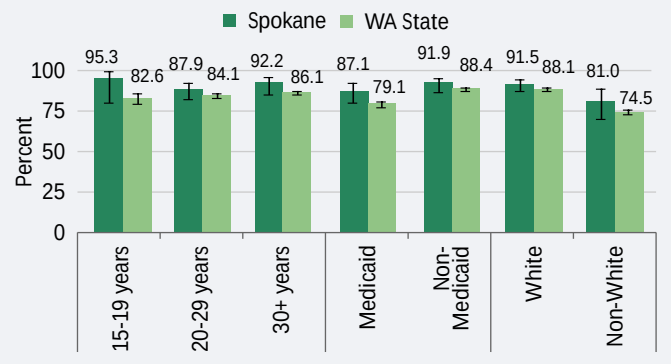
Demographics

In 2000-2006, Spokane County had a significantly higher proportion of women with a good social support system compared to Washington State (90.0% and 84.5%, respectively). There were no significant differences by maternal age or Medicaid status for Spokane County. For both Spokane County and Washington State, White women were 2.5 times more likely than non-White women to have a good social support system. Statewide, having good social support increased as maternal age increased and was 2 times less likely among women on Medicaid (Fig. 35).

Figure 35

Social Support by Maternal Demographics

Spokane County and Washington State, 2000-2006



Source: Pregnancy Risk Assessment Monitoring System (PRAMS)

Oral Health

The oral health of pregnant women is unique in that dental decay and the lack of dental hygiene not only affects the mother's health, it can also adversely affect the outcome of an unborn infant. Among expecting mothers there is an increase in the incidence of “pregnancy gingivitis”, a condition caused by poor oral hygiene and elevated hormone levels, resulting in an exaggerated response to plaque. Evidence suggests an association between periodontal disease and an increased risk of pre-term births and low birth weight infants, especially in economically disadvantaged populations[41]. Furthermore, an association between periodontal disease and increased risk of maternal complications, such as preeclampsia has also been observed[42]. There is no data available on this health issue for Spokane County and Washington State.

After birth, microorganisms that cause decay and infection can be passed to the infant, resulting in oral health problems. The microorganisms can be passed from a mother's mouth to the infant by way of inanimate objects such as toys, spoons, or pacifiers. Mothers should avoid saliva-sharing activities between herself and her child, which includes tasting her baby's food. Additionally, saliva-sharing activities between children should also be avoided as this can be another mode of transmission for infecting agents.

The following recommendations are from the American Academy of Pediatric Dentistry (AAPD) for oral health in infants.[43]

- In order to minimize oral infection and dental decay it is recommended that prior to a child developing any teeth, mothers should wipe the gums of their baby with a clean wet cloth after each feeding.
- Infants should not be given a bottle when being put to sleep.
- As soon as the first tooth appears, mothers should use a soft bristled toothbrush with no toothpaste in conjunction with massaging the gum tissues.
- Schedule a child's first dental appointment by their first birthday or within six months of their first tooth.

Good oral health and dental treatment during pregnancy and early childhood is important. For pregnant women it reduces the risk of adverse birth outcomes for their infant, results in good oral hygiene for expecting mothers, and initiates proper oral care for infants.

Preterm Birth

Preterm birth is defined as “childbirth occurring earlier than 37 completed weeks of pregnancy”. Approximately 12% of all infants (one in eight births) are born prematurely. Since the early 1980s, the rate of premature birth increased by 30% in the United States[44, 45]. This is due in part to an increase in the number of multiple-birth pregnancies, which are more likely to result in premature birth[46, 47]. The exact cause of premature births is not fully understood.

Infants born prematurely have an increased risk of health complications, including infant mortality, and are at a greater risk for developing long-term disabilities and conditions; such as cerebral palsy, chronic lung disease, gastrointestinal problems, and vision and hearing loss. The risk of adverse outcomes is directly related to the length of a woman's pregnancy: the shorter the term of the pregnancy, the greater the risk the newborn has for complications and disabilities, ranging from mild to severe.

County and State Data

In 2006, Spokane County and Washington State had a similar proportion of preterm births (11.6% and 10.7% respectively). Among all 39 counties in the state of Washington, Spokane County ranked 28th in the proportion of premature births among all live births. The proportion of preterm births remained stable from 2000 to 2006 for both Spokane County and Snohomish County, while Washington State and Clark County experienced a significant upward trend (Fig. 36).

Common classifications of specific gestational age categories of premature births include “very preterm” and “moderately preterm” births. Very preterm birth is defined as <32 weeks; moderately preterm birth is defined as 32 to 36 weeks. In 2000-2006, Spokane County and Washington State had a similar percent of moderately preterm births (85%) and very preterm births (15%), among all preterm births.

Multiple-birth infants were 21 times more likely for Spokane County and 19 times more likely statewide to be born prematurely when compared to singletons. Among multiple births in 2006, 64.6% for Spokane County and 61.1% for Washington State were preterm. Comparatively, 8.0% of Spokane County singletons and 7.7% of Washington State singletons were preterm.

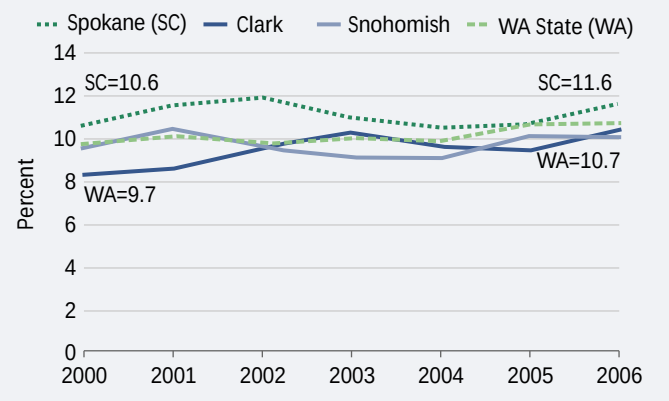
Demographics

For Spokane County and Washington State, the rates of preterm birth were highest among women 40-49 years of age. Women in Spokane County in their 20s, 30s, and 40s had preterm birth rates slightly higher than women of the same age group in Washington State. Women 15-19 years of age in Spokane County and Washington State had similar preterm birth rates (Fig. 37). From 2000 to 2006, preterm birth rates for each age group remained stable for Spokane County. For Washington State, women 15-19 years of age, women in their 20s, and women in their 30s experienced a significant upward trend for preterm birth rates. The rate remained stable for women in their 40s.

Figure 36

Premature Births

Spokane, Clark, and Snohomish Counties and Washington State

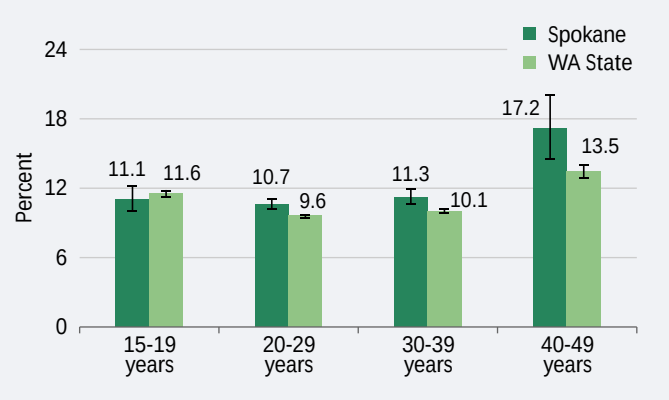


Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Figure 37

Premature Births by Maternal Age Group

Spokane County and Washington State, 2000-2006



Source: Pregnancy Risk Assessment Monitoring System (PRAMS)

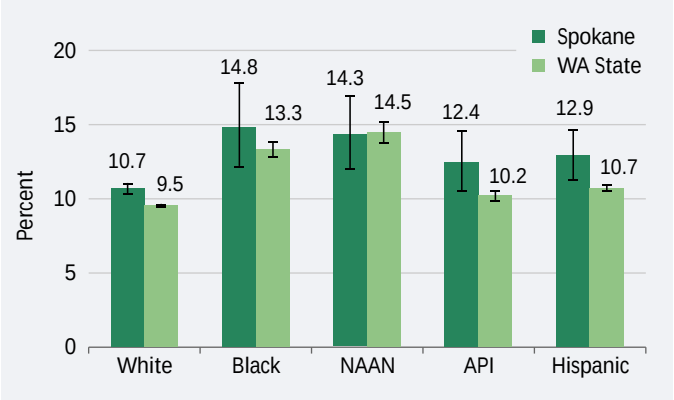
Preterm Birth *continued...*

The risk of preterm birth for Spokane County in 2000 to 2006 was lowest among White women (10.7%); all other racial groups had similar preterm birth rates. For Washington State, White women had the lowest rate of preterm birth (9.5%) while Native American/Alaska Native women had the highest rate of preterm birth (Fig. 38). Spokane County preterm birth rates among each racial group remained stable from 2000 to 2006. For Washington State, each racial group, with the exception of Asian/Pacific Islander women, experienced a significant upward trend in premature birth rates from 2000 to 2006.

Figure 38

Premature Births by Maternal Race

Spokane County and Washington State, 2000-2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics
NAAN = Native American/Alaska Native API = Asian/Pacific Islander

Outcomes

For Spokane County and Washington State, there was a significant difference in the occurrence of low birth weight infants among infants born prematurely when compared to infants that were not premature. In 2000-2006, infants for Spokane County born prematurely were 25 times more likely to be low birth weight; statewide, they were 29 times more likely to be low birth weight. During 2000-2005 for both Spokane County and Washington State, there was a significant difference between preterm and full-term births in relation to infant death. A preterm birth was more than 15 times more likely to result in infant death, when compared to a full-term birth.

In Spokane County and Washington State approximately 1 in 10 births were preterm. Preterm infants were 15 times more likely to die before their first birthday than full-term infants.

KEY FINDING

Risk Factors

In 2000-2006, women in Spokane County who began prenatal care in the first trimester were 20% less likely to have a preterm birth when compared to women who did not begin their prenatal care in the first trimester; women in Washington State were 3% less likely. Women who began their prenatal care in the third trimester or who did not receive any prenatal care during their pregnancy were 50% more likely to have an infant born prematurely when compared to women who began prenatal care prior to the third trimester; women in Washington State were 20% more likely.

Low Birth Weight

Low birth weight is defined as <2,500 grams (5.5 pounds) and very low birth weight is defined as <1,500 grams (3.3 pounds). About 1 in every 13 infants born in the United States is born with low birth weight (approximately 8%) and 67% of low birth weight infants are born prematurely.[48] Infants who are low birth weight have a 25% chance of dying before the age of one. More than three quarters of infant deaths are caused by babies being born too small or too early.[49] Low birth weight infants have higher rates of subnormal growth and of adverse health conditions. They are also at an increased risk of serious health problems as newborns, of developmental problems, of lasting disabilities, and even of death.

County and State Data

The proportion of births with low birth weight remained stable from 2000 to 2006 for Spokane County, but increased significantly statewide. Although the proportion of births with low birth weight remained stable for Spokane County (6.8%), it was higher than the proportion for Washington State (6.5%), Clark County (6.1%) and Snohomish County (5.9%) in 2006. Among all 39 counties for Washington State, Spokane County had the sixth highest rate for low birth weight (Fig. 39).

Multiple-birth infants were 21 times more likely to have a low birth weight when compared to singletons. Among multiple births in 2006, 54.6% for Spokane County and 53.3% for Washington State had a low birth weight. Comparatively, 5.4% of Spokane County singletons and 5.1% of Washington State singletons had a low birth weight.

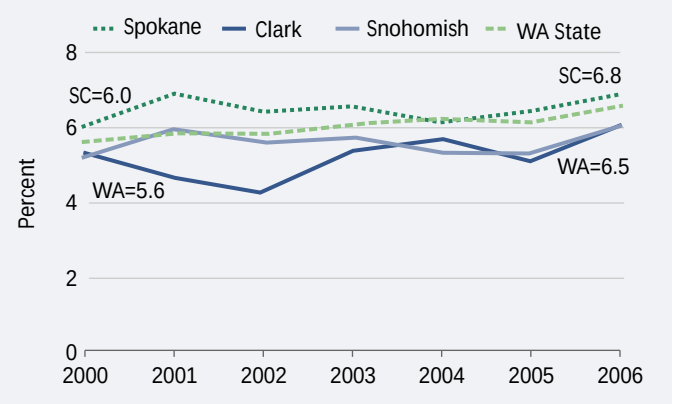
Demographics

Women 15-19 years of age and women over the age of 35 years are at an increased risk of having an infant that is low birth weight.[50] For both Spokane County and Washington State, women 15-19 years of age and 40-49 years of age had a higher percent of low birth weight infants than women in their 20s and 30s. Women 40-49 years of age had the highest proportion of low birth weight infants compared to any other age group for both the state and for Spokane County. From 2000-2006, Spokane County had a slightly higher proportion of low birth weight in each age group when compared to the state (Fig. 40).

Figure 39

Low Birth Weight (<2500g)

Spokane, Clark, and Snohomish Counties and Washington State

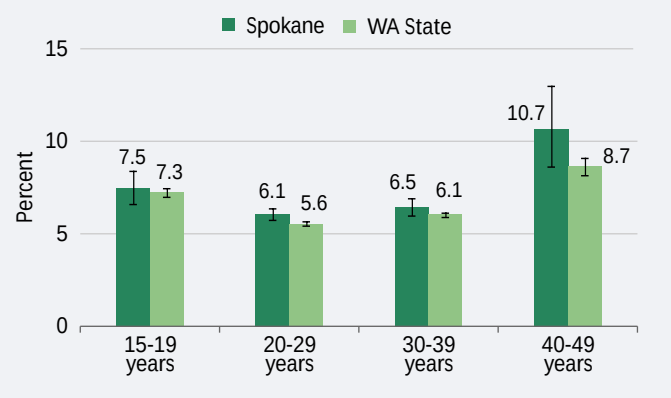


Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Figure 40

Low Birth Weight (<2500g) by Maternal Age Group

Spokane County and Washington State, 2000-2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Low birth weight infants in Spokane County and Washington State were more likely to die before their first birthday. Rates of low birth weight infants were highest among women 15-19 and 40-49 years of age.

KEY FINDING

Low Birth Weight *continued...*

In 2006, when compared to women 20-29 years of age, women 40-49 years of age were at an increased risk for delivering a low birth weight infant; 93% more likely for Spokane County and 65% more likely statewide. There was no difference among other age groups for Spokane County, but statewide women 15-19 years of age had a 32% increased risk for delivering a low birth weight infant.

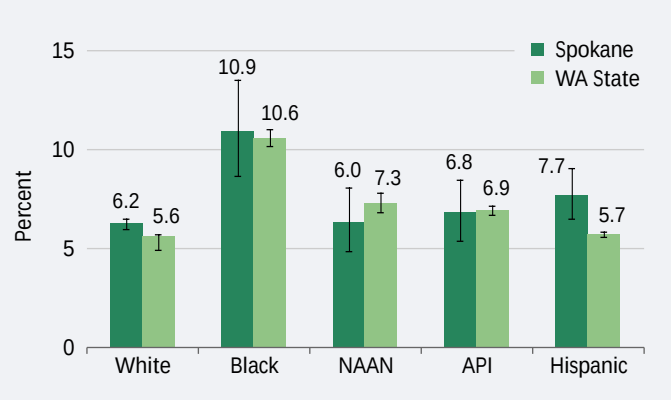
For Spokane County and Washington State, White women had the lowest rate of low birth weight infants among all racial groups, and Black women had the highest rate of low birth weight infants among all racial groups (Fig. 41).

Women on Medicaid were more likely than women not on Medicaid to deliver a low birth weight infant. In 2006, 7.9% of Medicaid births for Spokane County were low birth weight compared to 5.9% of non-Medicaid births. Statewide the proportions were 7.4% and 5.9%, respectively.

