

COMPARING TEENAGE PREGNANCY RATES AND TEENAGE BIRTH RATES  
BETWEEN STATES THAT DO AND DO NOT MANDATE SEX OR STD/HIV  
EDUCATION PROGRAMS

BY

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THESIS

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## **ABSTRACT**

In 2005, the teenage pregnancy rate increased for the first time in almost a decade. There are several negative outcomes associated with teenage pregnancy such as adverse health effects for mothers and infants and increased spending on welfare programs.

The purpose of the study is to determine if there is a relationship between teenage pregnancy rates and teenage birth rates and the type of sex education program taught in public high schools. The research questions were (1) Is there a difference in teenage pregnancy rates or teenage birth rates between states that require public high schools to provide sex or STD/HIV education and those that do not? (2) Is there a difference in teenage pregnancy rates or teenage birth rates between states that provide comprehensive sex education programs and those that provide abstinence-only or abstinence-based sex education programs? Data on teenage pregnancy rates, teenage birth rates, state laws on sex education, and topics covered in public high schools were obtained from the Guttmacher Institute.

The results show there is no significant difference in teenage pregnancy rates or teenage birth rates between states that require public high schools to provide sex or STD/HIV education programs and those that do not. There was also no significant difference between states that provide comprehensive sex education and those that provide abstinence-only or abstinence-based sex education. However, the results did show factors such as race and median household income have a significant impact on teenage pregnancy rates and teenage birth rates.

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# **CHAPTER 1**

## **INTRODUCTION**

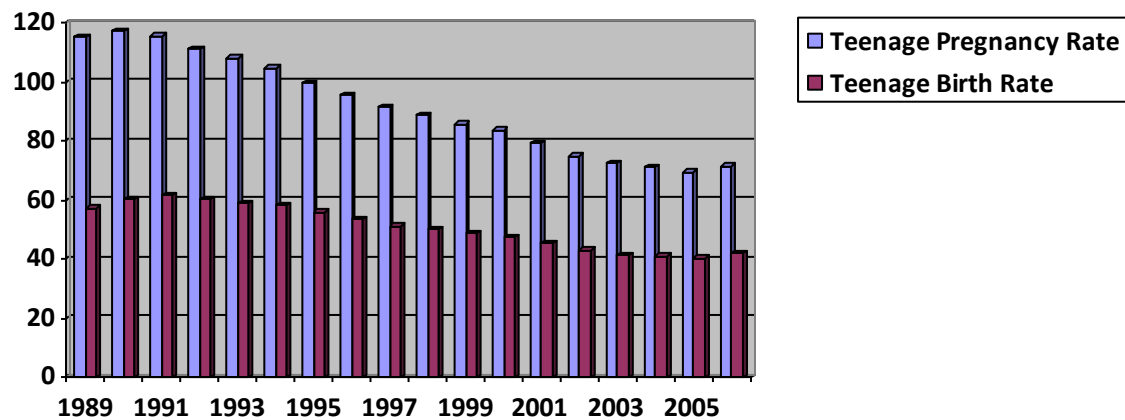
### **1.1 TEENAGE PREGNANCY: A GROWING CONCERN**

Over the past few decades, teenage pregnancy rates worldwide have declined, yet teenage pregnancy in the United States is still a growing concern. The teenage pregnancy rate is the number of pregnancies per 1,000 women aged 15-19 years. Some teenage pregnancies end in birth, while other teenage pregnancies end in miscarriage or abortion. Pregnancy rates are calculated by adding the number of live births, the number of abortions, and the number of estimated miscarriages. In 1981, the United States teenage pregnancy rate was almost twice that of England/Wales, France, and Canada (Jones et al., 1985). The teenage pregnancy rate was 45 in England/Wales, 43 in France, and 44 in Canada compared to 96 in the United States (Jones et al., 1985). This disparity in teenage pregnancy rates has existed for three decades. In the mid 1990's, the teenage pregnancy rate was 46.7 in Great Britain, 45.7 in Canada, and 20.2 in France compared to 83.6 in the United States (Darroch, Singh, Frost, & The Study Team, 2001). More recently, the teenage pregnancy rate in the United States declined from 83.6 in 2000 to 69.5 in 2005. However, in 2006, the teenage pregnancy rate increased from 69.5 in 2005 to 71.5 (Kost, Henshaw, & Carlin, 2010). This is the first increase in teenage pregnancy rate since 1990 (Figure 1).

The birth rate per 1,000 women aged 15-19 years peaked in the U.S. in 1991 at 61.8 (Kost et al., 2010). In 2006, the teenage birth rate was 41.9 which was 32% lower than in 1991 but 4% higher than the rate in 2005 (40.5) (Figure 1).



Figure 1 Teenage Pregnancy and Teenage Birth Rates 1989-2006



Adapted from “U.S. teenage pregnancies, births, and abortions: national and state trends and trends by race and ethnicity,” by K. Kost, S. Henshaw, and L. Carlin, 2010.

Unintentional pregnancies among adolescents can severely impact the health of teenage mothers and their babies. Women aged 10-19 years deliver only 11% of births worldwide yet they account for 23% of the overall burden of disease from pregnancy and childbirth (World Health Organization, 2008). Infants born to women in their late teens are more likely to be premature, have low Apgar scores, have low birth weight, or die during infancy (Martin et al., 2009; Chen, et al., 2007; Gilbert, Jandial, Field, Bigelow, & Danielsen, 2004; World Health Organization, 2010). Teenage mothers are also more likely to suffer health complications, such as urinary tract infections, during pregnancy (Jolly, Sebire, Harris, Robinson, & Regan, 2000).

Not only does teenage pregnancy impact young women, it also impacts the economy. Teenagers who get pregnant in high school are at a disadvantage when it comes not only to providing for themselves but for their child. Women aged 18-35 years who have their first child at 17 years or younger earn, on average, \$3,350 less than women who have their first child at 20 or 21 years (Hoffman, 2006). One explanation for why teenage mothers earn less is that they

have lower levels of educational achievement and occupations that do not require high levels of educational achievement are usually lower wage positions.

In 2004, only 40% of teenage mothers graduated from high school compared to about 75% of women who had their first child at 20-21 years (Hoffman, 2006). The same trend can be seen in years of higher education completed. In 2004, women who had their first birth at 20 or 21 years were significantly more likely to have completed two years of college (21%) compared to women who had their first birth at 17 years or younger (5%) or 18-19 years (10%) (Hoffman, 2006). These findings highlight the negative impact teenage pregnancy can have on the pursuit of education.

The cost to society is another reason teenage pregnancy is a concern. Taxpayers on the federal, state, and local levels pay for teenage mothers and their children through welfare. The National Campaign to Prevent Teenage Pregnancy estimated that teenage pregnancies cost taxpayers \$9.1 billion dollars in 2004 (Hoffman, 2006). The cost to taxpayers is based on the money that could be saved due to avoiding negative outcomes of teenage pregnancy.

Government programs that provide public healthcare like Medicaid, Medicare (for disabled children), State Children's Health Insurance Program (SCHIP), and Civilian Health and Medical Program of the Uniformed Services (CHAMPUS, renamed TRICARE), are utilized primarily by the children of teenage mothers. From ages 1-14 years, 60% of the healthcare of children of teenage mothers is provided through these sources, compared to 50% for children of mothers who were 20 or 21 years at the time of their first birth (Hoffman, 2006). Reducing teenage pregnancy rates would reduce some of the expenses incurred by government health programs. The money saved through reducing teenage pregnancy rates could be applied to other government programs.

There is on-going debate concerning the best way to decrease the rate of teenage pregnancy. Research has shown that sex education programs have an impact on the sexual behaviors of teenagers (Kirby, 2007). Widespread sex education programs that are evidence-based are one effective way to reduce teenage pregnancy rates (Bearinger, Sieving, Ferguson, & Sharma 2007). The materials and topics discussed in the classroom shape the style of sex education taught in public high schools and are determined by the state. Some state policies require public high schools to provide sex education programs while others allow sex education programs but they are not mandatory. There has been significant research on the effectiveness of programs designed to decrease teenage pregnancy rates, but rarely has the impact of state policies on teenage pregnancy rates been analyzed. Policies are the force behind the programs. State policies determine what types of sex education programs are offered in public high schools, which age group is taught, who the teachers are, and what material is covered. One of the ways in which teenage pregnancy rates can be lowered is through effective sex education programs that emphasize pregnancy prevention (Saunders, 2005; Kirby, 2007). Programs that are based on one or more theoretical framework have a higher likelihood of achieving the intended positive health outcome (Saunders, 2005). Several theoretical frameworks have been identified throughout the curriculums of effective sex education programs (Saunders, 2005; Kirby 2007) and these theories help shape the different styles of sex education.

## 1.2 RESEARCH QUESTIONS

Do sex and STD/HIV education programs provided in public high schools lower teenage pregnancy rates and teenage birth rates? The Guttmacher Institute (2010) collects information on which states in the United States require sex education in public high schools. The data indicate which states stress abstinence and which states do not, and whether or not contraception is covered. Each state has laws on what material is covered and how it is presented. By comparing states' individual teenage pregnancy rates and the characteristics of sex education programs across the United States, the impact of state mandated policies on sex education can be analyzed.

This study explores two research questions. 1) Is there a difference in teenage pregnancy rates or teenage birth rates between states that require public high schools to provide sex or STD/HIV education to students and states that do not require public high schools to provide sex or STD/HIV education to students? The hypothesis is states that require public high schools to provide sex or STD/HIV education programs will have lower rates of teenage pregnancy and teenage birth rates when compared to states that do not require public high schools to provide sex or STD/HIV education programs. 2) Is there a difference in teenage pregnancy rates or teenage birthrates between states that provide comprehensive sex education programs and states that provide abstinence-only or abstinence-based sex education? The hypothesis is that the mean teenage pregnancy rates and mean teenage birth rates will be lower in states that provide comprehensive sex education programs.

Three general themes have been identified throughout the research on this topic. (1) public high schools can be a valuable resource for information on sex; (2) public high schools' sex education programs can help delay the early/frequent initiation of sexual behavior, or

increase contraceptive use; and (3) in order for a public high school sex education program to be effective, it must be based on a theoretical approach that demonstrates a positive impact on teenage sex behaviors. If a public high school sex education program is based on a theoretical framework, it will be more effective at producing intended outcomes (Saunders, 2005). Positive behavior change is defined as any behavior that can prevent teenage pregnancy, whether that be abstaining from sex or increasing the use of contraceptives.