Figure 41

Low Birth Weight (<2500g) by Maternal Race

Spokane County and Washington State, 2000-2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

NAAN = Native American/Alaska Native API = Asian/Pacific Islander

Outcomes

In 2000-2005 for both Spokane County and Washington State, there was a significant difference between low birth weight infants and normal birth weight infants in relation to infant death. Low birth weight infants were more than 21 times more likely to die than a normal birth weight infant.

Risk Factors

In 2000-2006, women for Spokane County who began prenatal care in the first trimester were 15% less likely to have a low birth weight infant when compared to women who did not begin their prenatal care in the first trimester; statewide was 14% less likely. Women who began their prenatal care in the third trimester or who did not receive any prenatal care during their pregnancy were approximately 2 times more likely to have a low birth weight infant when compared to women who began prenatal care prior to the third trimester; statewide, 1.4 times more likely.

Very Low Birth Weight

Very low birth weight is a term used to describe infants weighing <1,500 grams (3.3 pounds). Nationally, approximately 1.5% of all live births are born weighing <1,500 grams. This rate has been increasing over the last several years primarily due to the increase in multiple-birth infants, who are more likely to be born early and to weigh less. The increase in multiple births is related in part to assisted reproductive techniques, which have been on the increase in recent years.

The primary cause of very low birth weight is premature birth (born before 37 weeks gestation). Very low birth weight infants are often born before 30 weeks of pregnancy.[51] Very low birth weight infants have risk factors similar to those of low birth weight infants, and they experience poor outcomes analogous to those experienced by low birth weight infants. However, very low birth weight infants experience complications that are more significant.

County and State Data

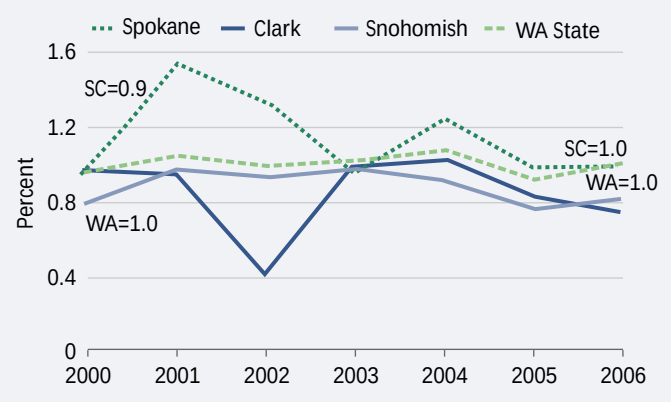
One in 100 births in Spokane County have a very low birth weight. From 2000 to 2006 there was no significant change in the very low birth weight rate for Spokane County, Clark County, Snohomish County and Washington State (Fig. 42).

For Spokane County during 2000-2006, 6.4% of all births were low birth weight, and 1.1% were very low birth weight. Very low birth weight infants accounted for 17.2% of all low birth weight infants born for Spokane County. For Washington State during 2000-2006, 6.0% of all births were low birth weight, and 1.0% were very low birth weight (Fig. 43). Very low birth weight infants accounted for 16.7 % of all low birth weight infants born for Washington State. In 2000-2006 for both Spokane County and Washington State, the likelihood of a very low birth weight infant being premature was significant.

Figure 42

Very Low Birth Weight (<1500g)

Spokane, Clark, and Snohomish Counties and Washington State

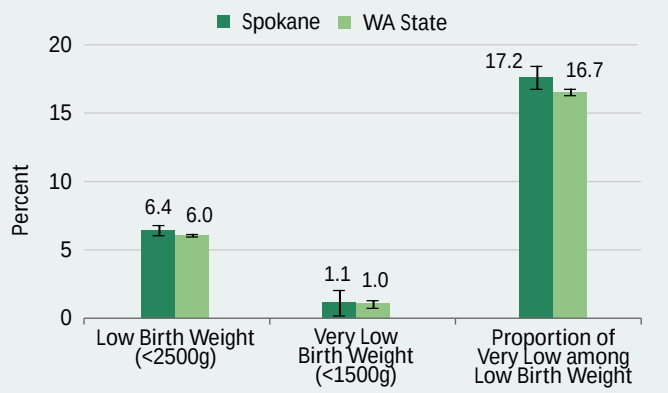


Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Figure 43

Comparison of Low to Very Low Birth Weight

Spokane County and Washington State, 2000-2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Very Low Birth Weight *continued...*

Demographics

In the State of Washington during 2000-2006, women 15-19 years of age and women 40-49 years of age had higher proportions of very low birth weight infants than women in their 20s and 30s. Women 15-19 years of age had a proportion that was approximately 1.5 times greater than women 20-29 years of age and 1.3 times greater than women 30-39 years of age. Women 40-49 years of age had a proportion of very low birth weight that was 1.3 times greater than women in their 20s and 1.5 times greater than women in their 30s. The proportion of very low birth weight infants remained stable for all age groups from 2000 to 2006 for Washington State (Fig. 44).

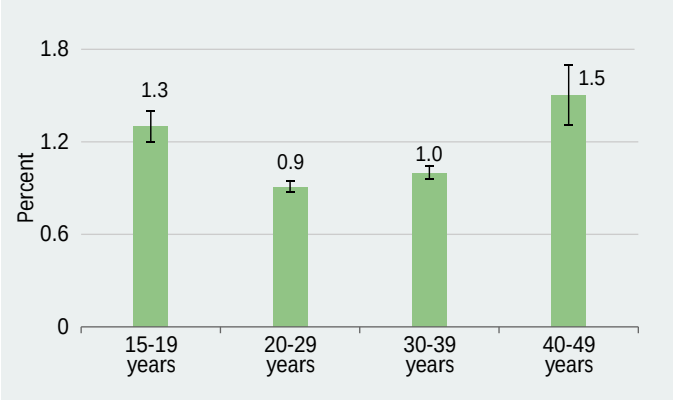
Statewide in 2000-2006, White women had the lowest proportion of very low birth weight infants (0.9%). The highest proportion of very low birth weight infants was among Black women (2.1%), which was 2.4 times greater than White women, approximately 2.2 times greater than Hispanic women, 2.1 times greater than Asian/Pacific Islander women, and 1.6 times greater than Native American/Alaska Native women. From 2000 to 2006, the proportion of very low birth weight infants for each racial group remained stable (Fig. 45).

Outcomes

In 2000-2006 for both Spokane County and Washington State, very low birth weight infants were approximately 20 times more likely to die in the first year when compared to infants with a low birth weight, but with a weight more than 1500 grams. Among all low birth weight infants that died, three quarters had a very low birth weight. Among all very low birth weight infants, a quarter died in the first year. Less than 2% of all infants with a birth weight between 1500-2500 grams died in the first year.

Figure 44

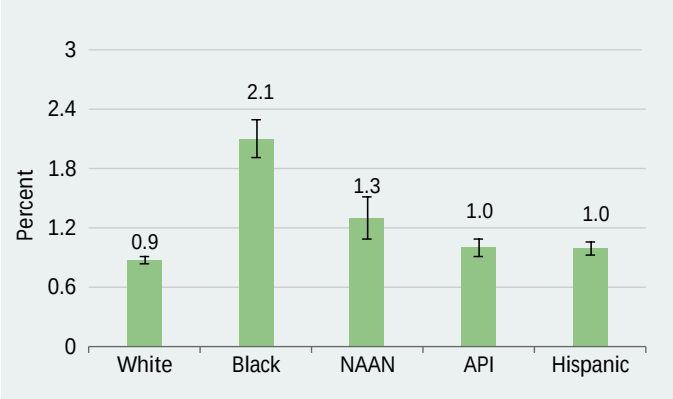
Very Low Birth Weight (<1500g) by Maternal Age Group
Washington State, 2000-2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics
NOTE: Due to small numbers, Spokane County data is not stable.

Figure 45

Very Low Birth Weight (<1500g) by Maternal Race
Washington State, 2000-2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics
NAAN = Native American/Alaska Native API = Asian/Pacific Islander
NOTE: Due to small numbers, Spokane County data is not stable.

Risk Factors

There was a significant difference in the occurrence of very low birth weight infants for both Spokane County and Washington State among women who had smoked during their pregnancy when compared to women who did not smoke. In 2000-2006, women from Spokane County who smoked were 1.4 times more likely to have a very low birth weight infant; statewide they were 1.3 times more likely.

For Spokane County, there was no significant difference in the occurrence of very low birth weight infants among women related to when they began prenatal care. Statewide in 2000-2006, women who began prenatal care in the first trimester were 8 times less likely to have a very low birth weight infant when compared to women who did not begin their prenatal care in the first trimester. Women who began their prenatal care in the third trimester or who did not receive any prenatal care during their pregnancy were 1.5 times more likely to have a very low birth weight infant when compared to women who began prenatal care prior to the third trimester.

Congenital Anomalies

Congenital anomalies are birth defects which are recognizable at birth and are significant enough to be considered a problem. Birth defects noted on the birth certificate include physical structural defects and chromosomal defects.[52]

Less than 1% of births had a birth defect observed within the first 24 hours after delivery in each of the geographic areas that were examined. The rate of congenital anomalies was stable from 2003 to 2006 for both Spokane County and statewide. An average of 40 infants per year for Spokane County had a birth defect identified in the first 24 hours. In 2006, births for Spokane County were at a 61% increased risk for a congenital anomaly when compared to Washington State, 13% higher than Clark County and 71% higher than Snohomish County (Fig. 46).

Demographics

For the combined years of 2003 to 2006, there were no differences in congenital anomalies for Spokane County between age groups. Statewide, when compared to infants born to women 20-29 years of age, infants born to women 15-19 years of age had a 22% increased risk and those born to women 40-49 years of age had a 89% increased risk for a congenital anomaly. Women on Medicaid were also at an increased risk for a congenital anomaly when compared to women not on Medicaid; 39% higher for Spokane County and 14% higher statewide during 2003 to 2006 (Fig. 47).

Outcomes

For Spokane County in 2003-2006, infants with a congenital anomaly were three times more likely to be born preterm. Twenty percent of infants with a congenital anomaly were born preterm. Comparatively, 8.0% of infants with no congenital anomaly were born preterm.

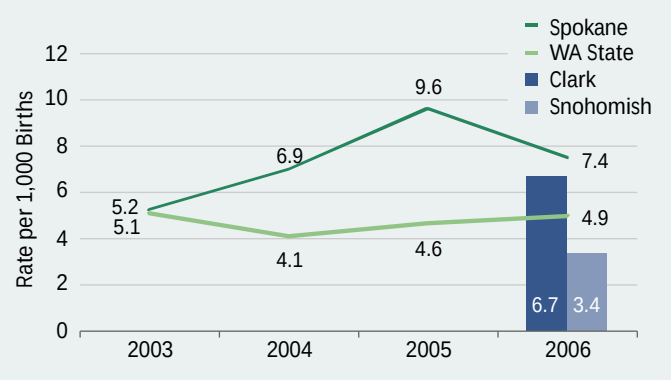
Risk Factors

Maternal smoking increased the risk of a congenital anomaly by 23%. There was no difference in having an infant with a congenital anomaly between women who began prenatal care in the first trimester and those who did not.

Figure 46

Congenital Anomalies Identified at Birth

Spokane, Clark and Snohomish Counties and Washington State

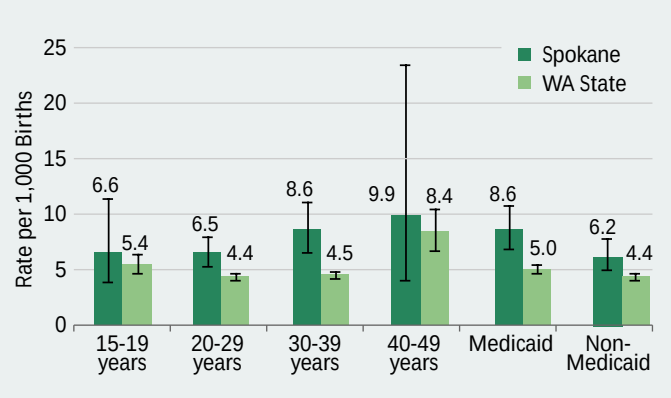


Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Figure 47

Congenital Anomalies Identified at Birth by Maternal Age Group and Medicaid Status

Spokane County and Washington State, 2003-2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

An average of 40 infants per year in Spokane County had a birth defect identified in the first 24 hours after their birth. More than half of the congenital anomalies were orofacial clefts and chromosomal disorders.

KEY FINDING

Select Congenital Anomalies

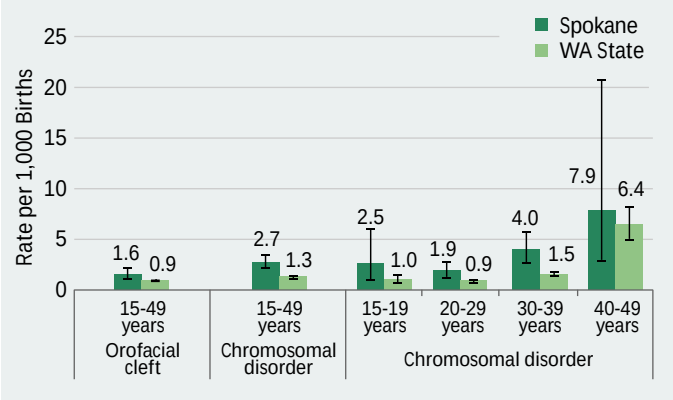
Two common congenital anomalies are orofacial clefts, such as cleft lip or cleft palate, and chromosomal disorders, such as Down syndrome[53]. For the combined years of 2003 to 2006, 1 in 5 birth defects was an orofacial cleft for both Spokane County and Washington State. Chromosomal disorders accounted for 37.3% of birth defects for Spokane County, but only 29.1% statewide.

Spokane County had a significantly higher rate of orofacial clefts than did Washington State in 2003-2006. There was no significant difference for Spokane County or statewide, in the incidence of orofacial clefts by age group or by whether the mother was on Medicaid.

Chromosomal disorders occurred at a higher rate for Spokane County than for Washington State during 2003 to 2006. The risk of a chromosomal disorder increased with maternal age. For Spokane County, women 30-39 years of age were 2.1 times more likely and women 40-49 years of age were 4.2 times more likely to have an infant with a chromosomal disorder when compared to women 20-29 years of age. Statewide when compared to women 20-29 years of age, women 30-39 years of age were 1.7 times more likely and women 40-49 years of age were 7.3 times more likely to have an infant with a chromosomal disorder. There was no difference in the incidence of chromosomal disorders by Medicaid status for either Spokane County or Washington State (Fig. 48).

Figure 48

Select Congenital Anomalies by Maternal Age Group
Spokane County and Washington State, 2003-2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

In Spokane County, 13% of births had a condition requiring medical attention in the first 24 hours after the birth. The majority of these were admitted to newborn intensive care unit (NICU). Low birth weight, preterm birth, and having a congenital anomaly increased the likelihood of the child being admitted to NICU.

KEY FINDING

Hospitalization

In 2002-2006, the average length of stay in a hospital for a newborn for Spokane County was 3 days. A "healthy" baby was defined as spending 3 or fewer days in a hospital. Among infants born preterm (<37 weeks gestation), the average length of stay in a hospital was 16 days. Preterm infants were 23 times less likely to be healthy when compared to full-term infants. Among full-term infants, 92.6% were healthy. Comparatively, only 35.1% of preterm infants were healthy. On hospitalization records, 7% of newborns were identified as preterm, which is less than the proportion identified using the birth certificate.

Cost

The average charge for a newborn hospitalization was about $5,400. Infants born preterm and infants who were not healthy and were hospitalized longer than 3 days, had substantially higher average charges than full-term or healthy infants. Although 7% of newborn hospitalizations were for preterm births, they accounted for nearly half of the total charges. Similarly, 1 in 10 newborn hospitalizations were for infants that were not healthy; these hospitalizations accounted for more than three-quarters of the total charges (Table 12).