### *Significance*

Comparing state policies on sex education may provide insight into ways teenage pregnancy rates can be lowered. Lowering teenage pregnancy rates can help decrease some of the negative outcomes of teenage pregnancy. There is significant information on different theoretical frameworks used to design intervention programs as well as information on program designs that have worked in the past (Saunders, 2005). By analyzing state mandated sex education policies the role government plays in decreasing teenage pregnancy rates can be further explained. Decreases in teenage pregnancy rates can lead to decreased spending on government sponsored programs that primarily help teenage mothers (Hoffman, 2006).

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 CURRENT STATE OF TEENAGE PREGNANCY**

Each year in the United States, there are approximately 750,000 women between the ages of 15-19 years who become pregnant (Kost et al., 2010). In 2006, the teenage pregnancy rate was 71.5 per 1,000 women aged 15-19 years (Kost et al., 2010). This represents a 3% increase in teenage pregnancy rates since 2005; and the first increase since 1990. The decline in teenage pregnancy rates through the 1990s and early 2000s and an increase in 2006 can be seen in all teenagers regardless of race. Among Black and non-Hispanic White teenagers aged 15-19 years, pregnancy rates fell nationwide by 45% and 50% respectively, between 1990 and 2005 before increasing in 2006 (Kost et al., 2010). Among Hispanic women aged 15-19 years, pregnancy rates fell by 26% between 1992 and 2005 before rising in 2006 (Kost et al., 2010). These increases in the rate of teenage pregnancy are the first in over a decade.

In 2006, the national teenage pregnancy rate was 71.5 (Kost et al., 2010). Some states' teenage pregnancy rates are above the national average while teenage pregnancy rates in other states are below the national average. All of the numbers reported are measured per 1,000 women aged 15-19 years. According to Kost et al. (2010), the following are the five states with the highest rates of teenage pregnancy in 2005: New Mexico (93), Nevada (90), Arizona (89), Texas (88), and Mississippi (85). Of the states with the highest rates of teenage pregnancy, only Nevada mandates sex education (Guttmacher Institute, 2005). The five states with the lowest rates of teenage pregnancy were: New Hampshire (33), Vermont (40), Maine (43), Minnesota (43), North Dakota (45) (Kost et al., 2010). Of the states with the lowest rates of teenage

pregnancy North Dakota is the only state that does not mandate sex education (Guttmacher Institute, 2005).

In 2005 the teenage abortion rate for the United States was 19. The highest rate of teenage abortions was among Blacks (44), which was significantly higher than the rate of Hispanics (24) and Non-Hispanic Whites (11) (Kost et al., 2010). Currently, 34 states require some parental involvement in a minor's decision to have an abortion. Twenty states require parental consent, ten states require parental notification, and four states require both (Guttmacher Institute, 2010).

In 2006, the abortion rate per 1,000 women aged 15-19 years was 19.3. This rate is 56% lower than its peak of 43.5 in 1988 but 1% higher than the rate of 9.1 in 2005 (Kost et al., 2010).

A study by Henshaw and Kost (2008) used data gathered from the Guttmacher Institute's survey of abortion providers to analyze trends in abortion rates from the period 1974-2004. In 2004, the highest proportion of abortions was obtained by women in their 20s (57%); however 17% of abortions were obtained by women younger than 20 years. Since 1974 the proportion of abortions obtained by women younger than 20 years has decreased from 33% in 1974 to 25% in 1989, and 17% in 2004 (Henshaw and Kost, 2008).

One of the biggest reasons for the decrease in teenage pregnancy rates is improved contraceptive use (Santelli, Lindberg, Finer, & Singh, 2007). In developed countries where teenage pregnancy rates are lower, the availability and use of contraceptives has been a key indicator of teenage pregnancy rates. Santelli, et al., (2007) conducted an analysis of data collected by the National Survey of Family Growth (NSFG) between 1995 and 2002 in an attempt to understand the role contraception plays in teenage pregnancy rates. Their analysis indicated there were significant increases in contraceptive use among women aged 15-19 years

during 1995-2002, a period during which teenage pregnancy rates steadily declined from 99.6 in 1995 to 75.0 in 2002 (Figure 1 and Table 1).

Table 1 Percentages of Sexually Active Women Aged 15-19 Years Who Used Selected Contraceptive Method at Most Recent Sexual Intercourse

Method	Total		White Non-Hispanic		Black Non-Hispanic		Hispanic	
	1995	2002	1995	2000	1995	2000	1995	2000
Condom	35.7	53.0	38.4	58.0	37.9	52.7	19.6	30.6
Birth control								
Pill	23.7	32.5	28.9	39.7	14.5	24.1	14.1	18.3
No Method	33.9	18.3	30.7	12.2	33.3	24.8	50.2	39.6

Adapted from “Explaining Recent Declines in Adolescent Pregnancy in the United States: The Contribution of Abstinence and Improved Contraceptive Use,” by J. Santelli, L. Lindberg, L. Finer, and S. Singh, 2007, *American Journal of Public Health*, 97(1), p. 153.

Between 1995 and 2002, condom use and the use of the birth control pill among teenagers of all racial backgrounds (White, Black, and Hispanic) increased significantly (Table 1). In addition to the increase in the percentage of teenagers using condoms and birth control pills, there was also a decrease in the percentage of teenagers not using any type of contraceptive method. These increases in contraceptive use and decreases in the rate of non-use during the period 1995-2002 are consistent with the decrease in teenage pregnancy rates that occurred in that same time span and could be a reason why teenage pregnancy rates fell.

Another factor observed in this analysis was a decrease in the number of sexually active teenagers, which increased federal funding for abstinence-only programs. In the period 1995-



2002, the number of women aged 15-19 years who had ever engaged in sexual intercourse declined 10% from 52% in 1995 to 47% in 2002 (Santelli et al., 2007). The percentage of women aged 15-19 years who had ever engaged in sexual activity decreased from 60% in 1995 to 57% in 2002 among Blacks and decreased from 56% in 1995 to 40% among Hispanics. Among White non-Hispanics, the percentage of women who had ever engaged in sexual activity decreased from 51% in 1995 to 46% in 2002 (Santelli et al., 2007). The decrease in the number of sexually active teenagers could be a result of sex education programs that promote abstinence (Santelli et al., 2007).

Of the states that mandate sex education, public high schools that stress abstinence have some of the highest levels of teenage pregnancy (Kost et al., 2010). Arizona, Arkansas, Mississippi, and Texas all require that abstinence be stressed in sex education classes and those states have some of the highest rates of teenage pregnancy (Kost et al., 2010). Teenage sexual behavior may be influenced by the types of sex education programs in place in public high schools.

## 2.2 ACCESS TO ORAL CONTRACEPTIVES AND ABORTION

In 1960, the Food and Drug Administration approved the first form of oral contraceptives. This event is significant because it changed the ways society viewed sex. Compared to the decades before when sex was hindered by a fear of unintended pregnancy, the widespread availability of oral contraceptives in the 1960s allowed women to experience more sexual freedom (Luker, 1996). Although the oral contraceptive revolution meant freedom for older women it excluded teenagers who could not legally obtain contraceptives from physicians without parental consent. Teenagers had little or no access to contraceptives in the 1960s, and there are still restrictions in some states preventing teenagers from accessing oral contraceptives.

In 1969, females had to be 21 years to obtain oral contraceptives in all but nine states (Goldin & Katz, 2002). Those nine states allowed females who were at least 18 years to obtain oral contraceptives. In 1971, a total of 16 states allowed teenagers that were under 21 (at least 18 years) to obtain oral contraceptives and 17 states allowed teenagers below the age of 18 to obtain oral contraceptives given specific circumstances (Goldin & Katz, 2002). In 1974, there were only two states where the age to be prescribed oral contraceptives was higher than 18 (Goldin & Katz, 2002). These changes in the age of majority represent a shift in societal views on what age is appropriate to engage in sexual activity.

In 1981, the federal government began supporting programs that promote abstinence through the Adolescent Family Life Act (AFLA) (Dodge, et al., 2008). In 1996, the federal government increased support for abstinence-only programs while restricting other information. In 2000, Community-Based Abstinence Education (CBAE) projects were funded through a maternal health block grant for Special Projects of Regional and National Significance (SPRANS). Section 510 of the Social Security Act (part of welfare reform of 1996) and SPRANS prohibits the dissemination of information related to contraceptive services (Dodge et al., 2008).

Currently, 21 states and the District of Columbia explicitly allow all minors to consent to contraceptive services, and 25 states explicitly allow all minors to consent to contraceptive services but only if they meet specific requirements (Guttmacher Institute, 2010a). The other four states do not have any specific policy related to minors consenting to contraceptive services. The rates of use of contraceptives may vary depending on the states restrictions on teenagers' access.

Compared to other forms of contraception like the birth control pill, minors are able to obtain condoms at numerous locations at a lower price. However, the percentage of teenage women using condoms as their primary method of contraception decreased from 1995-2008. From 1995-2002, the amount of users relying on the pill increased slightly which coincides with the decrease in amount of teenage women relying on the condom. Currently, 23% of teenage women using contraceptives choose condoms as their primary method, however oral contraceptives are the method most widely used by women in their teens and 20s. Of the 2.9 million teenage women who use contraceptives, 45% rely on the pill (Mosher & Jones, 2010). Laws restricting minors' access to oral contraceptive services may be a contributing factor to higher teenage pregnancy rates.

### 2.3 ADVERSE HEALTH OUTCOMES

There are negative health outcomes for women who get pregnant at an early age. Jolly, Sebire, Harris, Robinson, and Regan (2000) explored fetal and neo-natal complications among women younger than 18 years and found women under 18 years were more likely than older women to have chest or urinary tract infections during pregnancy. One possible explanation is that at such a young age, the immune system may not be as effective at fighting infections (Jolly et al., 2000). Jolly et al., (2000) also found that preterm labor is twice as likely in women less than 18 years. This is consistent with findings from other studies.

Gilbert et al. (2004) and Chen et al. (2007) analyzed the negative health outcomes associated with early pregnancy. Gilbert et al. (2004) confirmed that not only was preterm labor more common among teenagers, preterm labor was also more common among Black teenagers than any other race. This is significant given the high rate of teenage pregnancy among Black teenagers (Kost et al., 2010).

The Apgar score, created by Virginia Apgar and used in many hospitals throughout the United States, scores an infant's health at birth (Casey, 2001). Chen et al. (2007) analyzed physical infant health and found that low Apgar scores are more common among infants born to teenage mothers. Both Gilbert et al. (2004) and Jolly et al. (2000) found that another negative health outcome in teenage mothers is low birth weight. Period of gestation, low birth weight and Apgar score are important predictors of future health and are contributing factors to the infant mortality rate.

The infant mortality rate is often used as an indicator of the overall health of a country. In 2004, the national infant mortality rate (6.7 per 1,000 live births) was 10% lower than in 1995 (7.57 per 1,000 live births) (Matthews & MacDorman, 2007). However, when compared to other developed countries, the United States' infant mortality rate has declined more slowly. The United States' international ranking in infant mortality rate fell from 12<sup>th</sup> lowest in 1960 to 23<sup>rd</sup> lowest in 1990 and 30<sup>th</sup> lowest in 2005 (MacDorman & Matthews 2008). Matthews & MacDorman (2007) also found that infant mortality rates were higher among teenage mothers.

Results from previous studies consistently found that discrepancies exist between teenage mothers and older women regardless of race. In each group of mothers, the pregnancy outcomes were worse for the group of women younger than 20 years.

## 2.4 CONSEQUENCES OF TEENAGE PREGNANCY

In addition to the physical costs to a teenage mother and her child, there are also societal costs. Public sector costs are paid by state, local, and federal governments from taxpayer revenue (Hoffman, 2006). These costs are increased with higher rates of teenage pregnancy. Vermont, which had one of the lowest rates of teenage pregnancy in 2004 (20.8 per 1,000 women aged 15-19 years) costs taxpayers approximately \$12 million dollars, whereas Texas, which had one of

the highest rates of teenage pregnancy in 2004 (63.1 per 1,000 women aged 15-19 years) costs taxpayers approximately \$1 billion dollars (Hoffman, 2006).

Estimating the costs to society of teenage pregnancy is a complicated process. Hoffman (2006) completed a report outlining the steps in calculating the costs. The goal was to measure the costs that could be avoided if teenage mothers (15-19 years) delayed their first birth to a later age (20 or 21 years). Billions of dollars could be spent on other government programs if teenage mothers delayed their first pregnancy until they were older. Through age 35, women who have their first child at age 17 years or younger collect an average of \$37,000 in cash assistance through welfare compared to \$17,000 for those who have their first child at age 20-21 years (Hoffman, 2006). In addition, women who give birth at 17 years or younger spend more time receiving assistance, 6.9 years for mothers under 17 years compared to 3.6 years for older mothers (Hoffman, 2006). Total SCHIP expenditures in 2005 were approximately \$7 billion dollars compared to \$10 billion dollars in 2008. The federal share was \$5 billion dollars and the state share was \$2 billion dollars (Kaiser Family Foundation, 2010). Kaiser State Health Facts records enrollment numbers for SCHIP for the month of June each year. In June 2005, there were approximately four million children enrolled in SCHIPs compared to five million children in 2008 (Kaiser Family Foundation, 2010). According to data collected by the Kaiser Family Foundation (2003), in 2003 41% of total births in the United States were financed by Medicaid. There are significant funds being spent to support the outcomes of teenage pregnancy. According to the Urban Institute, federal, state, and local spending on child welfare totaled \$11.6 billion dollars in 2004 (Scarcella, Bess, Zielewski, and Green, 2006). These funds could be allocated to other public sectors such as transportation or city development.

An analysis of data by Hoffman (2006) shows that teenage mothers were 2.2 times more likely to have a child placed in foster care during the first five years after birth compared to mothers who first gave birth at 20-21 years. This is consistent with the findings in a study by Maynard (1996) that estimated 5% of children born to adolescent mothers entered foster care. Although foster care can benefit many children, it can also have an unintended effect on a child's future sexual behavior. A study by Carpenter, Clyman, Davidson, and Steiner (2001) showed that foster care was associated with first conception at a younger age and an overall greater number of sexual partners. This study by Carpenter et al. (2001) highlights the effect living in foster care can have on sexual behavior and teenage pregnancy.

Teenage mothers and their children also face an uphill climb in terms of academics. Teenage mothers are less likely to complete high school when compared to women who delay their first child birth until their early twenties. By completing fewer years of high school, teenage mothers miss out on opportunities for social growth and development. Studies by Hoffman (2006) and Hofferth, Reid, and Mott (2001) showed that teenage mothers are less likely to finish high school or obtain a GED and complete fewer years of schooling overall when compared to women who had their first birth at a later age.

Just as teenage mothers are less likely to complete high school, children born to teenage mothers (19 years or younger) are more likely to drop out of high school as well (Hoffman, 2006). This is also consistent with findings by Maynard (1996). Maynard (1996) found that approximately 77% of children of teenage mothers completed high school compared to 89% of children born to mothers whose first conception was at 20 or 21 years. The children of teenage mothers aged 17 years and younger complete an average of 0.8 fewer years of education when compared to the children of mothers who gave birth at 20-21 years (Hoffman, 2006). Due to this

lower level of educational attainment, the children of teenage mothers work in lower paying occupations, and as a result pay less in taxes.

The sons of teenage mothers aged 19 years and younger are more likely to spend time in prison (Hoffman, 2006). High incarceration rates cost taxpayers on the federal, state and local level. In 2004, approximately 1.2 million males were in state prisons and the cost to build and maintain prisons was approximately \$29 billion dollars (Hoffman, 2006).

## 2.5 THEORETICAL FRAMEWORK

There are several ways in which high school sex education programs can decrease teenage pregnancy. Current sex education programs are designed to delay the initiation of sexual activity, decrease the amount of sexual activity, decrease the number of sexual partners and increase contraceptive use (Smylie, Maticka-Tyndale & Boyd, 2008). Saunders (2005) provides a background of theoretical frameworks which have been used over the years to design effective sex education programs. There are four broad categories of theoretical frameworks (1) developmental theories, (2) perceived control theories, (3) attitude/intention theories, and (4) social learning theories.

According to Saunders (2005), developmental theories analyze individuals as they progress through distinct stages of growth. Students are separated according to their grade level which makes it easier to administer age appropriate sex information (Somers & Surmann, 2005). As teenagers progress through the different stages, they develop cognitively and acquire better decision-making skills which make it easier to set goals.

Sex education programs that consider developmental stages, are more effective in the long term. Many state laws on sex education require information about sexuality to be age appropriate. Research by Somers and Surmann (2005) shows that sex education programs that

are administered at early ages are a predictor of desired teenage sexual behavior such as less risk-taking and less frequent sexual activity.

Perceived Control Theory is used in developing effective education programs. The core component of Perceived Control Theory is that individuals who perceive themselves to be in control of any given situation will act differently and more positively than someone who believes they are not in control (Bandura, 1977). Self-efficacy is defined by Bandura (1977) as one's belief in their ability to accomplish a task, and is critical in Perceived Control Theory.

The following models (Theory of Planned Behavior, Theory of Interpersonal Behavior, and Health Belief Model) all influence teenagers' intentions and goals for sex. The main component of each model is whether or not someone intends to perform a behavior which is the best indicator of whether or not a person will actually perform that behavior.

The Theory of Planned Behavior (TPB) is one of the simplest to implement in sex education programs and suggests that an individual's intention to perform a behavior is based on three variables: attitudes, social norms and perceived control (Saunders, 2005). Sex education programs that strive to increase contraceptive use have a basis in the TPB and consist of activities and assignments that strengthen positive attitudes towards contraceptive use. In addition, these sex education programs help participants learn what their peers believe about sexual behavior and pregnancy (Saunders, 2005). Results from a study by Caron, Godin, Otis, and Lambert (2004), in which a sex education intervention program was administered to high school students by other high school students found that both sets of students showed positive change such as decreasing sexual activity and increasing condom use. Knowing what their peers believe about sexual behavior may help reinforce positive social norms about contraception use. Another aspect of a sex education program modeled after the TPB is that it helps students figure



out what barriers exist to practicing safe sex and help them overcome those barriers (Saunders, 2005).

Similar to the TPB, the Theory of Interpersonal Behavior (TIB) is based on seven components that influence an individual's intention to perform a behavior: cognitive, affective, social, normative beliefs, personal normative beliefs, role beliefs, and habit (Saunders, 2005). Of these components four are commonly addressed in sex education programs.

(1) Normative beliefs are what an individual's peers believe about the behavior. Within the context of the TIB, normative beliefs account for the influence from outside sources in one's decisions when it comes to safe sex behaviors.

(2) Personal normative beliefs (PNB) is the importance an individual places on a specific behavior and can be influenced by religious or moral beliefs.

(3) The affective component is an individual's reaction to completing a behavior, such as an individual's emotional response to using condoms would be an important predictor of his or her use of them.

(4) "Habit" is an individual's past behavior. If the individual performed the behavior in the past, they are more likely to perform it again. Although more complex, programs based on this model would encourage students to develop positive beliefs about healthy sexual behavior, such as using condoms and birth control.

The Health Belief Model (HBM), suggests that in order to prevent a behavior such as unintended pregnancy or sexually transmitted diseases (STDs), an individual must understand that they are susceptible to that condition and why (Saunders, 2005). The HBM also suggests that students must be convinced that teenage pregnancy and STDs are undesirable conditions. Sex education programs grounded in the HBM focus on providing information about the risk of

unprotected sex and educating teenagers to the realities of pregnancy and parenting (Saunders, 2005).

All of the models mentioned on attitudes and intentions can be applied at the individual level. Social learning theory analyzes the individual in relation to their environment. According to Saunders (2005), students are more likely to adopt behaviors if they are receiving positive messages from people they respect or admire. Sex education programs taught by someone who students believe in and trust will be more effective in altering their behaviors. In the Smylie et al. (2008) study, researchers analyzed a sex education program administered to ninth graders, which included sessions with parents, other adult professionals and a teen panel discussion. The results showed that these characteristics of sex education programs were effective at increasing sexual health knowledge. Caron et al. (2004) used peer education to shape students' beliefs about positive sexual behaviors.