Table 12

Hospital Charges for Newborns

Spokane County, 2002-2006

	Average charges	Percent of total charges
All newborns	$5,398	100.0
Full-term newborns	$3,155	54.4
Preterm newborns	$35,313	45.6
Healthy newborns	$1,365	22.4
Not healthy newborns	$36,724	77.6

Source: Comprehensive Abstract Reporting System (CHARS), Washington State Department of Health, Office of Hospital and Patient Data Systems

Conditions Requiring Medical Attention

Conditions that required medical attention for the newborn in the first 24 hours are listed on birth certificates. They include: needing assisted ventilation, admission to the newborn intensive care unit (NICU), receipt of surfactant replacement therapy, neonatal sepsis, seizure or serious neurologic dysfunction, or a significant birth injury. Due to changes in how this information was collected, some of the individual conditions, as well as an aggregate of any condition requiring medical attention, could not be compared over time. Only 2006 information is presented for those conditions.

County and State Data

In 2006, 12.7% of Spokane County births had a condition that required medical attention in the first 24 hours. The proportion for Spokane County was significantly higher than that seen statewide (9.7%).

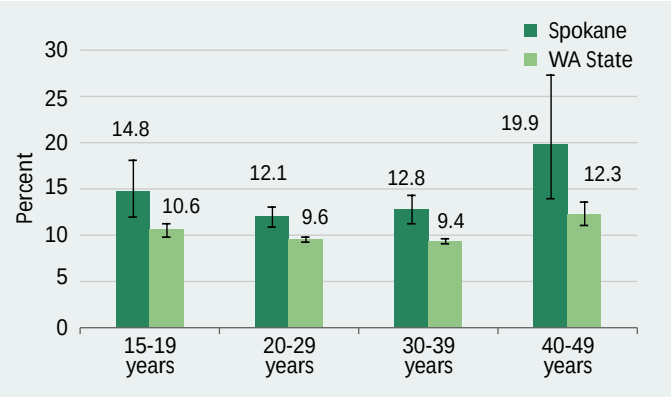
Demographics

When compared to women 20-29 years of age, women 40-49 years of age for both Spokane County and Washington State were significantly more likely to give birth to an infant who needed medical attention. Additionally, statewide, women 15-19 years of age were at an increased risk for their newborn to need medical attention (Fig. 49). There was no difference in the proportion of births needing medical attention between women on Medicaid and women not on Medicaid for either Spokane County or Washington State.

Figure 49

Newborn Required Medical Attention in the First 24 Hours by Maternal Age Group

Spokane County and Washington State, 2006



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Outcomes

Among newborns with a condition requiring medical attention in 2006, the majority were admitted to the NICU (83.8% for Spokane County and 67.3% for Washington State). More than one-third required ventilation (35.8% for Spokane County and 41.5% statewide). Newborns with a seizure or other serious neurologic dysfunction accounted for 0.5% of births needing medical attention. One percent sustained a significant birth injury such as a skeletal fracture, peripheral nerve injury, or a soft tissue or solid organ hemorrhage which required intervention.

Newborn Intensive Care Unit (NICU)

In 2006, 1 in 10 Spokane County newborns were admitted to the newborn intensive care unit (NICU) at birth. The newborn NICU admission rate was significantly higher for Spokane County (10.7%) compared to Washington State's rate (6.5%). The proportion of newborns admitted to the NICU increased significantly since 2003 for both Spokane County (9.1%) and Washington State (5.0%).

Demographics

When compared to infants born to women 20-29 years of age, infants born to women 40-49 years of age were at an increased risk of being admitted to the NICU; 74% more likely for Spokane County and 38% more likely statewide. There was no difference among other age groups for both Spokane County and Washington State (Fig. 50). Additionally, there was no difference in NICU admissions for infants born to women on Medicaid and infants born to women not on Medicaid for either Spokane County or Washington State.

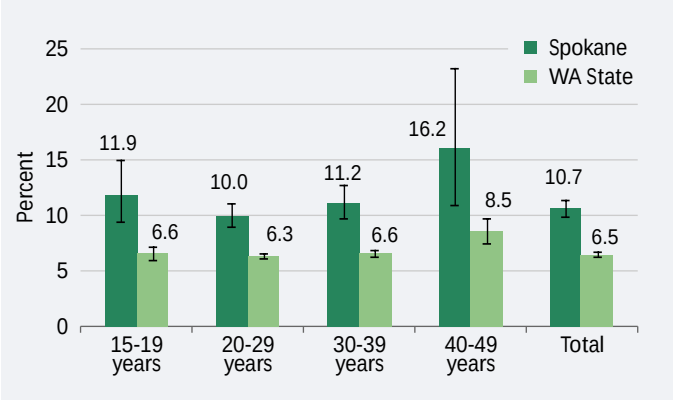
Admission Factors

Both low birth weight and preterm birth increased the risk of being admitted to the NICU by more than 20 times for both Spokane County and Washington State. Among low birth weight or preterm newborns, the likelihood of being admitted to the NICU was more than double for Spokane County when compared to Washington State. For both Spokane County and the state, a newborn with a congenital anomaly was more than 10 times more likely than other newborns to be admitted to the NICU. Among newborns with a congenital anomaly, those from Spokane County were 57% more likely to be admitted to the NICU than were those for Washington State. Multiple-birth newborns were 12 times more likely for Spokane County and 9 times more likely for Washington State to be admitted to the NICU when compared to singletons. Multiple birth infants for Spokane County were more than twice as likely to be admitted to the NICU compared to multiple birth infants statewide (Fig. 51).

Figure 50

Newborn Admitted to the NICU by Maternal Age Group

Spokane County and Washington State, 2006

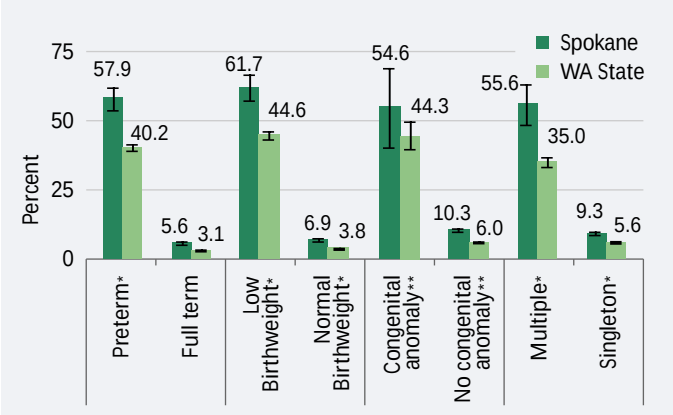


Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

Figure 51

Newborn Admitted to the NICU by Birth Outcome

Spokane County and Washington State



Source: Birth Certificate Data, Washington State Department of Health, Center for Health Statistics

*2006 **2003-2006 combined

Infant Mortality

Infant mortality is a useful indicator for the level of health in a community. It is defined as "the number of deaths of infants younger than one year of age per 1,000 live births for a given period of time". Infant mortality is related to the underlying health of the mother, public health practices, socioeconomic conditions, and the availability and use of appropriate health care for infants and pregnant women.[54] Two-thirds of infant deaths occur in the first month after birth and are primarily due to health problems of the infant or the pregnancy, such as preterm delivery or birth defects. Infant deaths occurring after the first month are influenced greatly by social or environmental factors, such as exposure to cigarette smoke or problems with access to health care.[55]

County and State Data

In 2000-2006, the rate of infant mortality for Spokane County was 5.9 per 1,000 live births. This was higher than Washington State's rate of 5.3 per 1,000 live births, higher than Clark County's rate of 4.4 per 1,000 live births, and higher than Snohomish County's rate of 4.5 per 1,000 live births. Since 2002, Spokane County had a mortality rate consistently higher than Washington State's rate. Since 2000, Washington State experienced a significant downward trend, although the mortality rate for Spokane County remained stable (Fig. 52). In 2000-2006, 60% of all infant mortalities were neonatal and 40% were post-neonatal*.

Multiple-birth infants were at twice the risk of dying before turning 1 year of age. Among multiple-birth infants in 2006, 1.1% for Spokane County and 0.9% statewide died before their first birthday. Comparatively, 0.4% of Spokane County singletons and 0.5% of Washington State singletons died in the first year.

Demographics

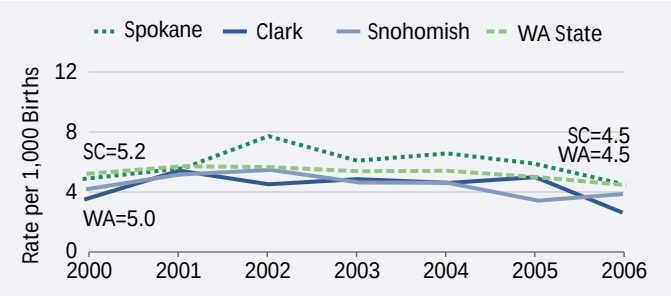
Infant mortality rates by maternal age group and racial group were not assessed for Spokane County due to the small number of cases. Infant mortality was, however, evaluated by age group and racial group for Washington State in 2000-2006.

*Neonatal=0 to 28 days old Post-neonatal=29-364 days old

Figure 52

Infant Mortality

Spokane, Clark, and Snohomish Counties and Washington State

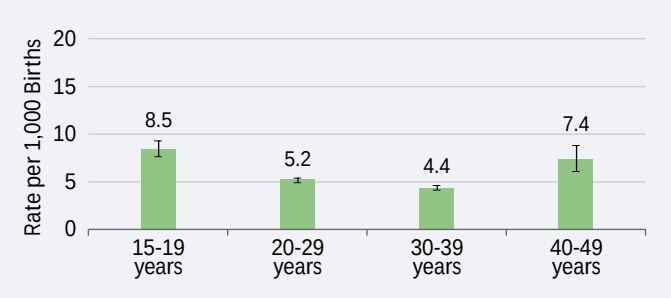


Source: Linked Birth/Death Certificate Data, Washington State Department of Health, Center for Health Statistics

Figure 53

Infant Mortality by Maternal Age Group

Washington State, 2000-2006



Source: Linked Birth/Death Certificate Data, Washington State Department of Health, Center for Health Statistics

Table 13

Infant Deaths and Births by Maternal Age Group

Washington State, 2002-2006

Maternal Age Group	Percent of Births	Percent of Infant Deaths
15-19 years	8.8	14.3
20-29 years	51.9	51.1
30-39 years	36.5	30.7
40-49 years	2.8	4.0

Source: Linked Birth/Death Certificate Data, Washington State Department of Health, Center for Health Statistics

The infant mortality rate for Spokane County was 5.9 per 1,000 live births. Of the infant deaths, 60% died in the first 28 days. For Washington State this rate was highest for mothers 15-19 and 40-49 years of age. Black and Native Americans/Alaskan Natives had higher infant mortality rates than Whites. The leading cause of death for infants was birth defects.

KEY FINDING

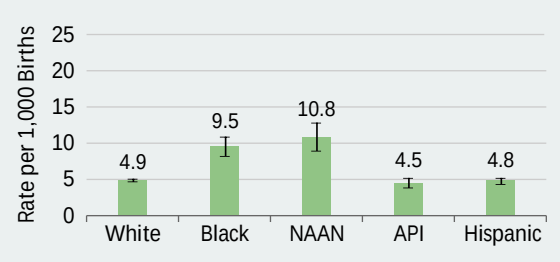
Infant Mortality *continued...*

A total of 2,995 infant deaths occurred for Washington State in 2000-2006. The majority of infant deaths were among infants born to women 20-39 years of age. However, infants born to teen mothers and women 40-49 years of age had a disproportionately higher proportion of death compared to their share of births. Washington State's infant mortality rate was highest among women 15-19 years of age and lowest among women 30-39 years of age (Fig. 53, Table 13).

The maternal racial distribution of infant deaths was 61.6% White, 7.1% Black, 4.1% Native American/Alaska Native, 7.1% Asian/Pacific Islander, and 15.2% Hispanic. Race was not identified on 4.9% of infant death records. When compared to Whites, Blacks had an infant mortality rate that was approximately two times greater and Native American/Alaska Natives had a rate that was 2.2 times greater (Fig. 54).

Figure 54

Infant Mortality by Maternal Race
Washington State, 2000-2006



Source: Linked Birth/Death Certificate Data, Washington State Department of Health, Center for Health Statistics
NAAN = Native American/Alaska Native API = Asian/Pacific Islander

Risk Factors

Spokane County and Washington State share four of the top five causes of death for infant mortality. The leading cause of death for infants was congenital malformations, deformations, and chromosomal abnormalities. This accounted for approximately one quarter of all infant deaths. The rate from this cause was approximately 2 times greater than the rate from the second leading cause of death, Sudden Infant Death Syndrome (SIDS).

Table 14 presents infant deaths, percentage of total deaths and mortality rates for the 5 leading causes of infant deaths for Spokane County and Washington State in 2000-2006.

Table 14

Mortality Rates for the Five Leading Causes of Infants Deaths
Spokane County and Washington State, 2000-2006

Rank	Cause of Death	Number	Percent of Total Deaths	Rate per 1,000 births
Spokane County				
–	All causes	229	100.0	5.86
1	Congenital malformations, deformations, and chromosomal abnormalities	60	26.2	1.53
2	Sudden Infant Death Syndrome (SIDS)	34	14.9	0.87
3	Newborn affected by maternal complications of pregnancy	18	7.9	0.46
4	Disorders related to short gestation and low birth weight	16	7.0	0.41
5	Newborn affected by complications of placenta, cord and membranes	14	6.1	0.36
–	All other causes (residual)	87	38.0	2.22
Washington State				
–	All causes	2,995	100.0	5.3
1	Congenital malformations, deformations, and chromosomal abnormalities	743	24.8	1.3
2	Sudden Infant Death Syndrome (SIDS)	395	13.2	0.7
3	Disorders related to short gestation and low birth weight	325	10.9	0.6
4	Newborn affected by maternal complications of pregnancy	175	5.8	0.3
5	Accidents	129	4.3	0.2
–	All other causes (residual)	1,228	41.0	2.15

Source: Linked Birth/Death Certificate Data, Washington State Department of Health, Center for Health Statistics

Sudden Infant Death Syndrome (SIDS)

Nationally, Sudden Infant Death Syndrome (SIDS) is the leading cause of death in infants between 1 to 12 months old and is responsible for roughly one death per 200,000 live births[56]. Most SIDS cases occur when an infant is between two and four months of age. Nine out of ten SIDS victims die before six months. SIDS is a syndrome that can strike without warning and is marked by the sudden and unexplained death of an apparently healthy infant younger than one year. There is no proven method for preventing SIDS, and health care providers do not know specifically what causes SIDS.[57]

A current trend in monitoring infant deaths is to monitor Sudden Unexplained Infant Deaths (SUID). Approximately half of SUID deaths are attributed to SIDS. Other causes of SUID include overlaying and suffocation. A standardized investigation form for unexplained infant deaths is being promoted. The goal is to improve the accuracy and consistency of reported information and classification of deaths.[58] This report looks at SIDS instead of SUID because the death records have not yet begun to capture SUID as a diagnosis.

Risk factors associated with increased probability of SIDS include: infants sleeping on their stomach or side, infants sleeping on a soft surface/bedding or sleeping in an adult bed, bed sharing with an adult or another child, loose bedding around a sleeping infant, overheating of a sleeping infant, mother smoking during her pregnancy, newborn infant exposed to second-hand smoke, preterm pregnancy, low birth weight, delayed or no prenatal care, maternal drug and/or alcohol use, subsequent births less than one year apart, and teenage pregnancy.

County and State Data

For Spokane County and Washington State, SIDS is the second leading cause of all infant deaths, accounting for about 15% of infant deaths. From 2000 to 2006, Washington State had a significant downward trend in SIDS, while the rate of SIDS for Spokane County, Clark County, and Snohomish County remained stable (Fig. 55).