Fine (1993) presented an overview of four common perspectives on teaching sex education that have dominated the classroom for the past century. All but one (sexuality as a discourse for desire) attempts to control youth sexual behaviors.

Fine's first perspective on sexuality education is "sexuality as violence" and assumes there is a causal relationship between silence about sexuality and a decrease in sexual activity (Fine, 1993). Through this discourse, teenagers are taught that sex is something to be feared.

Fine's second perspective on sexuality education is "sexuality as victimization." The main focus of this type of education is women who are viewed as the victims of male predators. This type of education instills in women a sense of fear of males, however this can create conflict because women are taught to fear the men they are simultaneously being told to love and one day marry. Both the "sexuality as violence" and "sexuality as victimization" models use fear as a

way of attempting to control the actions of youth. These two perspectives have dominated sex education material throughout most of the twentieth century.

In the third perspective on sexuality education, Fine (1993) argues that the idea of “sexuality as individual morality” presents sexuality as a test of self-control. In this model, teenagers are given more freedom in decision making, as long as they make the right decisions. This perspective is seen frequently in states that teach abstinence only. Laws that require abstinence be taught in schools often have a curriculum that emphasizes the failure rates of contraceptive methods while highlighting the 100% effectiveness of abstinence (Dailard, 2003).

Fine’s (1993) fourth perspective on sexuality education, “sexuality as a discourse of desire” teaches adolescents to explore their own sexuality. By exploring their own sexuality and subjectively defining what feels good and what does not, teenagers learn using a method that is not attempting to control or manipulate their sexual behavior; they are able to make more responsible decisions and define what it means to be sexually healthy. This perspective is seen most frequently in comprehensive sex education programs.

Sex education programs are intended to delay the initiation of sex, increase contraceptive use, and decrease the number of sexual partners. The programs that are most effective at achieving these goals of encouraging positive sexual behavior and increasing sexual health knowledge are most likely to decrease the incidence of unintended teenage pregnancy.

## 2.6 HISTORY OF SEX EDUCATION

There are some general themes throughout the research on effective sex education programs. A lack of education programs in schools was related to early initiation of sexual activity. A study conducted by Somers and Surmann (2005) explored the effect that multiple sources of information about sexual topics and the timing of receiving the information had on

adolescent's sexual attitudes and behavior. The study also analyzed the impact of different sources of information on sexual topics (peers, school, parents, and media) and compared it to what stage they receive these messages.

According to the results,

...later learning from any sources and less learning from school sex education about various sexual topics (including all sexual behavior, importance of using birth control and consequences of teen pregnancy) was statistically significantly predictive of more frequent sexual activity, including oral sex and sexual intercourse. (Somers and Surmann, 2005, p. 48)

The results shown here further highlight the need for early initiation of sex education classes. Timing is an important element in the developmental theories listed by Saunders (2005) and, ideally, programs should be administered at younger ages yet be age appropriate taking developmental stage into consideration.

Schools can be a very important resource for young women. Teenage pregnancy has more of an impact on women considering they carry the child during gestation and are responsible for the child after birth. Programs that focus on young women may be able to lower teenage pregnancy rates by giving them the skills to make responsible decisions and set future goals. According to Somers and Surmann (2005), more learning from school about teenage pregnancy and learning at an earlier stage of development combined to explain less frequent sexual behavior among girls. The same study showed that earlier learning for girls about the importance of using birth control was related to less frequent sexual behavior.

Somers and Surmann (2005) also demonstrated the timing and source of information about sex education impacts racial/ethnic groups differently. The data from their study indicated

that among African-Americans, school-based education is more related to desirable outcomes for adolescents rather than peer-based education. Among Caucasians, earlier learning about love and/or marriage and the consequences of teenage pregnancy was related to less frequent sexual behavior compared to African-American adolescents. However, when compared to Hispanics, “with few exceptions, more learning from various sources and learning earlier were related to more risky sexual behavior” (Somers & Surmann, 2005, p. 50).

Somers and Surmann (2005) focused on teenage pregnancy rates at the state level, but there have also been studies done to examine the relationship between sex education programs and teenage pregnancy rates at the county level. A study by Hedman, Larsen, and Bohenblust (2008) analyzed the correlation between the type of sex education taught in schools and the teenage pregnancy rates for the county where the school was located. By looking at the relationship between the topics covered in sex education programs and the teenage pregnancy rates at the county level, it may be possible to develop more effective sex education programs and gain insight into the weaknesses of other studies.

A study by Hedman et al. (2008) is significant because it was conducted strictly among public high schools in Minnesota, and a significant finding was what topics were most commonly taught in schools. State policy is aimed at public high schools and the focus of the current study will also be on public high schools. The investigators received data from educators and students who worked and attended the schools involved in the study. The information was collected through questionnaires designed to record what participants thought were the most common sexual topics being covered. The researchers reported that the highest percentages were teaching decision-making (66%) and communication (62%). This is consistent with the social learning theory and the developmental theories summarized by Saunders (2005). By helping

students build decision-making and communication skills, they will be more likely to make responsible decisions and take their future goals into consideration.

## 2.7 CURRENT IDEAS ON SEX EDUCATION

Adults have different opinions and beliefs on what should be included in sex education programs in public high schools. In 1999, 40% of general social survey respondents in the South agreed that sex should only occur within the context of marriage compared to 34% in the Midwest, 29% in the West, and 26% in the Northeast (Landry, Darroch, Singh, & Higgins, 2003). Based on these results, adults living in the South typically have less permissive attitudes about sexuality than other regions (Northeast, Midwest, and West). Adult beliefs on the appropriateness of sexual behavior reflect public opinion and support for sex education programs. School districts in the south were more likely than school districts in other regions to require teaching abstinence as the only option for unmarried teenagers (Landry, et. al., 2003).

Landry et al. (2003) analyzed data collected by the Guttmacher Institute in a 1999 nationally representative survey of public school teachers in grades 7-12. Results of their analysis showed that there were differences in how sex education was taught according to the region of the country where the respondents resided. In the South, 29.7% of teachers taught abstinence as the only option compared to 16.8% of teachers in the Northeast, 22.4% of teachers in the Midwest, and 21.1% of teachers in the West.

The goal of sexuality education is to promote healthy sexuality. Some programs do this by promoting strict abstinence while other programs take a more comprehensive approach. The way sexuality education is taught has changed over the past few decades. Most people refer to one of two types of sexuality education, comprehensive and abstinence-only. However, there are five different ways of teaching sex education and most schools fall into one of these categories.

The following categories of sex education are defined by the Sexuality Information and Education Council of the United States (2010).

- **Comprehensive Sexuality Education:** sexuality education programs that start in kindergarten and continue through 12<sup>th</sup> grade. These programs include age-appropriate, medically accurate information on a broad set of topics related to sexuality including human development, relationships, decision-making, abstinence, contraception, and disease prevention. These programs provide students with opportunities for developing skills as well as learning information.
- **Abstinence-based:** programs that emphasize the benefits of abstinence. These programs also include information about sexual behavior other than intercourse as well as contraception and disease prevention methods.
- **Abstinence-only:** programs that emphasize abstinence from all sexual behaviors. These programs do not include information about contraception or disease prevention methods.
- **Abstinence-only-until-marriage:** programs that emphasize abstinence from all sexual behaviors outside of marriage. If contraception or disease-prevention methods are discussed, these programs typically emphasize failure rates. In addition, they often present marriage as the only morally correct context for sexual activity.
- **Fear-based:** Abstinence-only and abstinence-only-until-marriage programs that are designed to control young people's sexual behavior by instilling fear, shame, and guilt. These programs rely on negative messages about sexuality, distort information about condoms and STDs, and promote biases based on gender, sexual orientation, marriage, family structure, and pregnancy options. (SIECUS, 2010)

Recent results from the Annenberg National Health Communication Survey gathered in 2005, showed that U.S. public opinion of abstinence-only education is low. The majority of survey respondents disagreed with the belief that abstinence-only-programs are effective in preventing unplanned pregnancies (Bleakley, Hennessy, & Fisbein, 2006). Results showed 80.4% of survey respondents believed a combination of abstinence and other methods was effective at reducing unintended pregnancy. Belief in what methods of sex education are most effective can influence what programs are used in public high schools. Approximately 82% of survey respondents indicated support for sex education programs that teach both abstinence and other methods (Bleakley et al., 2006). In this instance, public opinion accurately reflects support for public policies.

In California, the law does not mandate sex education. However, when it is taught, the state follows comprehensive sex education guidelines. California law states that information provided be medically accurate, taught in kindergarten through the 12th grade, and contain information about abstinence (SIECUS, 2005). California laws are different than other states' laws.

In Indiana, sex education is mandated and taught according to abstinence-only-until-marriage guidelines. Indiana law requires teachers to “teach abstinence from sexual activity outside of marriage as the expected standard for all school age children” and to “include that abstinence from sexual activity is the only certain way to avoid out-of –wedlock pregnancy, sexually transmitted diseases and other associated health problems” (SIECUS, 2005).

In 1999, 23% of secondary school sex education teachers taught abstinence compared to 2% in 1988 (Lindberg, Santelli, & Singh, 2006). In 2000, according to the Centers for Disease Control and Prevention, 92% of all United States middle and junior high schools and 96% of



high schools had at least one required class that taught abstinence as the best way to avoid pregnancy, HIV and STDs while only 62% of middle and junior high schools and 87% of high schools had a class about methods of contraception (Lindberg, et al., 2006).

Kirby (2007) demonstrated that sex and STD/HIV education programs focusing only on abstinence failed to have a significant effect on sexual behavior. From 1995-2002, the content and prevalence of formal sex education shifted away from birth control instruction towards abstinence. According to data from the National Survey of American Males (NSAM) and the National Survey of Family Growth (NSFG), the proportion of adolescents who received any formal instruction about methods of birth control declined from 81% to 66% among males and from 87% to 70% among females (Lindberg, et al., 2006). Those receiving abstinence-only education increased in males, from 9% in 1995 to 24% in 2002 and among females from 8% in 1995 to 21% in 2002 (Lindberg, et al., 2006). This trend shows that there was a decrease in the number of boys and girls receiving instruction in both areas of abstinence and birth control methods.