Demographics

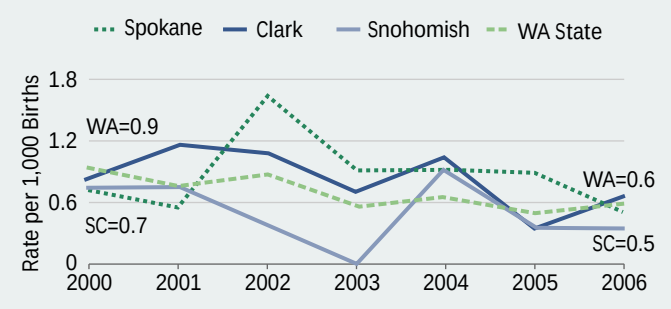
SIDS rates by age group and racial group were not assessed for Spokane County due to the small number of cases, but was evaluated statewide for 2000-2006.

In 2000-2006, the SIDS rate for Washington State was 0.7 per 1,000 live births. The rate of SIDS decreased as the mother's age increased. The rate for infants born to women 15-19 years of age was the highest rate among all age groups and was about 2.3 times greater than the rate among infants born to women in their 20s, approximately 5 times greater than infants born to women in their 30s, and 6.8 times greater than infants born to women in their 40s (Fig. 56). Over time, infants born to women in their 20s and 30s experienced a significant downward trend in SIDS from 2000 to 2006.

Figure 55

Sudden Infant Death Syndrome (SIDS)

Spokane, Clark, and Snohomish Counties and Washington State

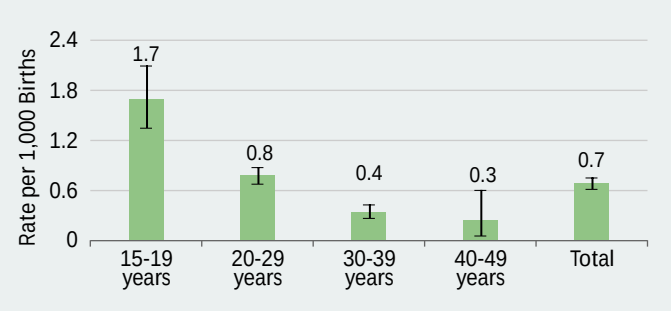


Source: Linked Birth/Death Certificate Data, Washington State Department of Health, Center for Health Statistics

Figure 56

SIDS Mortality Rate by Maternal Age Group

Washington State, 2000-2006



Source: Linked Birth/Death Certificate Data, Washington State Department of Health, Center for Health Statistics

Sudden Infant Death Syndrome (SIDS) *continued...*

In 2000-2006, the rate of SIDS was highest among Native American/Alaska Natives, followed by Blacks. When compared to Whites, the rate of SIDS for Native American/Alaska Natives was 2.4 times greater and 1.7 times greater for Blacks (Table 15). Whites were the only group to have a significant downward trend in SIDS from 2000 to 2006.

Risk Factors

The American Academy of Pediatrics provides recommendations to reduce the risk of SIDS. They include always placing an infant to sleep on their back when sleeping, placing an infant in a safety-approved crib, and not placing an infant to sleep on an adult bed or other non-infant sleeping location.[59] The majority of infants in Spokane County and Washington State were most often placed on their back to sleep. Yet, a quarter of infants were placed on either their side or stomach for sleep. There was no difference between Spokane County and Washington State in the distribution of sleep positions. For Spokane County, 28.4% of infants were placed in a bed with another person always or almost always. When compared to Washington State (36.8%), Spokane County infants were 50% less likely to sleep in a bed with another person (Fig. 57).

Sudden Infant Death Syndrome (SIDS) is the second leading cause of infant mortality in Spokane County and Washington State, accounting for approximately 15% of all infant deaths. In Washington State, SIDS was 2.4 times greater among Native American/ Alaskan Native infants and 1.7 times greater among Black infants when compared to White infants.

KEY FINDING

Table 15

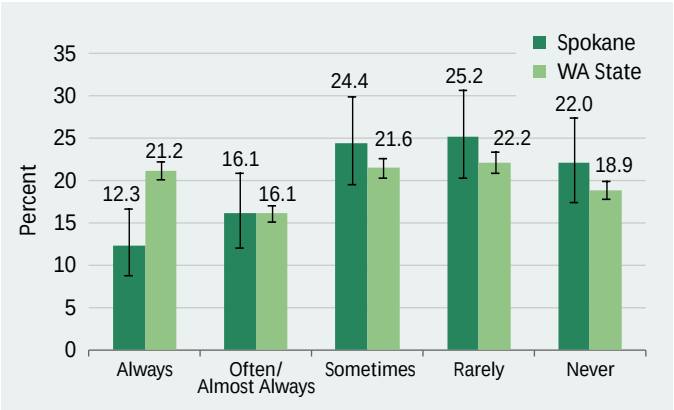
SIDS Mortality by Maternal Race
Washington State, 2000-2006

Maternal Race	Rate per 1,000 Births
White/Non-Hispanic	0.7
Black/Non-Hispanic	1.3
Native American/Alaska Native/Non-Hispanic	1.7
Asian/Pacific Islander/Non-Hispanic	0.5
Hispanic	0.3
Total	0.7

Source: Linked Birth/Death Certificate Data, Washington State Department of Health, Center for Health Statistics

Figure 57

Bed Sharing with an Infant
Spokane County and Washington State, 2000-2006



Source: Pregnancy Risk Assessment Monitoring System (PRAMS)

Child Abuse

Child abuse is the physical, psychological, or sexual maltreatment, as well as the neglect of a child. Child abuse is defined as any act or series of acts of commission or omission by a parent or other caregiver that results in harm, potential for harm, or the threat of harm to a child.[60] Approximately 80% of all child abuse cases involve parents of the victims. Every day, about four children die in the United States because of abuse or neglect, most of them babies or toddlers. For every incidence of child abuse or neglect that is reported, it is estimated that two others go unreported.[61]

Child abuse is associated with a number of negative and lasting outcomes that include lower school achievement, juvenile delinquency, substance abuse, and mental health problems. It can result in death and long-term physical, social, and emotional problems.[62] Adults who were abused or neglected as a child are at an increased risk for health problems that include alcoholism, depression, drug abuse, eating disorders, obesity, sexual promiscuity, suicide, and smoking. Also, adults who were maltreated as children show higher levels of certain chronic diseases, such as heart disease, cancer, chronic lung disease, and liver disease.[63, 64]

County and State Data

From 2001-2007 for Spokane County, 25,308 child abuse cases for children 0 to17 years of age were referred to and investigated by Child Protective Services (CPS). Of these, 4,701 (18.6%) were deemed legitimate. Of the legitimate cases, 1,194 (25.4%) occurred among children 0-1 year of age, which included children greater than one year but less than two years of age.

Demographics of Children

The Spokane County child abuse rate among children 0-1 year of age increased significantly from 2001 to 2007 and was significantly greater each year than the rate for Spokane County (0 to 17 years of age) and for Washington State (0 to 17 years of age). From 2001 to 2007 among children 0-1 year of age, Spokane County experienced on average, approximately a 7% increase in child abuse each year (Fig. 58).

For Spokane County during 2001-2007, 57% of all child abuse cases among children 0-1 year of age occurred among boys and 43% occurred among girls. A significant upward trend was observed in child abuse among both boys and girls 0-1 year of age from 2001 to 2007 for Spokane County. This represents an average increase each year of 7.2% for boys and 6.6% for girls (Fig. 59).

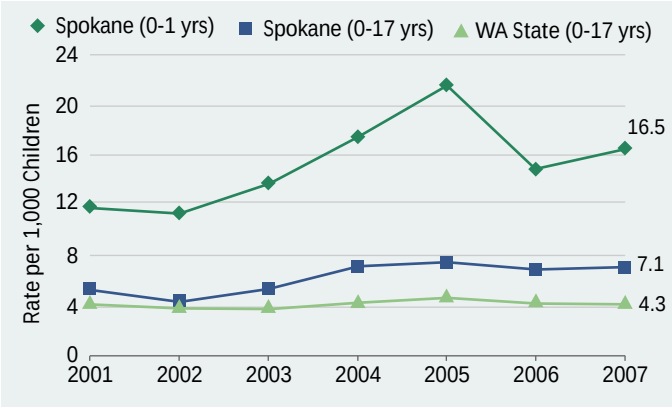
Abuse rates for Spokane County in 2001-2007 were highest among children 0-1 year of age when compared to other age groups. The rate of abuse decreased as a child's age increased.

Type of Abuse

The most common type of abuse for Spokane County in 2001-2007 among children 0-1 year of age was physical neglect, accounting for approximately 93% of the cases. Sexual abuse occurred least, accounting for less than 1% of all cases among children 0-1 year of age (Fig. 60).

Figure 58

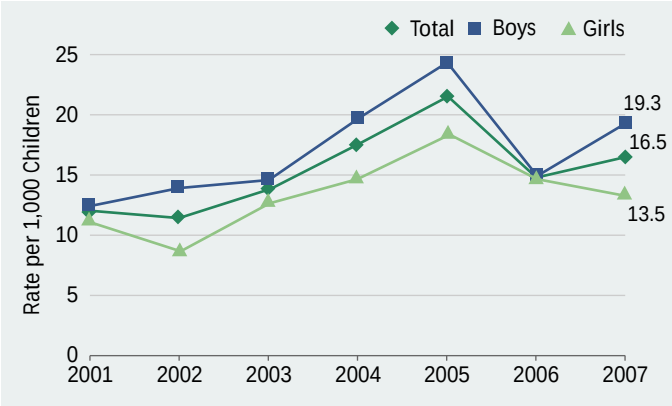
Child Abuse (Founded Cases) by Age Groups
Spokane County and Washington State



Source: Washington State Department of Social and Health Services, Child Protective Services

Figure 59

Child Abuse (Founded Cases), 0-1 Year of Age by Sex
Spokane County



Source: Washington State Department of Social and Health Services, Child Protective Services

Child Abuse *continued...*

Boys were the victims of physical abuse 2.6 times more often than were girls. Emotional abuse/medical neglect/abandonment occurred 2 times more for boys than for girls. Physical neglect occurred slightly more among boys than it did in girls (Fig. 61).

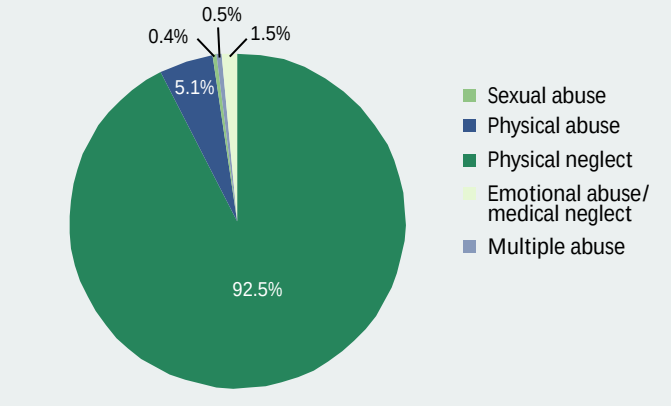
Table 16 presents the percent of children abused by age group for each type of abuse (founded cases) for Spokane County in 2001-2007.

Emergency Room Visits for Abuse

From January 1999 to September 2008, a total of 84 visits to the emergency room for abused children 0-1 year of age occurred in Spokane County. There was no difference in emergency room visits for child abuse among boys and girls. There were significantly more children 0-1 year of age who visited the emergency room that were White (80%) than non-White (20%). This is not reflective of the general population with Whites accounting for approximately 90% of the population in Spokane County. There was no difference in the disposition of the emergency room visits for children who were abused; approximately half were admitted into the hospital and half were discharged home. Children who were discharged home encompass an array of outcomes which includes children being discharged back to their parents, a member of the family, or to foster care. Specifically where a child was discharged after an emergency room visit was not assessed in this report. There were significantly more abused children 0-1 year of age that went to the emergency room whose medical insurance was issued by the government (4 in 5 children). The primary type of government medical insurance for abused children visiting the emergency room was Medicaid (Healthy Options) (Fig. 62).

Figure 60

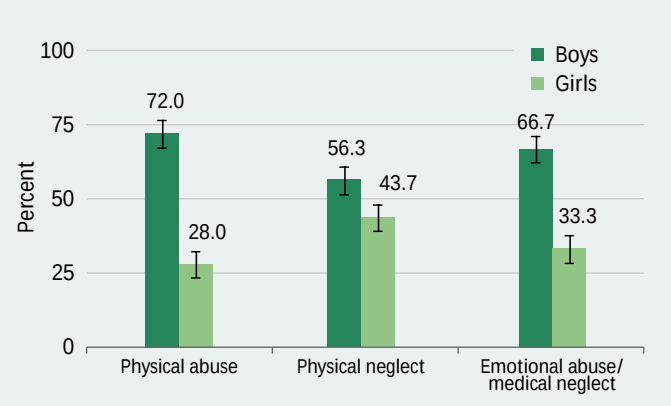
Child Abuse (Founded Cases), 0-1 Year of Age by Type
Spokane County, 2001-2007



Source: Washington State Department of Social and Health Services, Child Protective Services

Figure 61

Type of Abuse, 0-1 Year of Age by Sex
Spokane County, 2001-2007



Source: Washington State Department of Social and Health Services, Child Protective Services

Table 16

Child Abuse by Child Age Group and Type of Abuse (Founded Cases)
Spokane County, 2001-2007

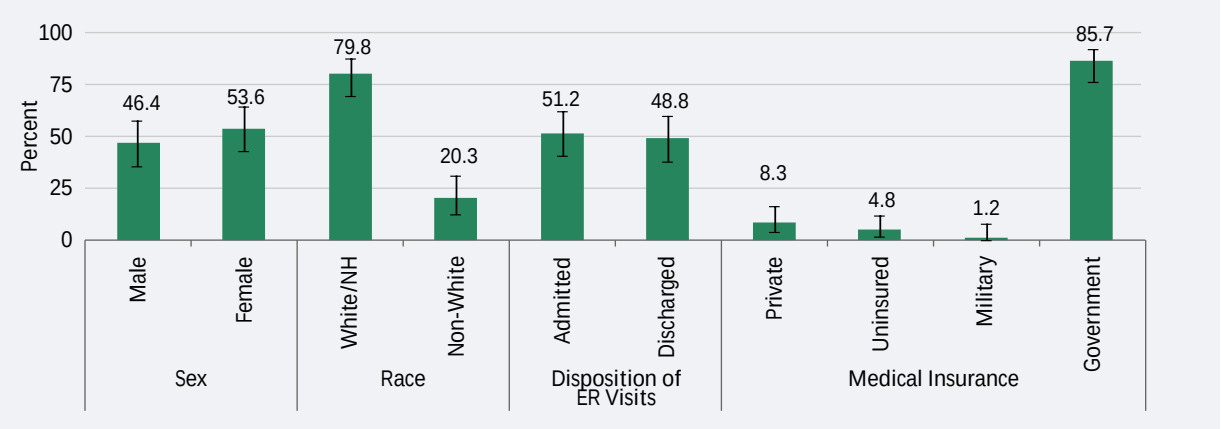
Age Group	Sexual Abuse	Physical Abuse	Physical Neglect	Emotional Abuse/Medical Neglect/Abandonment
Count	n=211	n=425	n=4,004	n=47
0-1 year	2.4%	14.4%	27.6%	38.3%
1-5 years	16.1%	21.9%	32.6%	25.5%
6-11 years	45.0%	34.8%	29.8%	19.1%
12-17 years	36.5%	28.9%	10.0%	17.0%
Total	100.0%	100.0%	100.0%	100.0%

Source: Washington State Department of Social and Health Services, Child Protective Services

Figure 62

Abused Children 0-1 Year of Age Visiting an Emergency Room by Demographics

Spokane County, January 1999-September 2008



Source: Meditech System, Inland Northwest Health Services (INHS)
NH = Non-Hispanic

Approximately 5% of all child abuse cases for Spokane County were among children 0-1 year of age. From 2001 to 2007, there was approximately a 7% increase each year in child abuse cases among this age group. The most common type being physical neglect. KEY FINDING

The primary type of abuse for children 0-1 year of age who visited the emergency room was for physical abuse (2 in 5 visits) followed by multiple forms of abuse (1 in 5 visits). Table 17 shows the top forms of abuse identified for children 0-1 year of age who presented to an emergency room in Spokane County.

Table 17

Most Common Types of Abuse Among Abused Children 0-1 Year of Age Visiting an Emergency Room

Spokane County, January 1999-September 2008

Type of Abuse	Percent
Physical abuse	39.8
Multiple forms of abuse	18.1
Sexual abuse	13.3
Shaken infant syndrome	12.0
Child maltreatment syndrome	8.4
Emotional/psychological abuse	8.4
Total	100.0

Source: Meditech System, Inland Northwest Health Services (INHS)

Immunizations

The purpose of immunization is to prevent disease. Immunization is a process or procedure that increases a child's early reaction to antigens, thereby improving his or her ability to resist or overcome infection before it develops into the disease. Administration of vaccines begins at birth and continues throughout childhood at specific ages. The age at which a child is recommended to receive vaccinations is not arbitrary, but rather is designed to give the child the earliest and best protection against disease and to address the special vulnerabilities of infants.

Importance of Immunizations

The importance of immunizing a child is multifaceted. While newborns may be immune to many diseases because of the antibodies acquired from the mother during the pregnancy, the duration of this immunity weakens as the infant begins to mature. Despite having limited immunity from the mother for some infections, the newborn infant does not gain maternal immunity against many vaccine-preventable diseases. Thus, vaccinating a child can prevent diseases that might occur at an early age that can be far more serious or common among infants. In addition, vaccines assist communities by protecting children who are unable to be vaccinated, such as children who are too young, those who cannot be vaccinated for medical reasons, or those who do not respond to vaccines. Finally, vaccines can also slow down or stop disease outbreaks.

Misconceptions of Immunizations

Despite the success of vaccinations, many families have misconceptions that undermine their confidence in immunizations. The lack of confidence results in parents hesitating to have their child vaccinated or choosing not to have their child vaccinated at all. Worries include that their child will have serious reactions to or complications from the vaccination, may contract the illness that is to be prevented by the vaccine, or may experience discomfort from the vaccine. Absence or delay of a vaccine can lead to the occurrence of a preventable disease that can result in dangerous consequences, including seizures, brain damage, blindness, and even death.[65] Despite misconceptions and concerns, the protection provided by vaccines far outweighs the very small risk of serious problems.

Recommended Vaccinations

Initiation of 10 types of vaccine series are recommended within the first year of an infant's life. Beginning these vaccinations offers protection from 14 infectious and preventable diseases (Table 18). An infant attending a licensed child care facility will need to have current immunizations. If a parent chooses to waive vaccinating his or her child, it is up to the child care provider to decide whether it will accept the infant. If an outbreak of vaccine preventable illness occurs at the childcare site, any child who is not vaccinated against the illness may be excluded from attending until the outbreak is over.

Table 18

Recommended Immunization Schedule for Children 0-1 Year of Age
Washington State

Vaccine	Age of Infant					
	Birth	1 month	2 months	4 months	6 months	12 months
Hepatitis B[1]	HepB	HepB			HepB	
Rotavirus[2]			Rota	Rota	Rota	
Diphtheria, Tetanus, Pertussis[3]			DTaP	DTaP	DTaP	DTaP
Haemophilus influenzae type b[4]			Hib	Hib	Hib	Hib
Pneumococcal[5]			PCV	PCV	PCV	PCV
Inactivated poliovirus[6]			IPV	IPV	IPV	
Influenza[7]					Influenza (Yearly)	
Measles, Mumps, Rubella[8]						MMR
Varicalla[9]						Varicella
Hepatitis A[10]						HepA

Source: Centers for Disease Control and Prevention, Vaccines and Immunizations 2008

Range of recommended ages

1. The final dose should be administered no earlier than 24 weeks but no later than the end of the 18th month.
2. Administer the first dose at age 6-12 weeks. Do not start the series later than age 12 weeks
3. The fourth dose of DTaP may be administered as early as 12 months, provided six months have elapsed since the third dose. The final dose in the series is administered at the age of 4-6 years.
4. A booster is recommended in children 12 months or older. If PRP-OMP is administered at ages 2 and 4 months, a dose at 6 months is not required.
5. The final dose can be given beginning on the 12th month but before the end of the 15th month.
6. The third dose in the series can be given beginning the sixth month but no later than the end of the 18th month. The final dose in the series is administered at the age of 4-6 years.
7. Administer annually. Trivalent inactivated influenza vaccine (TIV) can be given to infants as early as 6 months.
8. The initial dose can be given as early as the 12th month but no later than the end of the 15th month. The final dose in the series is administered at the age of 4-6 years.
9. The initial dose can be given as early as the 12th month but no later than the end of the 15th month. The final dose in the series is administered at the age of 4-6 years.
10. The vaccination is a series of two shots. The initial dose can be given as early as 12 months. The final dose should be administered by the end of the 23rd month at least six months apart from the initial dose.

Breastfeeding

Breastfeeding an infant provides benefits to both the mother and the infant. Breastfed infants have fewer ear infections, less diarrhea and constipation, and fewer illnesses. Breastfeeding also helps protect against allergies, asthma, some childhood cancers, and diabetes. For the mother, breastfeeding returns the uterus to its normal size more quickly than if a mother does not breastfeed, it reduces the risk of some types of ovarian and breast cancer, and provides an opportunity for rest and bonding with their infant.[66]

Length of Breastfeeding

For both Spokane County and Washington State, 9 out of 10 women had breastfed or pumped milk to feed their infant. Of those women who started breastfeeding, more than half were still breastfeeding 2-4 months after the birth. However, Spokane County women were 45% less likely to continue breastfeeding when compared to women statewide. Breastfeeding initiation and continuation of breastfeeding increased significantly as maternal age increased (Table 16).

Table 16

Initiation and Continuation of Breastfeeding

Spokane County and Washington State, 2000-2006

Age Group	Spokane County		Washington State	
	Ever breastfed	Still breastfeeding	Ever breastfed	Still breastfeeding
15-19 years	78.5%	14.9%	84.8%	39.4%
20-29 years	90.1%	53.1%	89.8%	62.3%
30+ years	94.3%	84.0%	92.7%	78.0%
Overall total	90.1%	59.1%	90.6%	67.1%

Source: Pregnancy Risk Assessment Monitoring System (PRAMS)

For both Spokane County and Washington State, 9 out of 10 women breastfed or pumped milk to feed their infant. Of the women who breastfed, more than half were still breastfeeding 2 to 4 months after the birth. However, Spokane County women were 45% less likely to continue breastfeeding when compared to women statewide.

KEY FINDING

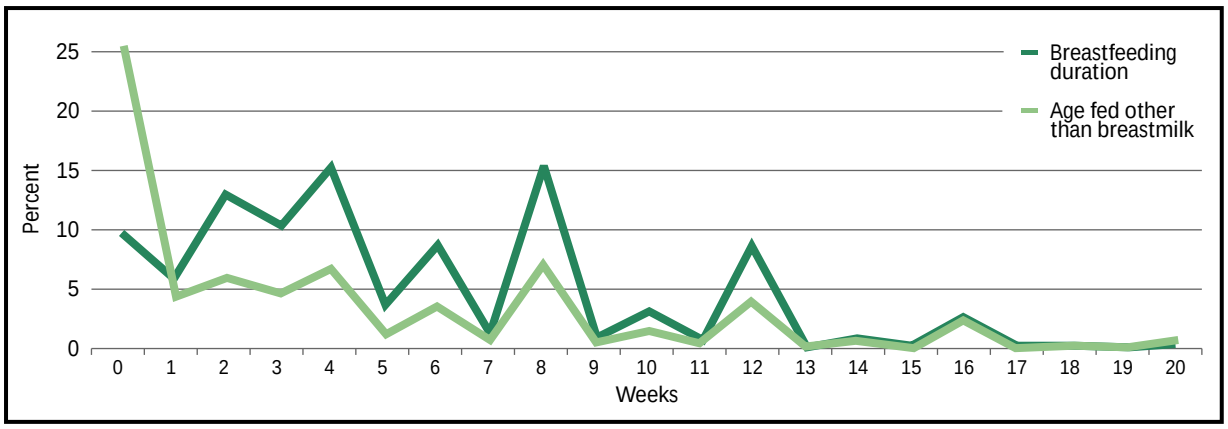
Infant Fed Something Other Than Breastmilk

Among women statewide who initiated breastfeeding, 30% had only fed their infant breast milk 2-4 months after the birth. Within one week of birth, a quarter of women fed their infant something other than breast milk, such as formula, baby food, juice, cow's milk, or water. Peaks in when breastfeeding stopped and the infant was fed something else occurred at 8 weeks and 12 weeks (Fig. 63).

Figure 63

Age of Infant When Breastfeeding Stopped and When Fed Something Other Than Breast Milk

Washington State, 2000-2006



Source: Pregnancy Risk Assessment Monitoring System (PRAMS)

Appendix A

Table 19

Indicators Data Table

Spokane County, Washington State and United States

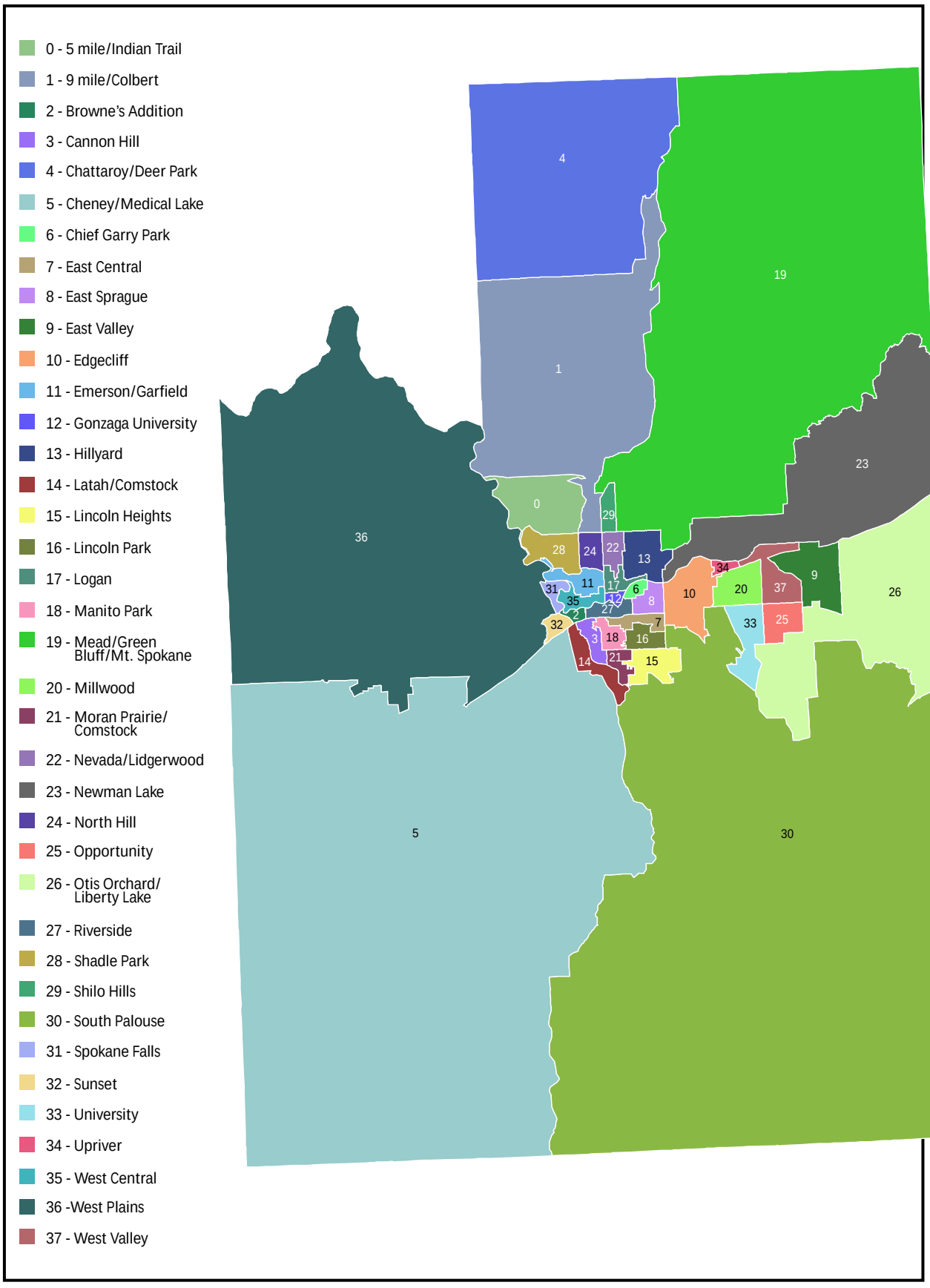
● Increased risk or worse over time
ne Not evaluated

	15-19 years	20-29 years	30+ years	White	Non-White	Low Income	Change over time	Year of Data	Spokane County	Washington State	United States
Maternal Health :: Medical Risks											
Delivery by C-section	○	○	●	○	●	○	●	2006	27.6%	28.4%	30.3% (05)
Diabetes	○	○	●	○	●	○	●	2006	5.5%	5.8%	3.9% (05)
Group B strep	○	○	ne	○	●	○	●	2006	20.1%	16.7%	Not available
High blood pressure	○	○	●	●	○	○	○	2006	6.1%	6.8%	5.0% (05)
Infections	●	○	○	○	●	●	○	2006	9.1%	6.5%	Not available
Maternal Mortality	ne	ne	ne	ne	ne	ne	ne	00-06	7.7 per 100,000	9.8 per 100,000	15.1 / 100,000 (05)
Previous “other” poor outcome	○	○	●	ne	ne	●	○	2006	3.0%	2.2%	Not available
Previous preterm birth	○	○	○	ne	ne	●	●	2006	5.1%	3.7%	Not available
Maternal Health :: Behavioral Risks											
Alcohol use	○	○	●	●	○	○	ne	00-06	8.4%	7.8%	Not available
Folic acid use	●	○	○	○	●	●	ne	00-06	48.0%	45.9%	35.1% (04)
Good social support	○	○	○	○	●	○	ne	00-06	90.0%	84.5%	Not available
Intimate partner violence	●	●	○	○	●	●	ne	00-06	4.3%	3.6%	3.6% (04)
Late or no prenatal care	●	●	○	○	●	●	●	2006	3.1%	5.1%	7.7% (05)
Prenatal care in 1st trimester	●	○	○	○	●	●	●	2006	87.8%	78.5%	70.2% (05)
Short interpregnancy interval	●	●	○	ne	ne	○	ne	2006	40.4%	38.3%	Not available
Smoking	●	●	○	○	●	●	●	2006	20.1%	10.3%	12.4% (05)
Unintended pregnancy	●	●	○	○	●	●	ne	00-06	39.1%	37.7%	Not available
Infant Health :: Prenatal Birth Outcomes											
Congenital anomalies	○	○	○	ne	ne	●	○	2006	7.4 per 1,000 births	4.9 per 1,000 births	4.0 per 1,000 births (05)
Infant mortality	●	○	○	○	●	ne	○	00-06	5.9 per 1,000 births	5.3 per 1,000 births	6.8 per 1,000 births (04)
Low birth weight	●	○	●	○	●	●	○	2006	6.8%	6.5%	8.2% (05)
NICU admission	○	○	○	ne	ne	○	●	2006	10.7%	6.4%	6.4% (05)
Preterm birth	○	○	●	○	●	○	○	2006	11.6%	10.7%	12.7% (05)
Required medical attention	●	○	○	ne	ne	○	ne	2006	12.7%	9.7%	14.8% (04)
Sudden Infant Death Syndrome	●	●	○	●	●	ne	○	00-06	0.9 per 1,000 births	0.7 per 1,000 births	0.5 per 1,000 births (04)
Infant Health :: Risk and Protective Factors											
Breastfeeding initiation	●	○	○	ne	ne	ne	ne	00-06	90.1%	90.6%	73.8% (04)
Child abuse	ne	ne	ne	ne	ne	ne	●	2006	15.3 per 1,000 children	20.0 per 1,000 children	Not available