Kirby (2007) demonstrated that sex and STD/HIV education programs focusing only on abstinence, failed to have a significant effect on sexual behavior. In contrast, Kirby (2007) also found that comprehensive programs that encouraged both abstinence and condom/contraceptive use did not increase sexual behavior, but did have a positive impact on delaying sex, reducing the frequency of sex and number of partners, or increasing condom/contraceptive use.

According to Dailard (2003), from a scientific standpoint, a person who is an “abstinence user” is someone who intentionally refrains from sexual activity. The number of people consciously using abstinence as a method of birth control is smaller than the group of people who are not having sex (Dailard, 2003).

There are two different methods used to measure the effectiveness of contraceptives. The “perfect use” method is how effective the contraceptive is if used correctly and consistently every time; most contraceptives have “perfect use” rates of around 99%. The “typical use” method is how effective the contraceptive is when it is not used correctly and consistently (Dailard, 2003). When abstinence is used correctly and consistently it is 100% effective in preventing pregnancy and STDs. However, when it is not used correctly and consistently abstinence is not 100% effective. According to Dailard (2003), “From a public health perspective, it is important to subject abstinence to the same scientific standards that apply to other contraceptive methods and make consistent comparisons across methods.” When comparing abstinence effectiveness rates, public health officials have to consider the typical use of abstinence. The public debate over whether or not abstinence-only education should be taught partially stems from the belief that abstinence is 100% effective in preventing teenage pregnancy. It is possible that someone may not use abstinence consistently 100% of the time, and as a result, unintended pregnancy can occur.

## **CHAPTER 3**

### **RESEARCH METHODS**

#### **3.1 PURPOSE OF THE STUDY**

The purpose of this study was to determine if there is a relationship between teenage pregnancy rates and the type of sex education program taught in public high schools. Data on teenage pregnancy rates for each state in the United States were compared to state laws on what aspects of sex education were taught and how they were covered in public high schools. The findings of this chapter are organized around two research questions.

##### *Research Questions*

1. Is there a difference in teenage pregnancy rate or teenage birth rate between states that require public high schools to provide sex or STD/HIV education to students and states that do not require public high schools to provide sex or STD/HIV education to students?
2. Is there a difference in teenage pregnancy rate or teenage birth rate between states that provide comprehensive sex education programs and states that provide abstinence-only or abstinence based sex education?

#### **3.2 RESEARCH METHODOLOGY**

##### *Data Collection*

The data on teenage pregnancy rates and teenage birth rates were gathered by the Guttmacher Institute. The teenage pregnancy rates were calculated as the sum of births, abortions and miscarriages per 1,000 women 15-19 years. The Guttmacher Institute gathered data on the number of births from the National Center for Health Statistics (NCHS) of the U.S. Department of Health and Human Services. All teenage pregnancy rates and teenage birth rates were for the year 2005. All of the data were published in U.S. Teenage Pregnancies, Births, and Abortions:

National and State Trends and Trends by Race and Ethnicity, a report published by the Guttmacher Institute in January 2010 (Kost et al., 2010).

The amount of funding each state received for abstinence-only-until-marriage programs was provided by the Sexuality Information and Education Council of the United States (SIECUS) for fiscal year 2005 and were rounded to the nearest million. If a state received less than \$500,000 for abstinence-only-until-marriage programs, the amount recorded was rounded up to \$0.5 million and if the state received less than \$300,000 the amount recorded was rounded to \$0.3 million.

The percentage of Blacks, Hispanics, and Whites in each state were obtained from the Center for Disease Control (CDC) Wide-ranging Online Data for Epidemiologic Research (WONDER) database. The CDC estimates the population of the United States every year in between censuses. The data taken from the CDC WONDER database were for the year 2005. The percentages were calculated by dividing the total number of members of each race by the total population for the state. The data on the percentage of teenagers (15-19 years) were calculated by dividing the total number of teenagers (15-19 years) by the total population in each state in 2005.

Data on median household income by race were obtained from the American Community Survey (ACS). The ACS is a nationwide survey that collects demographic information from samples of U.S. households and makes estimates of the population in between the decennial census. Data used in this study were collected in 2005.

The data on the number of people enrolled in high school were taken from the ACS as well. The ACS provided estimates of the number of people enrolled in school by grade level. The data used in this analysis were for all students enrolled in grades 9-12 in 2005.

The data on whether a state mandates sex education or STD/HIV education were gathered by the Guttmacher Institute. The Guttmacher Institute's website provides the most up to date state policies and publishes the information each month in State Policy Briefs. In order to obtain the State Policy Brief on Sex and STD/HIV Education from 2005, a request was sent through email to a public policy associate at the Guttmacher Institute who provided information on state policies updated as of January 1, 2005. The data indicate which states mandate sex education and STD/HIV education based on the laws for each state.

The Policy Brief published by the Guttmacher Institute (2005) also indicates whether abstinence and contraception are "stressed" or "covered" in each state based on the laws. In order to run the one-way analysis, categories of sex education were defined based on the information provided by Guttmacher and the definitions described by SIECUS. If a state "stresses" abstinence and nothing else, it falls into the category of "abstinence only" sex education. If a state "stresses" abstinence and "covers" contraception, it falls into the category of "abstinence-based" sex education. If a state "covers" abstinence and "covers" contraception, it falls into the category of "comprehensive" sex education.

### *Data Analysis*

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 17.0. A 95% confidence interval was calculated, and statistical analyses were performed using two-sided tests of significance at the 0.05 level. Student t-tests were performed to test whether there was a difference in mean teenage pregnancy rates between states that require high schools to provide sex or STD/HIV education and states that do not. Similar tests were performed for testing differences in teenage birth rates. Finally, differences on these two outcomes were tested. Levene's test of significance was applied to test the equality of variances. Equal variances were

assumed in all analyses except for when the teenage pregnancy rate was compared to whether or not sex education programs were mandatory. In this analysis the teenage pregnancy rate for Hispanics did not have equal variances.

Linear regressions were used to explore the associations between the two outcome variables (teenage pregnancy rate and teenage birth rate) and other demographic and socioeconomic variables. The main independent variables were whether sex and STD/HIV education programs were mandatory. Additional independent variables were the percentage of the population in each racial/ethnic group, median household income, number of males and females enrolled in high school, the percentage of teenagers and the amount of funding for abstinence-only sex education programs in each state. Regression coefficients, standard errors, and p-values were calculated.

One-way ANOVA was used to study the differences in mean teenage pregnancy rate and mean teenage birth rate between the categories of sex education (comprehensive, abstinence-based, or abstinence-only).

## **CHAPTER 4**

### **RESULTS**

The independent samples t-test for whether or not sex education and STD/HIV education is mandatory was conducted using the variables teenage pregnancy rate and teenage birth rate. All of the independent samples t-tests that were conducted were two-sided. The results for the variable teenage birth rate are displayed in Table 2 and Table 3. Table 2 displays the results of the independent samples t-test for mandatory sex education. Total mean teenage birth rate was lower in states that mandated sex education. However, the analysis by race indicates that the mean teenage birth rate was higher among Black, White, and Hispanic teenagers in states where sex education was mandatory. This may be due to the fact that some states were missing data on birth rates by race. None of the results were statistically significant.

The results for whether or not STD/HIV education is mandatory are displayed in Table 3. The total mean teenage birth rate was lower in states that mandated STD/HIV education. The analysis indicated that the mean teenage birth rate for Blacks and Whites was lower among states that mandated STD/HIV education. Among Hispanic teenagers, the mean teenage birth rate was higher among states that mandated STD/HIV education.

The results for the variable teenage pregnancy rate are displayed in Table 4 and Table 5. Table 4 displays the results of the independent samples t-test for mandatory sex education. The overall mean teenage pregnancy rate was lower in states that did not mandate sex education; however, the difference was not statistically significant (see table 4). Among Blacks and Hispanics, the mean teenage pregnancy rate was higher in states that did not mandate sex education. The mean teenage pregnancy rate for Whites was lower in states where sex education was not mandatory. This may be due to the fact that there were missing data on pregnancy rates

for some races by state. In all of these instances none of the differences were statistically significant.

Table 2 Results of an Independent Samples t-test for Teenage Birth Rates and Sex Education

Race	Mandatory Sex Education			Non-Mandatory Sex Education			p-value
	M	SD	N	M	SD	N	
Total	39.8	11.2	23	39.9	12.7	28	0.98
Blacks	61.8	17.7	22	58.9	17.6	25	0.58
Whites	28.0	9.9	22	27.2	9.8	28	0.77
Hispanics	103.1	40.5	22	90.4	27.7	27	0.20

*Note.* Birth rates for Blacks were incomplete for the following states where the population base of women 15-19 was <500: Montana, North Dakota, South Dakota, Vermont, Wyoming  
Birth rates for Hispanics were incomplete for the following states where the population base of women 15-19 was <500: North Dakota, Vermont

Table 3 Results of an Independent Samples t-test for Teenage Birth Rates and STD/HIV Education

Race	Mandatory STD/HIV Education			Non-Mandatory STD/HIV Education			p-value
	M	SD	N	M	SD	N	
Total	38.4	11.4	39	39.9	12.7	28	0.14
Blacks	60.1	17.9	36	58.9	17.6	25	0.23
Whites	26.9	9.7	38	27.2	9.8	28	0.77
Hispanics	98.2	37.1	37	90.4	27.7	27	0.20

*Note.* Birth rates for Blacks were incomplete for the following states where the population base of women 15-19 was <500: Montana, North Dakota, South Dakota, Vermont, Wyoming  
Birth rates for Hispanics were incomplete for the following states where the population base of women 15-19 was <500: North Dakota, Vermont



Table 4 Results of an Independent Samples t-Test for Teenage Pregnancy Rate and Sex Education

Race	Mandatory Sex Education			Non-Mandatory Sex Education			p-value
	M	SD	N	M	SD	N	
Total	69.6	24.8	23	39.9	12.7	28	0.98
Blacks	100.2	27.0	16	58.9	17.6	25	0.58
Whites	49.8	11.4	12	27.2	9.8	28	0.77
Hispanics	146.0	64.4	10	90.4	27.7	27	0.20

*Note.* Pregnancy rates for Blacks were incomplete for the following states: California, Connecticut, District of Columbia, Florida, Illinois, Louisiana, Maryland, Massachusetts, Montana, Nebraska, New Hampshire, New Jersey, North Dakota, South Dakota, Vermont, Wyoming

Pregnancy rates for Hispanics were incomplete for the following states: Alaska, California, Connecticut, District of Columbia, Florida, Illinois, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Montana, Nebraska, Nevada, New Hampshire, New Jersey, North Carolina, North Dakota, Oklahoma, Rhode Island, Vermont, Washington, Wyoming

Pregnancy rates for Whites were incomplete for the following states: Alaska, California, Connecticut, District of Columbia, Florida, Illinois, Iowa, Louisiana, Maryland, Massachusetts, Michigan, Nebraska, Nevada, New Hampshire, New Jersey, North Carolina, Oklahoma, Rhode Island, Washington, Wyoming

The results for mean teenage pregnancy rate compared to whether or not STD/HIV education is mandated are displayed in Table 5. The total mean teenage pregnancy rate was lower in states where STD/HIV education was mandated. The analysis by race indicated that the mean teenage pregnancy rate for Whites was lower in states where STD/HIV education was mandatory. Among Black and Hispanic teenagers, the mean pregnancy rate was higher in states that mandated sex education. None of the differences were statistically significant.