Appendix B

Figure 64

Spokane County Neighborhoods

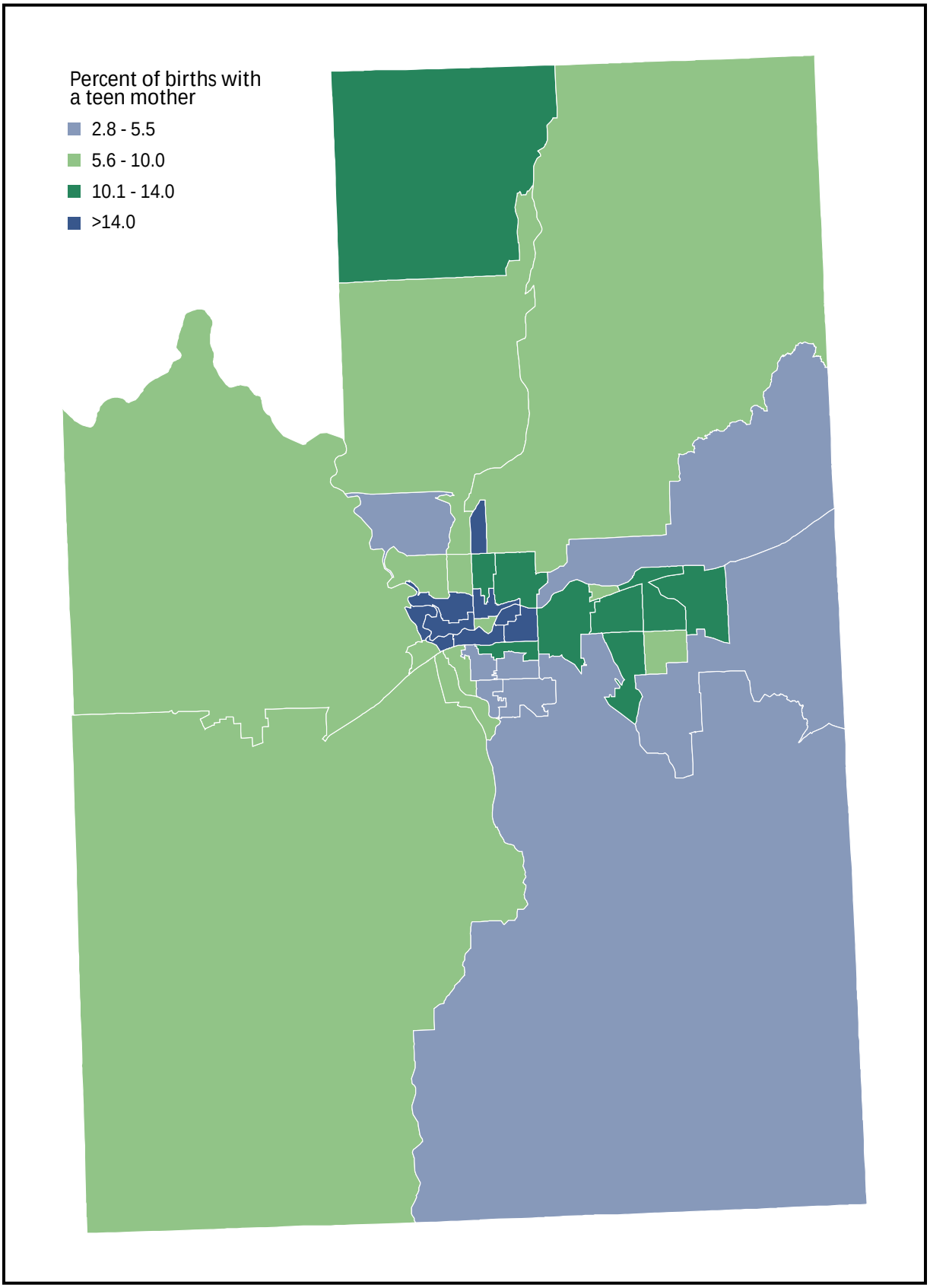


Created by: Spokane Regional Health District using VistaPHw, February 2008

Figure 65

Teen Mothers (15-19 years) by Neighborhood

Spokane County, 2000-2006

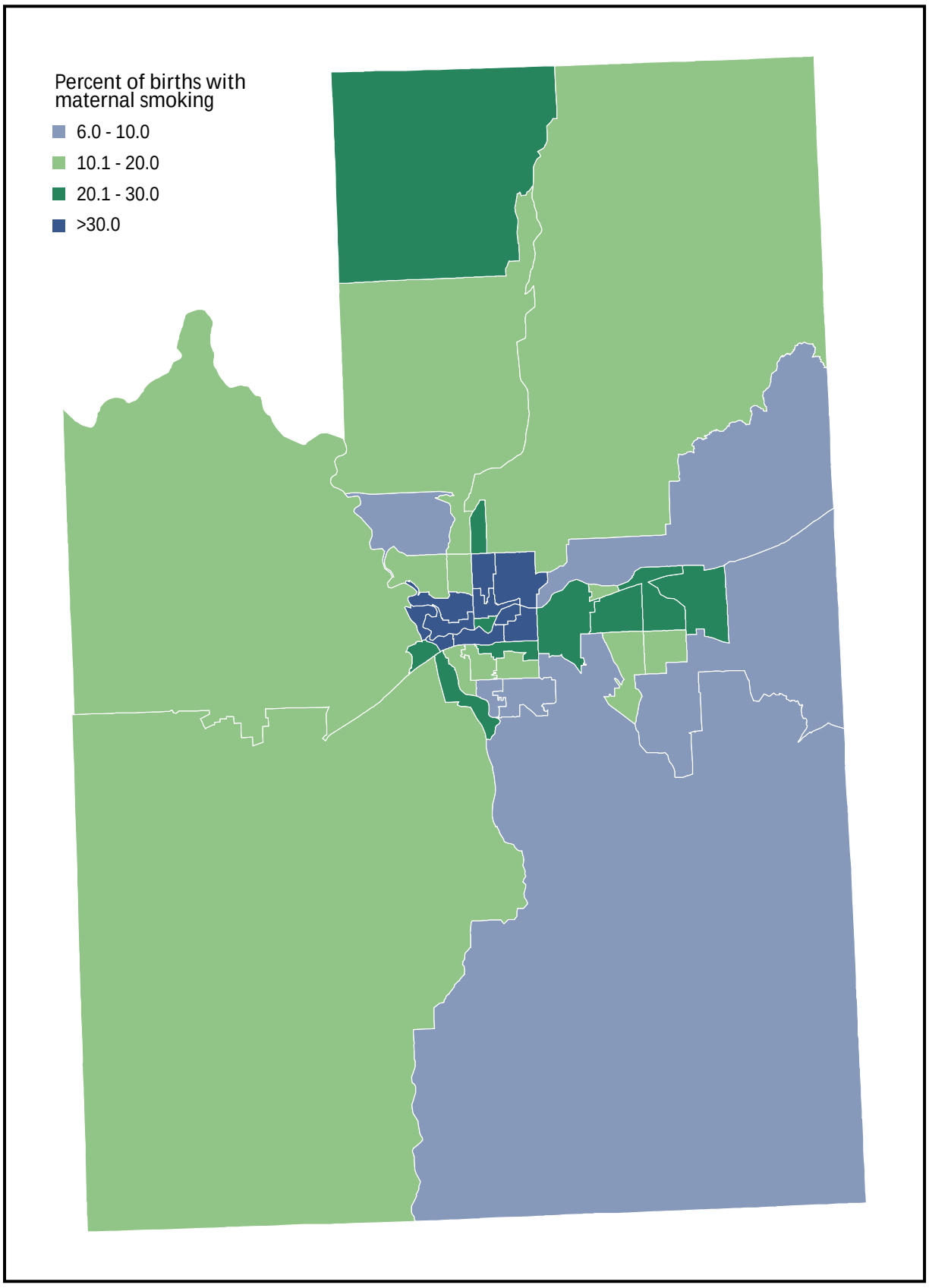


Created by: Spokane Regional Health District, June 2008 Source: Birth Certificates

Figure 66

Maternal Smoking by Neighborhood

Spokane County, 2000-2006

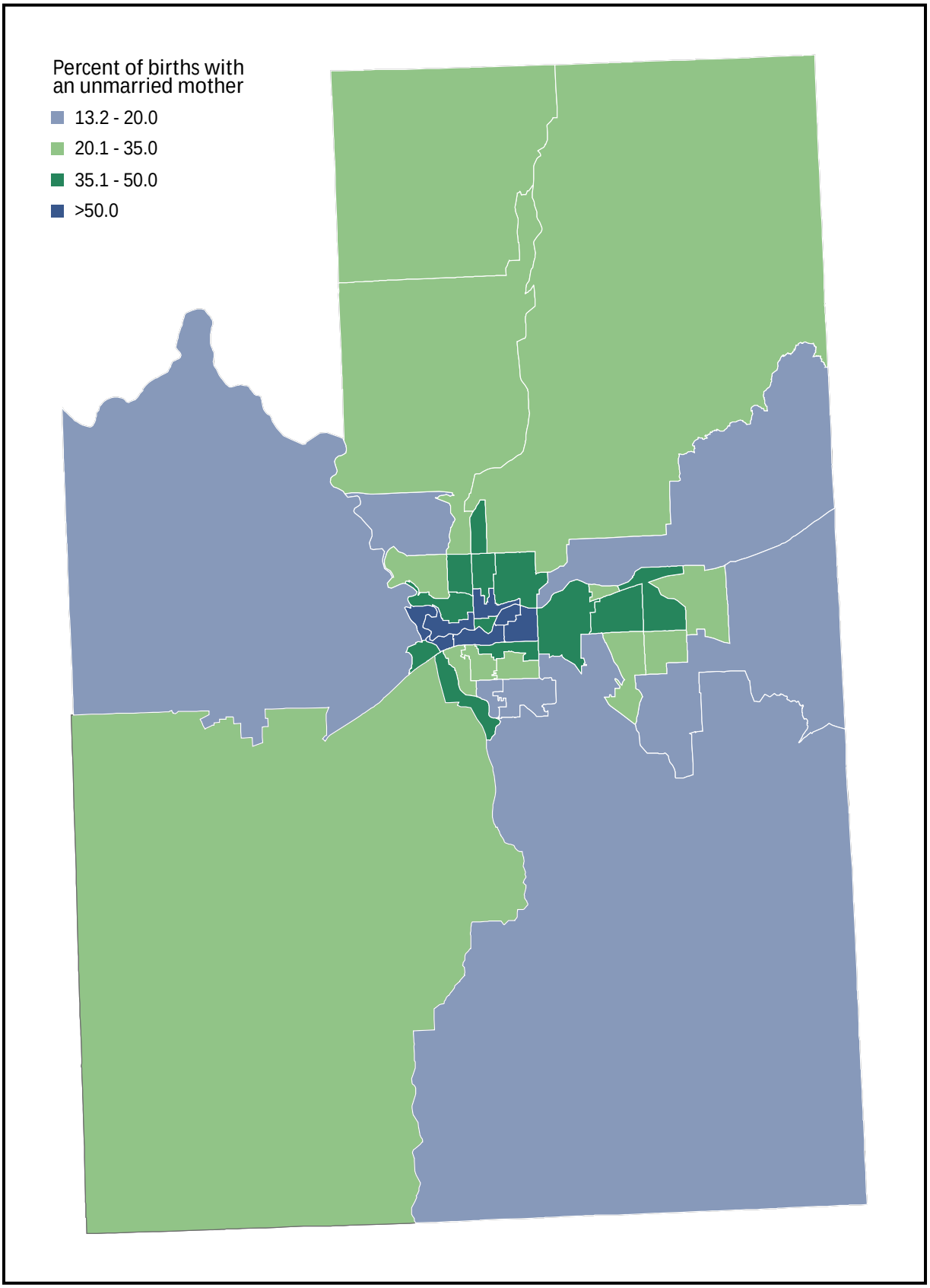


Created by: Spokane Regional Health District, June 2008 Source: Birth Certificates

Figure 67

Unmarried Mothers by Neighborhood

Spokane County, 2000-2006

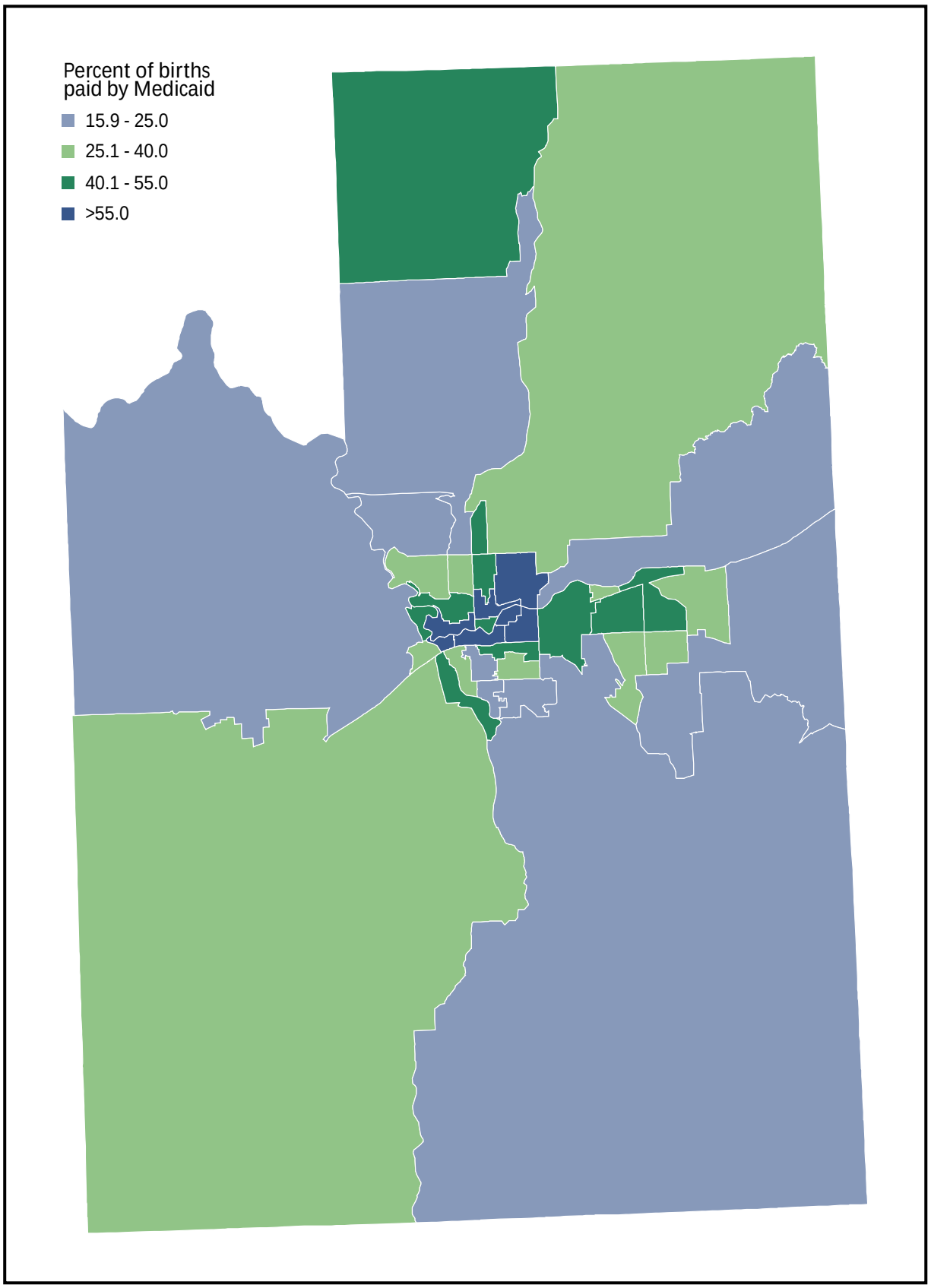


Created by: Spokane Regional Health District, June 2008 Source: Birth Certificates

Figure 68

Births Paid by Medicaid by Neighborhood

Spokane County, 2000-2006

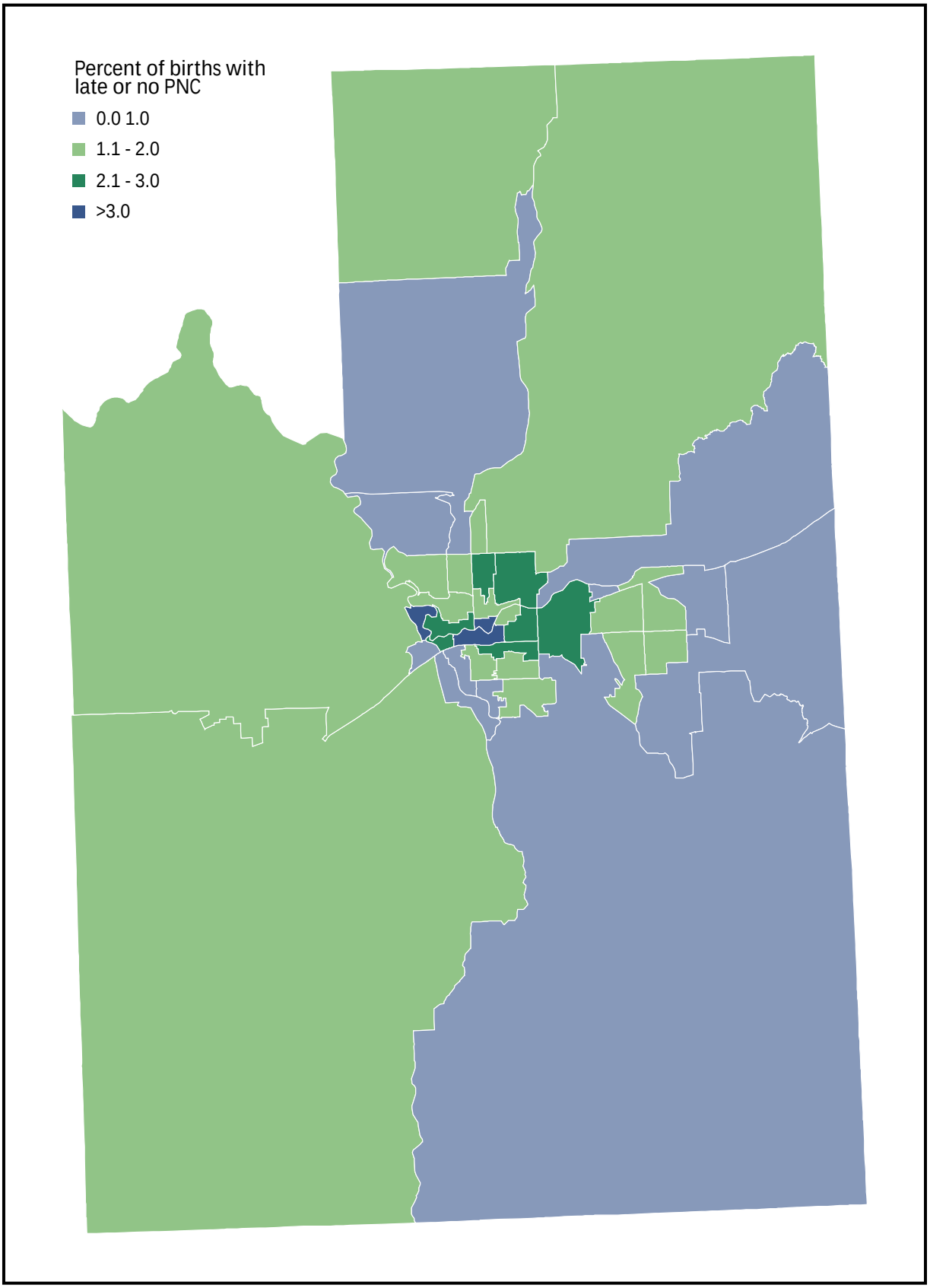


Created by: Spokane Regional Health District, June 2008 Source: Birth Certificates

Figure 69

Late or No Prenatal Care (PNC) by Neighborhood

Spokane County, 2000-2006

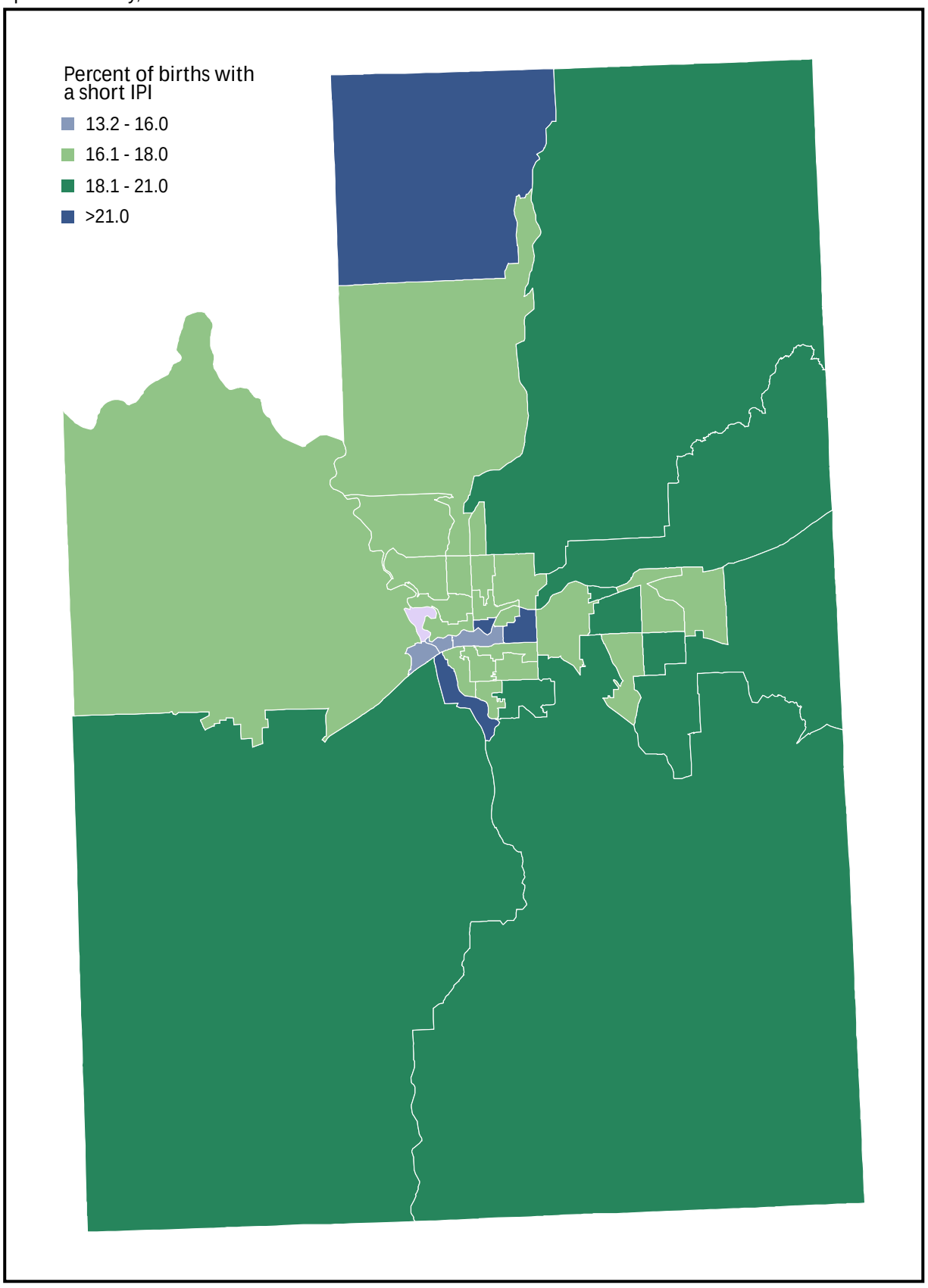


Created by: Spokane Regional Health District, June 2008 Source: Birth Certificates

Figure 70

Short Interpregnancy Interval (IPI) by Neighborhood

Spokane County, 2000-2006

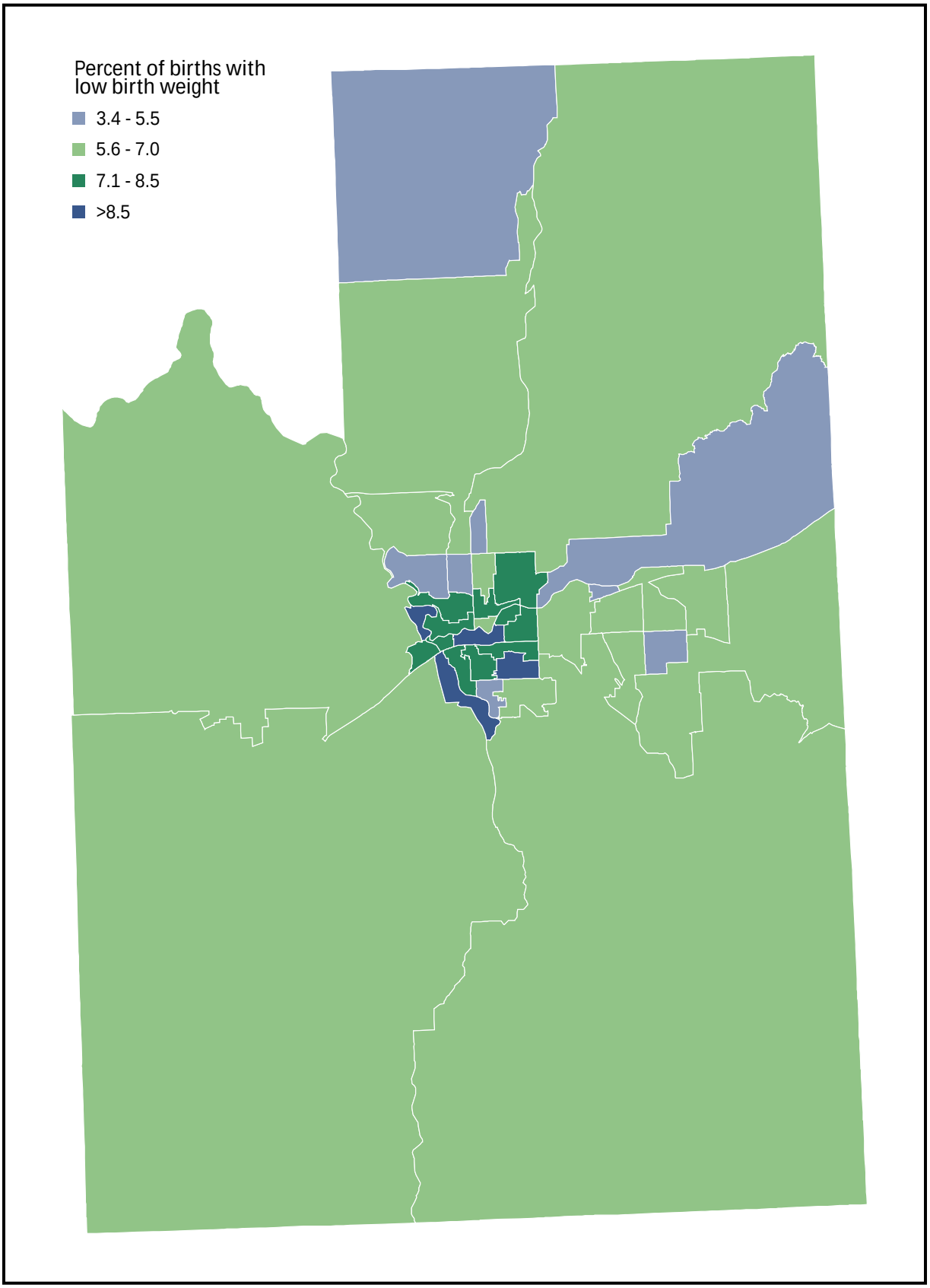


Created by: Spokane Regional Health District, June 2008 Source: Birth Certificates

Figure 71

Low Birth Weight by Neighborhood

Spokane County, 2000-2006

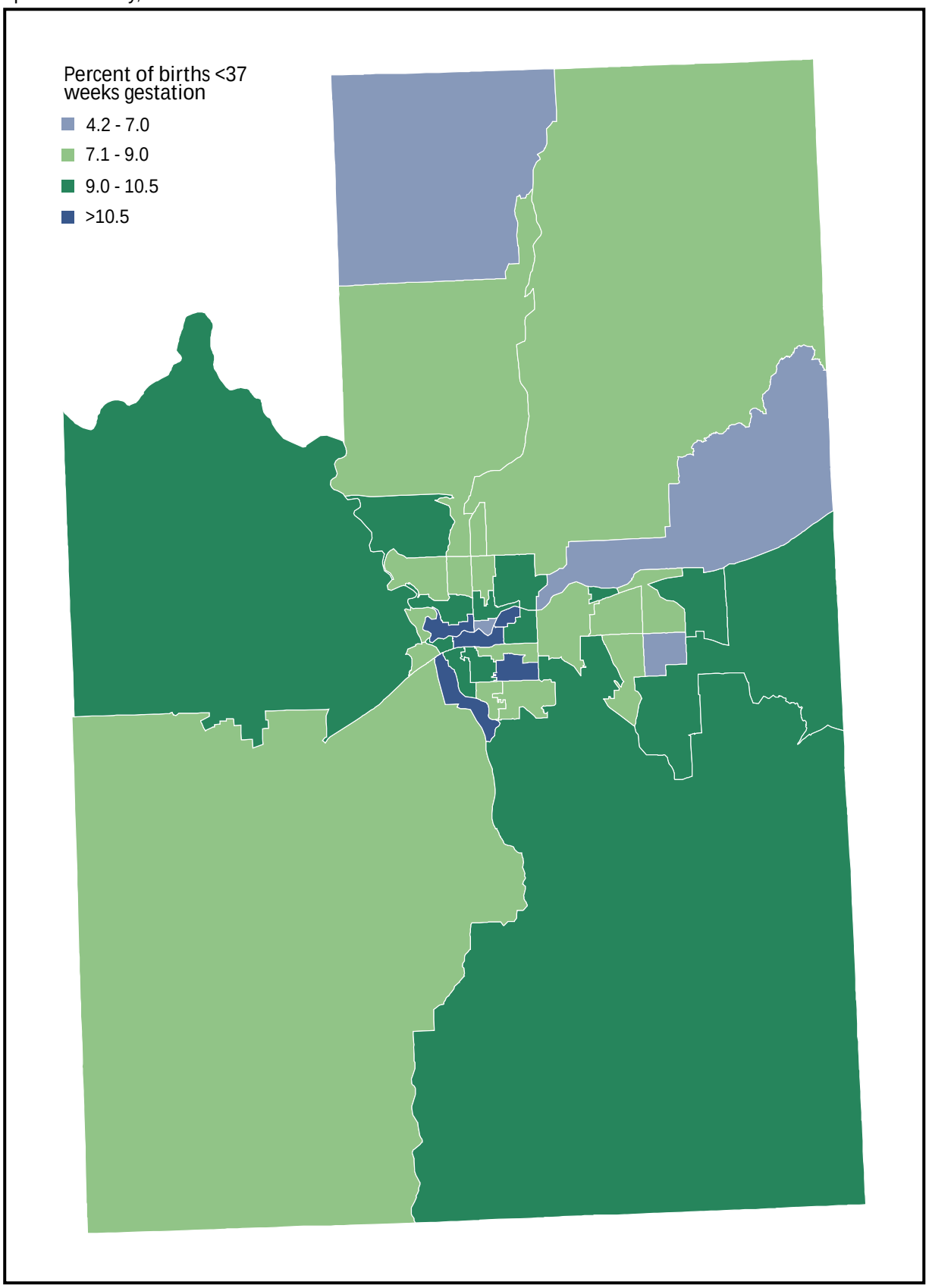


Created by: Spokane Regional Health District, June 2008 Source: Birth Certificates