Table 6 displays the results of an independent samples t-test that compares teenage pregnancy rate and teenage birth rate between states that require specific types of sex education and states that do not. If a state meets the requirements for one of three categories of sex education (abstinence-only, abstinence-based, or comprehensive), they were put into one group. If a state did not meet any of the requirements for one of the three categories it was put into a separate group. The results show mean teenage pregnancy rate and mean teenage birth rate were lower in states that did not have a specific type of sex education compared to states that did fall into one of the three different types of sex education. This may be due to the fact that the sample size was so small.

Table 5 Results of an Independent Samples t-test for Teenage Pregnancy Rate and STD/HIV Education

Race	Mandatory STD/HIV Education			Non-Mandatory STD/HIV Education			p-value
	M	SD	N	M	SD	N	
Total	66.5	21.3	39	66.9	15.4	12	0.95
Blacks	105.9	26.0	28	94.9	20.5	7	0.26
Whites	47.1	10.4	22	48.2	9.9	9	0.78
Hispanics	144.1	50.6	19	131.9	15.7	8	0.52

*Note.* Pregnancy rates for Blacks were incomplete for the following states: California, Connecticut, District of Columbia, Florida, Illinois, Louisiana, Maryland, Massachusetts, Montana, Nebraska, New Hampshire, New Jersey, North Dakota, South Dakota, Vermont, Wyoming  
Pregnancy rates for Hispanics were incomplete for the following states: Alaska, California, Connecticut, District of Columbia, Florida, Illinois, Iowa, Kentucky, Louisiana, Maryland, Massachusetts, Michigan, Montana, Nebraska, Nevada, New Hampshire, New Jersey, North Carolina, North Dakota, Oklahoma, Rhode Island, Vermont, Washington, Wyoming  
Pregnancy rates for Whites were incomplete for the following states: Alaska, California, Connecticut, District of Columbia, Florida, Illinois, Iowa, Louisiana, Maryland, Massachusetts, Michigan, Nebraska, Nevada, New Hampshire, new jersey, north Carolina, Oklahoma, Rhode island, Washington, Wyoming

Table 6 Results of an Independent Samples t-Test Between Teenage Pregnancy Rate, Teenage Birth Rate, and Different Types of Sex Education

Category	Teenage Pregnancy Rate			Teenage Birth Rate		
	M	SD	N	M	SD	N
No Category	63.2	26.8	22	36.1	11.5	22
One of Three Categories	69.1	12.5	29	42.7	11.7	29
p-value	.30			.05		

In order to evaluate the impact of demographic and socioeconomic variables on teenage pregnancy rates, a linear regression approach was used. Table 7 contains all the controlled demographic and socioeconomic variables. Race and household income were the only two variables that were statistically significant across all models. The percentage of teenagers was statistically significant in Models 1 and 2 which used teenage pregnancy rate as the dependent variable.

Model 1 analyzed teenage birth rate and whether or not sex education was mandated. In Model 1, race and median household income were statistically significant variables. An increase of 1% in the Black population was associated with a 0.32 increase in teenage birth rates. An increase of 1% in the White population was associated with a 0.24 decrease in the teenage birth rates. An increase of 1% in the Hispanic population was associated with a 0.45 increase in the teenage birth rates. A 1% increase in median household income was associated with a 1.06 decrease in teenage birth rates.

Model 2 analyzed teenage birth rates and whether or not STD/HIV education was mandated. In Model 2, race and median house hold income were statistically significant variables that affected teenage birth rates. An increase of 1% in the Black population was associated with a 0.33 increase in teenage birth rates. An increase of 1% in the White population was associated with a 0.25 decrease in the teenage birth rates. An increase of 1% in the Hispanic population was associated with a 0.43 increase in the teenage birth rates.

Model 3 analyzed teenage pregnancy rates and whether or not sex education was mandated. In Model 3, race, median household income, and percentage of teenagers were all statistically significant variables. An increase of 1% in the Black population was associated with a 1.03 increase in teenage pregnancy rates. An increase of 1% in the White population was associated with a 0.36 decrease in the teenage pregnancy rate. An increase of 1% in the Hispanic population was associated with a 0.92 increase in the teenage pregnancy rates. A 1% increase in the percentage of teenagers 15-19 years was associated with a 9.86 decrease in teenage pregnancy rates.

Model 4 analyzed teenage pregnancy rate and whether STD/HIV education was mandated. An increase of 1% in the Black population was associated with a 1.05 increase in teenage pregnancy rates. An increase of 1% in the White population was associated with a 0.36 decrease in the teenage pregnancy rates. An increase of 1% in the Hispanic population was associated with a 0.93 increase in the teenage pregnancy rates. A 1% increase in the percentage of teenagers 15-19 years was associated with a 9.95 decrease in teenage pregnancy rates.

Table 7 Coefficients from Linear Regressions on Sex and STD/HIV Education, Teenage Birth Rate, and Teenage Pregnancy Rate

Variable	Birth Rate		Pregnancy Rate	
	Model 1	Model 2	Model 3	Model 4
Sex Education Mandatory	1.38 (.43)		2.61 (.29)	
STD/HIV Education Mandatory		-1.45 (.46)		2.78 (.32)
% Teenagers	-1.18 (.59)	-1.64 (.45)	-9.86* (.00)	-9.65* (.00)
% of Black Population	0.32* (.01)	0.33* (.01)	1.03 *(.00)	1.04* (.00)
% of White Population	-0.24* (.02)	-0.28*(.01)	-0.36* (.01)	-0.35* (.02)
% of Hispanic Population	0.45* (.01)	0.43* (.01)	0.92 (.00)	0.93* (.00)
Median Household Income	-1.06* (.00)	-1.03* (.00)	-0.63* (.00)	-0.61* (.00)
Total number of HS students	-0.01 (.08)	-0.01 (.09)	-0.01 (.09)	-0.01* (.04)
Funding for Abstinence- Only-Until Marriage	-0.06 (.87)	-0.11 (.76)	-0.67 (.18)	-0.65 (.18)
Sample Size	51	51	51	51

*Note.* Model 1= teenage birth rate, sex education is mandatory  
 Model 2 = teenage birth rate, STD/HIV education is mandatory  
 Model 3 = teenage pregnancy rate, sex education is mandatory  
 Model 4 = teenage pregnancy rate, STD/HIV education is mandatory  
 Exact p-values are in parenthesis  
 \*  $p \leq .05$

Table 8 displays the results from a one-way ANOVA analysis. The results showed no difference in teenage birth or pregnancy rates according to what type of sex education was taught. If a state “stresses” abstinence and nothing else, it falls into the category of “abstinence only” sex education. If a state “stresses” abstinence and “covers” contraception, it falls into the

category of “abstinence-based” sex education. If a state “covers” abstinence and “covers” contraception, it falls into the category of “comprehensive” sex education. Twenty nine states fell into one of these three categories. The other states had no indication of the type of sex education taught. There were no statistically significant differences in teenage birth rates and teenage pregnancy rates based on the ANOVA analysis. However, the descriptive statistics show that the mean teenage pregnancy rate and the mean teenage birth rate were highest among states that taught abstinence only. The mean pregnancy rate was lowest among states that taught abstinence-based sex education and mean birth rates were lowest among states that taught comprehensive sex education.

Table 8 One Way ANOVA Between Different Categories of Sex Education for Teenage Pregnancy Rate and Teenage Birth Rate

Category	Pregnancy Rate			Birth Rate		
	M	SD	N	M	SD	N
Total	69.1	12.5	29	42.7	11.7	29
Abstinence only	73.5	11.5	15	48.1	11.5	15
Abstinence Based	64.2	9.8	10	38.1	8.6	10
Comprehensive	64.8	18.8	4	34.0	10.9	4
p-value	.14			.23		

An independent samples t-test was conducted to see if there was any difference in the demographic make-up of the states that mandated sex or STD/HIV education programs and those that didn't. Although there were no statistically significant differences in demographic make-up

between the states that mandated either program or states that did not, the results are highlighted in Table 9.

Table 9 Demographic Makeup of States with Mandated Sex and STD/HIV Education

	Mandated Sex Education	Non-mandated Sex Education		Mandated STD/HIV Education	Non- Mandated STD/HIV Education	
Variable	M	M	p-value	M	M	p-value
% of Black						
Population	12.73	9.84	0.39	11.10	11.29	0.96
% of Hispanic						
Population	7.44	10.10	0.30	8.4	10.33	0.56
% of White						
Population	73.30	75.31	0.66	74.47	74.18	0.96
Funding*	2.65	4.02	0.13	3.31	3.71	0.71
% of teenagers	7.10	7.20	0.27	7.11	7.23	0.39
HS Enrollment**	245.48	405.82	0.16	343.67	300.50	0.75
Median Household						
Income	47.22	44.61	0.21	46.62	43.08	0.15
Sample Size	23	28	51	39	12	51

*Note.* \* rounded to millions

\*\* rounded to thousands

## **CHAPTER 5 DISCUSSION**

The purpose of this study was to determine if there is a relationship between teenage pregnancy rates and the type of sex education program taught in public high schools. Data on teenage pregnancy rates for each state in the United States were compared to state laws on aspects of sex education taught and how they were covered in public high schools. The findings of this chapter are organized around two research questions.

### *Research Questions*

1. Is there a difference in teenage pregnancy rates or teenage birth rates between states that require public high schools to provide sex or STD/HIV education to students and states that do not require public high schools to provide sex or STD/HIV education to students?
2. Is there a difference in teenage pregnancy rates or teenage birth rates between states that provide comprehensive sex education programs and states that provide abstinence-only or abstinence based sex education in public high schools?

### **5.1 FINDINGS**

Research question one asked is there a difference in teenage pregnancy rates or teenage birth rates between states that require public high schools to provide sex or STD/HIV education to students and states that do not require public high schools to provide sex or STD/HIV education to students? The findings in this study demonstrate there was no significant difference in the mean teenage pregnancy rates or mean teenage birth rates between states that mandated sex or STD/HIV education programs and states that did not mandate sex or STD/HIV education programs.



Although there was no significant difference in the means, the findings demonstrated that race, median household income, and percentage of teenagers significantly affected the teenage pregnancy rates while only race and median household income affected teenage birth rates. In states with larger percentages of Blacks and Hispanics, there was an increase in teenage pregnancy rates and teenage birth rates while states with larger percentages of Whites had a decrease in teenage pregnancy rates and teenage birth rates. This is consistent with the data presented by Kost et al. (2010) which indicated teenage pregnancy rates and teenage birth rates were higher among Black and Hispanic teenagers when compared to White teenagers. A high median household income was attributed with a decrease in teenage pregnancy rates and teenage birth rates.

The percentage of teenagers significantly impacted the pregnancy rates in each state. States with higher percentages of teenagers were attributed with a decrease in teenage pregnancy rates. This is inconsistent with findings by the Guttmacher Institute (2010) whose data indicated states with the largest amounts of teenagers had the highest number of teenage pregnancies. The total number of teenage pregnancies does not take into consideration abortion rates and miscarriages. In this study, the teenage pregnancy rate, which included estimated number of miscarriages and abortions, was analyzed and may have contributed to the differences in results and findings.

Research question two asked is there a difference in teenage pregnancy rates or teenage birth rates between public high schools that provide comprehensive sex education programs and public high schools that provide abstinence-only or abstinence-based sex education? The findings demonstrate there were no significant differences between the mean teenage pregnancy rates or mean teenage birth rates between states that taught abstinence-only, abstinence-based, or

comprehensive sex education. Kirby (2007) found that there was no supporting evidence for one sex education program over another. His review of 54 studies of different sex education programs found that there were effective methods and programs in all the categories of sex education.

A total of 29 states fell into one of the three categories of sex education. Of those 29 states, the mean teenage pregnancy rate was lowest in states categorized as abstinence-based which is defined as a state that stresses abstinence and covers contraception. Of those same 29 states, the mean teenage birth rate was lowest in states categorized as comprehensive which is defined as a state that covers abstinence and contraception. These results are consistent with Kirby (2007) who concluded that there was no strong evidence for the effectiveness of abstinence-only education programs. The mean teenage pregnancy rate was highest among states that were categorized as abstinence-only. This is consistent with data presented by the Guttmacher Institute (2005) and Kost et al. (2010) whose data indicated that the states with the highest rates of teenage pregnancy also have laws that require abstinence-only education.

## 5.2 LIMITATIONS

This study had several limitations. One limitation was the data on pregnancy rates were incomplete. The pregnancy rates were calculated as the sum of births, abortions and miscarriages per 1,000 women 15-19 years. Not all states record abortion rates by race/ethnicity, and this may account for why the pregnancy rates by race/ethnicity are missing.

Another limitation is the data on pregnancy rates only includes women whose pregnancy ended while they were 15-19 years and does not include pregnancies that began while the woman was 19 years and ended after the age of 19 years.

Another limitation is with the information on whether or not sex education programs in public schools are mandatory. The data indicate whether the laws mandate sex education and whether abstinence and contraception are stressed or covered. Although these laws are in place, there is no way to confirm what is actually being taught in public high schools or to evaluate the quality of the programs. In some instances, curriculums vary between school districts.

The types of sex education taught are another limitation of this study. For the purpose of the one-way ANOVA analysis, states were put into categories based on whether abstinence was “stressed” or “covered” and whether contraception was or was not “covered”. Of 51 states, only 29 fell into one of three categories (abstinence-only, abstinence-based, or comprehensive). The states that did not fall into any category were excluded and may impact the analysis. In addition, there is great variance in the materials and curriculums covered in each state. Two states that stress abstinence can offer different educational material.

The data used in this study were cross sectional. This may be another limitation because the data does not account for differences in mean teenage pregnancy that may be due to other confounding factors.

The curriculum in public high schools is determined by the school district. One consideration of this study is that in some states school districts overlap counties. As a result, there may be schools that are located in one county but fall into a school district in a different county. Data that were collected on teenage pregnancy rates were collected on the county level, so the analysis may not show the difference in curriculums taught between counties.

Linear regressions and independent samples t-tests were conducted on pregnancy rates and birth rates. However, when analyzing the data, teenage birth rates, abortions and miscarriages are not included. Pregnancy rates are a more accurate estimation because they

include abortions and miscarriages. If only teenage birth rates were analyzed, the results may be affected because of cultural differences that were not analyzed. Cultures that possess a strong belief that abortion is wrong may have lower levels of abortions resulting in higher birth rates.

Another consideration of this study is ecological fallacy. All of the data in this study were analyzed on the group level. The results may not account for differences that exist on the individual level. Ecological fallacy may account for why there were no statistically significant variables resulting in differences in the mean teenage pregnancy rate. This study did not attempt to measure the effect of sex and STD/HIV education programs on individual teenage sexual behaviors such as the frequency of sex and frequency of condom use.

### *Conclusion*

In this study, the alternative hypotheses for both research questions were rejected. There were no significant differences in mean teenage pregnancy rates or mean teenage birth rates between states that mandated sex or STD/HIV education programs and states that did not mandate sex or STD/HIV education programs. There was no difference in mean teenage pregnancy rate or mean teenage birth rate between states depending on what type of sex education program (abstinence-only, abstinence-based, or comprehensive) was taught.

This study was conducted using data collected in 2005. A 1999 Gallup Poll found that about 60% of adults said sex education should be a required course in public high schools, while 32% said it should be offered but not required (Crabtree, 2008). Public opinion on what type of sex education program should be taught in public high school can influence laws and in the past decade, social attitudes about abstinence-only education have changed. A study by Blekley et al. (2006) showed that abstinence only education programs received the lowest level of support (36%) and the highest level of opposition (50%) in 2006.

Sexual attitudes can be influenced by several factors. A study by Chappell, Maggard, and Gibson (2010) explored factors related to sexual attitudes as outlined in Reiss' (1980) theory. Reiss's theory explored the role that religiosity, gender egalitarianism, and labor shortages have on sexual attitudes. The results of the study by Chappell et al. (2010) showed that religiosity consistently predicted attitudes on sexual behavior and people who perceived a labor shortage were likelier to support sex education in schools. Most of the uncertainty surrounding what type of sex education is most effective comes from a lack of research on the effectiveness of sex education programs. So far there have been no conclusive studies that show one program to be more effective than another.

There are implications for the future development of sex education programs. Kirby (2007) performed a comprehensive study on curriculum-based sex and STD/HIV education programs, and developed seventeen characteristics of effective programs (Table 9). His analysis indicated that curriculum-based sex and STD/HIV education programs frequently produced positive impacts on behavior. In programs that stressed abstinence and contraception, condom and contraceptive use increased in some instances. Table 9 lists the characteristics of effective curriculum based sex and STD/HIV education programs. Kirby's (2007) review of sex education programs found the majority of programs that were effective incorporated most of the seventeen characteristics listed in the table. This may serve as a starting point for anyone developing a sex education program regardless of what type of sex education program is taught.

When designing a sex education program in the future multiple components of the effective characteristics of curriculum-based sex and STD/HIV education programs should be incorporated. Future research should focus on analyzing the differences in teenage pregnancy rates and teenage birth rates between school districts within each state. Future studies should also

explore the effect of sex education programs on teenage pregnancy rates and teenage birth rates at the individual level.

Table 10 The 17 Characteristics of Effective Curriculum-based Sex and STD/HIV Education Programs

The process of developing the curriculum	The contents of the curriculum	The process of implementing the curriculum
<ol style="list-style-type: none"> <li>Involved multiple people with different backgrounds in theory, research, and sex and STD/HIV education to develop curriculum.</li> <li>Assessed relevant needs and assets of target group</li> <li>Used a logic model approach to develop the curriculum that specified the health goals, the behaviors affecting those health goals, the risk and protective factors affecting those behaviors, and the activities addressing those risk and protective factors</li> <li>Designed activities consistent with community values and available resources (e.g. staff time, staff skills, facility space and supplies)</li> <li>Pilot-tested the program</li> </ol>	<ol style="list-style-type: none"> <li>Curriculum goals and objectives               <ol style="list-style-type: none"> <li>Focused on clear health goals-the prevention of STD/HIV and/or pregnancy</li> <li>Focused narrowly on specific behaviors leading to these health goals (e.g., abstaining from sex or using condoms or other contraceptives) give clear messages about these behaviors, and addressed situations that might lead to them and how to avoid them.</li> <li>Addressed multiple sexual psychosocial risk and protective factors affecting sexual behavior (e.g., knowledge, perceived risks, values, attitudes, perceived norms and self efficacy)</li> </ol> </li> <li>Activities and Teaching methodologies               <ol style="list-style-type: none"> <li>Created a safe social environment for youth to participate</li> <li>Included multiple activities to change each of the targeted risk and protective factors</li> <li>Employed instructionally sound teaching methods that actively involved the participants, that helped participants personalize the information, and that were designed to change each group of risk and protective factors</li> <li>Employed activities, instructional methods and behavioral messages that were appropriate to the youths' culture, developmental age and sexual experiences</li> <li>Covered topics in a logical sequence</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>Secured at least minimal support from appropriate authorities such as departments of health or education, school districts or community organization</li> <li>Selected educators with desired characteristics (whenever possible), trained them and provided monitoring, supervision and support</li> <li>If needed, implemented activities to recruit and retain youth and overcome barriers to their involvement, e.g., publicized the program, offered food or obtained consent</li> <li>Implemented virtually all activities with reasonable fidelity</li> </ol>