Figure 72

Preterm Births by Neighborhood

Spokane County, 2000-2006



Created by: Spokane Regional Health District, June 2008 Source: Birth Certificates

Glossary

Birth	To complete expulsion or extraction from it's mother of a product of human conception, irrespective of the duration of pregnancy, which, after such expulsion or extraction breathes, or shows any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached.
Diabetic pregnancy	A pregnancy where the mother was identified with either pre-existing diabetes or gestational diabetes.
Fertility rate	The number of live births divided by the number of women 15-44 years of age times 1,000.
Infant	A child younger than one year of age.
Low birth weight	An infant that weighs less than 2,500 grams (5.5 pounds) at birth.
Multiple births	More than one infant born as the result of a single pregnancy.
Neonatal	The time period of the first 27 days of life.
NICU	Newborn intensive care unit.
Postneonatal	The time period of 28-365 days of life.
Preterm birth (premature)	An infant born at less than 37 weeks gestation.
Singleton	An infant with zero siblings born as the result of a single pregnancy.
Trimester	The duration of the human pregnancy, approximately 266 days, divided by 3, resulting in 3 equal time periods equaling 88.67 days, or 12.67 weeks, or approximately three months each. Gestation weeks 1 through 12 are considered the first trimester of pregnancy; weeks 13 through 24 are considered the second trimester; and over 24 weeks, the third trimester.
Unintended pregnancy	A pregnancy where the mother did not want to be pregnant or wanted to be pregnant at a later time.
Very low birth weight	An infant weighs less than 1,500 grams (3.3 pounds) at birth.
WIC	The Women, Infants and Children program, which serves low to moderate income pregnant women and families with children younger than 5 years of age.

Resources

1. "Washington State WIC Nutrition Program: Health Effects and Cost Benefits." Washington State Department of Health. 2008. June 4, 2008 <http://www.doh.wa.gov/cfh/WIC/health_effects.htm>.
2. Center for Disease Control and Prevention, National Center for Health Statistics, Maternal Mortality and Related Concepts, Series 3, Number 33 February 2007, page 3.
3. KungHc, Hoyert DL, Xu JQ, Murphy SL. Deaths: Final data for 2005. National vital statistics reports; vol. 56 no 10. Hyattsville, MD: National Center for Health Statistics. 2008.
4. "STDs and Pregnancy – CDC Fact Sheet." Centers for Disease Control and Prevention. 2008. May 14, 2008 <http://www.cdc.gov/std/STDFact-STDs&Pregnancy.htm>.
5. "Viral Hepatitis - Pregnancy and Hepatitis B – Frequently Asked Questions." Centers for Disease Control and Prevention. 2006. June 10, 2008 <http://www.cdc.gov/ncidod/diseases/hepatitis/b/faqb-pregnancy.htm>.
6. Centers for Disease Control and Prevention. Epidemiology and Prevention of Vaccine-Preventable Diseases. Atkinson W, Hamborsky J, McIntyre L, Wolfe S, eds. 10th ed. 2nd printing, Washington DC: Public Health Foundation, 2008.
7. Centers for Disease Control and Prevention. A comprehensive Immunization Strategy to Eliminate Transmission of Hepatitis B Virus Infection in the United States. MMWR 2005;54(RR16):1-23.
8. "Diabetes and Pregnancy Frequently Asked Questions." Centers for Disease Control and Prevention. 2005. May, 15, 2008 <http://www.cdc.gov/ncbddd/bd/diabetespregnancyfaqs.htm>.
9. Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Reproductive Health. PRAMS and Preterm Delivery. November 2006.
10. Meis PJ, Goldenberg RL, Mercer BM, Iams JD, Moawad AH, Miodovnik M, Menard MK, Caritis SN, Thurnau GR, Bottoms SF, Das A, Roberts JM, McNellis D. (1998). The preterm prediction study: risk factors for indicated preterm births. Maternal-Fetal Medicine Units.
11. Mercer BM, Goldenberg RL, Moawad AH, Meis PJ, Iams JD, Das AF, Caritis SN, Miodovnik M, Menard MK, Thurnau GR, Dombrowski MP, Roberts JM, McNellis D. (1999). The preterm prediction study: effect of gestational age and cause of preterm birth on subsequent obstetric outcome. National Institute of Child Health and Human Development Maternal-Fetal Medicine Units Network. Am J Obstet Gynecol 181(5 Pt 1), 1216-21.
12. Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Reproductive Health. PRAMS and Preterm Delivery. November 2006.
13. York J, Devoe M. Health issues in survivors of prematurity. South Med J 2002; 95(9): 969-77.
14. CancerWEB. May 22, 2008 <http://cancerweb.ncl.ac.uk/>
15. MedlinePlus Medical Encyclopedia. May 22, 2008 <http://www.nlm.nih.gov/medlineplus/encyclopedia.html>.
16. "About High Blood Pressure." Centers for Disease Control and Prevention. 2007. May 15, 2008 <http://www.cdc.gov/bloodpressure/about.htm>
17. Centers for Disease Control and Prevention. 2008. Group B Strep Prevention.
18. American College of Obstetricians and Gynecologists. "Smoking Cessation During Pregnancy." ACOG Educational Bulletin 260. Washington, DC: ACOG, 2000.
19. "Smoking While Pregnant Causes Finger, Toe Deformities." American Society of Plastic Surgeons. ScienceDaily. January 6, 2006. June 10, 2008 <http://www.sciencedaily.com /releases/2006/01/060106122922.htm>.
20. "Entry Into Prenatal Care - United States, 1989-1997." Centers for Disease Control and Prevention, Morbidity and Mortality Weekly Report, 2000/49(18); 393-8. June 11, 2008 <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm4918al.htm>.
21. Office of the Assistant Secretary for Planning and Evaluation (2004). Trend's in the well-being of America's children and youth 2003. Washington D.C.: U.S. Department of Health and Human Services.
22. "Health Policy, Health Reform, and Performance Improvement, Prenatal Care in the First Trimester." The Commonwealth Fund. December 2006. June 11, 2008 <http://wwww.commonwealthfund.org/snapshotscharts/snapshotscharts_show.htm?docdoc_id=40872>.
23. Folic Acid: Topic Home. Centers for Disease Control and Prevention. June 16, 2008 <http://www.cdc.gov/ncbddd/folicacid/index.htm>.
24. Centers for Disease Control and Prevention. Preconception and interconception health status of women who recently gave birth to alive-born infant---Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 26 Reporting Areas, 2004. MMWR.
25. "Alcohol Use and Pregnancy." Centers for Disease Control and Prevention. 2005. June 23, 2008 <http://www.cdc.gov/ncbddd/factsheets/FAS_alcoholuse.pdf>.
26. Fuentes-Afflick E., Hessol NA. "Interpregnancy Interval and the Risk of Premature Infants." Obstet Gynecol. 2000. 95: 383-90. June 11, 2008 <http://www.greenjournal.org/cgi/reprint/95/3/383>.

27. "PNSS Health Indicators." Centers for Disease Control and Prevention. Pediatric and Pregnancy Nutrition Surveillance System. May 16, 2008 <http://www.cdc.gov/pednss/what_is/pnss_health_indicators.htm>.

28. Conde-Agudelo A, Rosas-Bermudez A, Kafury-Goeta AC. (2006). "Birth spacing and risk of adverse perinatal outcomes." JAMA, 295: 1809-1823. June 11, 2008 <http://jama.ama-assn.org/cgi/content/full/295/15/1809>.

29. Defranco EA, Stamilio DM, Boslaugh SE, Gross GA, Muglia LJ. (2007). A short interpregnancy interval is a risk factor for preterm birth and its recurrence. Am J Obstet Gynecol. 197(3):264-6.

30. Zhu BP, Rolfs RT, Nangle BE, Horan JM. (1999). "Effect of the interval between pregnancies on perinatal outcomes." N Engl J Med.340:589-594. June 11, 2008 <http://content.nejm.org/cgi/content/full/340/8/589?ijkey=861ac7935115779a2976c0200177d63ca14d3158>.

31. Boy A, Salihu HM. (2004). Intimate partner violence and birth outcomes: a systematic review. Int J Fertil Womens Med. 48(4):159-64.

32. Centers for Disease Control and Prevention. Preconception and interconception health status of women who recently gave birth to alive-born infant–Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 26 Reporting Areas, 2004. MMWR 2007; 56(SS10):1-35.

33. Boy A, Salihu HM. (2004). Intimate partner violence and birth outcomes: a systematic review. Int J Fertil Womens Med. 48(4):159-64.

34. Sharps PW, Laughon K, Giangrande SK. (2007). Intimate partner violence and the childbearing year: maternal and infant health consequences. Trauma Violence Abuse. 8(2):105-16.

35. Silverman JG, Decker MR, Reed E, Raj A. (2006). Intimate partner violence victimization prior to and during pregnancy among women residing in 26 W.S. states: associations with maternal and neonatal health. Am J Obstet Gynecol 195(1):140-8

36. Centers for Disease Control and Prevention. (2007). Unintended Pregnancy Prevention: Home June 17, 2008 <http://www.cdc.gov/reproductivehealth/UnintendedPregnancy/index.htm>.

37. Kuroki LM, Allsworth JE, Redding CA, et al. Is a previous unplanned pregnancy a risk factor for a subsequent unplanned pregnancy? Am J Obstet Gynecol 2008; 2008 Nov; 199(5):517.e1-7. Epub 2008, May 12.

38. Hellerstedt WL, Pirie PL, Lando HA, Curry SJ, McBride CM, Grothaus LC, Nelson JC. (1998). Differences in preconceptional and prenatal behaviors in women with intended and unintended pregnancies. American Journal of Public Health. 88(4):663-666.

39. Centers for Disease Control and Prevention. Preconception and interconception health status of women who recently gave birth to alive-born infant---Pregnancy Risk Assessment Monitoring System (PRAMS), United States, 26 Reporting Areas, 2004. MMWR 2007;56(SS10):1-35.

40. Feldman PJ, Dunkel-Schetter C, Sandman CA, Wadhwa PD. (2000). Maternal Social Support Predicts Birth Weight and Fetal Growth in Human Pregnancy. Psychosomatic Medicine. 62: 715-725.

41. Brown A, Zimmerman B. 2007. Research to Policy and Practice Forum: Periodontal Health and Birth Outcomes-Summary of a Meeting of Maternal, Child, and Oral Health Experts. Washington, DC: National and Child Oral Health Resource Center.

42. "Periodontitis Associated with Preeclampsia in Pregnant Women." American Academy of Periodontology. August 7, 2008 <http://www.perio.org/consumer/preeclampsia06.htm>.

43. "Prenatal Oral Health." New York State Department of Health. August 7, 2008 <http://www.health.state.ny.us/prevention/dental/prenatal_oral_health.htm>.

44. "Preterm Labor and Birth." National Institute of Child Health and Human Development. June 25, 2008 <http://www.nichd.nih.gov/health/topics/Preterm_Labor_and_Birth.cfm?renderforprint=1>.

45. "March of Dimes Fact Sheet: Preterm Birth." March of Dimes. June 3, 2008 <http://www.marchofdimes.com/professionals//14332_1157.asp>.

46. "Preterm Labor and Birth." Baby Center. June 25, 2008 <http://www.babycenter.com/0_preterm-labor-and-birth_1055.bc>.

47. "High-Risk Newborn." University of Virginia Health System. June 20, 2008 <http://healthsystem.virginia.edu/uvahealth/peds_hrnewborn/lbw.cfm>.

48. "Low Birthweight." March of Dimes, Professionals and Researchers. June 20, 2008 <http://www.marchofdimes.com/printablearticles/14332_1153.asp>.

49. The Future of Children. June 18, 2008 <http://www.futureofchildren.org>.

50. "Low Birthweight." March of Dimes, Professionals and Researchers. June 20, 2008 <http://www.marchofdimes.com/printablearticles/14332_1153.asp>.

51. "Very Low Birthweight." Lucile Packard Children's Hospital at Stanford. June 24, 2008 <http://www.lpch.org/DiseaseHealthInfo/HealthLibrary/hrnewborn/vlbw.html>.

52. "Congenital disorder." Wikepedia, The Free Encyclopedia. May 14, 2008 <http://en.wikipedia.org/wiki/Congenital>.

53. “Birth Defects: Frequently Asked Questions (FAQs).” Centers for Disease Control and Prevention. 2007. May 14, 2008 <http://www.cdc.gov/ncbddd/bd/faq1.htm>.

54. “Health, United States, 2007.” U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics. June 16, 2008 <http://www.cdc.gov/nchs/data/hus/hus07.pdf>.

55. “Definition of Mortality, Infant.” MedicineNet.com. June 13, 2008 <http://www.medterms.com/script/main/art.asp?articlekey=14274>.

56. “Sudden Infant Death Syndrome.” American SIDS Institute. June 18, 2008 <http://www.sids.org/nannualrates.htm>.

57. “Sudden Infant Death Syndrome.” Wikipedia, The Free Encyclopedia. June 17, 2008 <http://en.wikipedia.org/wiki/sudden_infant_death_syndrome>.

58. “Sudden, Unexplained Infant Death Initiative (SUIDI): Overview.” Centers for Disease Control and Prevention. October 14, 2008 <http://www.cdc.gov/SIDS/SUID.htm>.

59. “A Parents’ Guide to Safe Sleep.” American Academy of Pediatrics. November 21, 2008 <http://www.healthychildcare.org/pdf/SIDSparentssafesleep.pdf>.

60. “Child Maltreatment Prevention, Definition of Child Maltreatment.” Centers for Disease Control and Prevention. July 1, 2008 <http://www.cdc.gov/ncipc/dvp/cmp/cmp_def.htm>.

61. “Child Abuse and Neglect.” HelpGuide.com, A Trusted Non-Profit Resource. July 2, 2008 <http://www.helpguide.org/mental/child_abuse_physical_emotonal_sexual_neglect.htm>.

62. Federal Interagency Forum on Child and Family Statistics. America's Children: Key National Indicators of Well-Being, 2007. Federal Interagency Forum on Child and Family Statistics, Washington, DC: U.S. Government Printing Office.

63. “Understanding Child Maltreatment 2008.” U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, Injury Center. July 2, 2008 <http://www.cdc.gov.ncipc/pub-res/CMFactsheet.pdf>.

64. Goldman, Salus, Wolcott, Kennedy (2003). A Coordinated Response to Child Abuse and Neglect: The Foundation for Practice, Chapter Six: What are consequences of Child Abuse and Neglect?. United States Department of Health and Human Services, Administration for Children and Families, Administration on Children, Youth and Families, Children's Bureau, Office on Child Abuse and Neglect.

65. “Facts for Parents About Vaccine Safety.” American Academy of Pediatrics, July 21, 2008 <http://www.aap.org/advocacy/releases/autismparentsfacts.htm>.

66. “Breastfeeding Information.” Washington State Department of Health. August 12, 2008 <http://www.doh.wa.gov/cfh/WIC/breastfeeding.htm>.

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