Adapted from “Abstinence, Sex, and STD/HIV Education Programs for Teens: Their Impact on Sexual Behavior, Pregnancy, and Sexually Transmitted Disease,” by D. Kirby, 2007

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Appendix A  
Sex and STD/HIV Education Policy by State, July 2005

STATE SEX AND STD/HIV EDUCATION POLICY								
STATE	SEX EDUCATION			STD/HIV EDUCATION			PARENTAL ROLE	
	Mandated	If Taught, Content Required		Mandated	If Taught, Content Required		Consent Required	Opt-out Permitted
		Abstinence	Contraception		Abstinence	Contraception		
Alabama		Stress	Cover	X	Stress	Cover		X <sup>†</sup>
Alaska	X			X				
Arizona		Stress			Stress		X <sup>†</sup>	X <sup>†</sup>
Arkansas		Stress			Stress			
California		Cover	Cover	X	Stress	Cover		X
Colorado								X
Connecticut		Cover		X				X
Delaware	X	Cover	Cover	X	Cover	Cover		
Dist. of Columbia	X		Cover	X				X
Florida	X	Cover		X				X
Georgia	X	Cover		X	Cover			X
Hawaii	X	Stress	Cover	X	Stress	Cover		
Idaho								X
Illinois	X	Stress <sup>‡</sup>	Cover <sup>‡</sup>	X	Cover			X
Indiana		Stress		X	Stress			
Iowa	X			X				X
Kansas	X			X				X
Kentucky	X	Cover		X	Cover			X
Louisiana		Stress			Stress			X
Maine	X	Stress	Cover	X	Stress	Cover		X
Maryland	X	Stress	Cover	X	Stress	Cover		X
Massachusetts								X <sup>†</sup>
Michigan		Stress		X	Stress			X
Minnesota	X			X	Cover			X
Mississippi <sup>Ω</sup>		Stress			Stress			X
Missouri		Stress	Cover	X	Stress	Cover		X
Montana								X <sup>†</sup>
Nebraska								
Nevada	X			X			X	
New Hampshire				X				
New Jersey	X	Stress		X	Stress			X <sup>†</sup>
New Mexico				X	Stress	Cover		
New York				X	Stress	Cover		X <sup>†</sup>
North Carolina	X	Stress		X	Stress			X
North Dakota				X				
Ohio				X	Stress			X
Oklahoma		Stress		X	Cover	Cover		X
Oregon		Stress	Cover	X	Stress	Cover		X
Pennsylvania				X	Stress			X <sup>†,†</sup>
Rhode Island	X	Stress	Cover	X	Stress	Cover		X
South Carolina	X	Stress	Cover	X	Stress	Cover		X
South Dakota <sup>Ω</sup>								
Tennessee	X	Stress		X	Stress			X
Texas		Stress			Stress		X	X
Utah <sup>Ω</sup>	X	Stress		X	Stress			X
Vermont	X	Cover	Cover	X	Cover	Cover		X <sup>†</sup>
Virginia		Cover	Cover		Cover	Cover		X
Washington				X	Stress	Cover		X
West Virginia	X	Stress	Cover	X	Stress	Cover		X
Wisconsin				X				X
Wyoming	X			X				
<b>TOTAL</b>	<b>22 +DC</b>			<b>38+DC</b>			<b>3</b>	<b>36+DC</b>

\* Parents' removal of student must be based on religious or moral beliefs.

† In AZ, MT, NY and PA, opt-out is only permitted for STD education, including instruction on HIV/AIDS; in AZ, parental consent is required only for sex education.

‡ IL has a broad law mandating comprehensive health education, including abstinence instruction; a more specific second law requires a school district that elects to provide the specific sex education package to stress abstinence and cover contraception.

Ω Localities may override state requirements for sex education topics, including abstinence; state prohibits including material that "contradicts the required components."

◇ Abstinence is taught within state-mandated character education.

◇ State prohibits teachers from responding to students' spontaneous questions in ways that conflict with the law's requirements.

GUTTMACHER INSTITUTE

JULY 1, 2005

Guttmacher Institute. (2005, July). State policies in brief; sex and STD/HIV education. Washington, DC.

## Appendix B

### Rates of pregnancy, birth, and abortion among women aged 15-19, by state of residence, according to race and ethnicity, 2005

**Table 3.4 Rates of pregnancy, birth and abortion among women aged 15-19, by state of residence, according to race and ethnicity, 2005**

State	Pregnancy rate*			Birthrate			Abortion rate		
	Non-Hispanic white	Black	Hispanic	Non-Hispanic white†	Black	Hispanic	Non-Hispanic white	Black	Hispanic
U.S. total‡	43	123	125	26	62	82	11	44	24
Alabama	56	95	228	39	62	183	9	19	8
Alaska	u	74	u	24	36	72	u	27	u
Arizona	46	101	143	27	58	102	12	29	19
Arkansas	67	109	151	49	79	121	7	13	6
California	u	u	u	16	39	67	u	u	u
Colorado	40	89	151	22	53	107	12	23	20
Connecticut	u	u	u	11	43	77	u	u	u
Delaware	52	131	211	26	67	149	20	46	29
District of Columbia	u	u	u	1	101	136	u	u	u
Florida	u	u	u	29	69	60	u	u	u
Georgia	56	101	186	38	63	144	10	23	12
Hawaii	49	42	136	23	23	96	19	13	18
Idaho	45	52	126	30	27	96	9	18	10
Illinois	u	u	u	20	71	80	u	u	u
Indiana	51	117	139	36	74	104	7	25	13
Iowa	u	133	u	27	82	110	u	32	u
Kansas	47	119	130	32	75	100	7	26	9
Kentucky	(61)	93	u	46	64	142	(5)	15	u
Louisiana	u	u	u	36	67	44	u	u	u
Maine	42	66	47	24	38	24	11	18	17
Maryland	u	u	u	18	51	87	u	u	u
Massachusetts	u	u	u	14	46	73	u	u	u
Michigan	u	117	u	23	62	75	u	38	u
Minnesota	29	132	139	17	76	102	8	36	15
Mississippi	60	114	116	45	77	90	5	19	7
Missouri	51	117	128	36	70	99	8	30	9
Montana	(46)	§	u	27	§	53	(12)	§	u
Nebraska	u	u	u	23	83	120	u	u	u
Nevada	u	111	u	29	63	88	u	32	u
New Hampshire	u	u	u	17	29	41	u	u	u
New Jersey	u	u	u	8	49	63	u	u	u
New Mexico	44	79	127	30	38	85	7	30	22
New York	44	149	126	14	44	59	24	87	51
North Carolina	u	105	u	32	63	157	u	27	u
North Dakota	34	§	§	22	§	§	7	§	§
Ohio	49	131	124	31	77	86	10	36	18
Oklahoma	u	87	u	44	68	106	u	15	u
Oregon	45	92	131	25	44	93	14	36	18
Pennsylvania	34	141	147	20	77	106	10	44	19
Rhode Island	u	114	u	18	54	91	u	45	u
South Carolina	63	101	212	38	68	157	16	17	21
South Dakota	36	§	108	25	§	83	5	§	7
Tennessee	63	125	224	44	62	174	9	24	14
Texas	52	98	131	33	64	98	11	20	12
Utah	35	66	132	25	46	99	5	9	11
Vermont	40	§	§	19	§	§	16	§	§
Virginia	42	101	129	24	54	89	12	33	21
Washington	u	86	u	23	46	95	u	28	u
West Virginia	60	90	43	43	57	31	8	20	5
Wisconsin	31	140	127	19	92	89	7	26	18
Wyoming	u	§	u	36	§	106	u	u	u

\*All rates are the number of events per 1,000 women aged 15-19; pregnancy rate includes estimated number of pregnancies ending in miscarriage or stillbirth. †Includes white births with ethnicity unknown.‡Estimates include all states. §Rate not calculated because population base of women aged 15-19 was <500.

Notes: In states with parental notification or consent requirements for minors, pregnancy and abortion rates may be too low because minors have traveled to other states for abortion services, and rates in neighboring states may be too high. Pregnancy rates and abortion rates in parentheses include abortions obtained by Hispanic women; in these states ≥10% of births to white women 15-19 were to Hispanics. u=unavailable.

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## Appendix C

State rankings by rates of pregnancy, birth, and abortion among women aged 15-19; rates by age-group; and abortion ratio, all according to state of residence, 2005

State	Pregnancy rate*				Birthrate				Abortion rate				Abortion ratio†
	Rank	15-19	15-17	18-19	Rank	15-19	15-17	18-19	Rank	15-19	15-17	18-19	
U.S. total	na	70	38	118	na	40	21	70	na	19	11	31	32
Alabama	16	73	40	123	11	50	27	85	30	12	7	20	20
Alaska	31	61	29	110	28	37	17	69	25	15	8	25	28
Arizona	3	89	50	150	5	58	34	97	17	17	9	31	23
Arkansas	7	80	41	139	4	59	29	104	45	9	6	13	13
California‡	15	75	42	129	24	39	21	68	6	26	15	43	40
Colorado	19	69	39	117	19	43	24	72	18	17	9	28	28
Connecticut	36	57	34	94	47	23	12	41	5	26	17	40	53
Delaware	6	83	46	137	15	44	23	76	4	27	17	42	38
District of Columbia	na	165	113	246	na	63	40	100	na	81	59	114	56
Florida‡	12	77	42	134	21	42	22	75	9	24	14	40	36
Georgia	8	80	43	137	8	53	28	92	23	15	9	24	22
Hawaii	17	71	43	112	29	36	19	62	7	25	18	35	41
Idaho	38	55	26	98	26	38	17	69	43	9	5	14	19
Illinois	21	67	40	110	25	39	22	65	14	19	13	28	33
Indiana	26	62	30	113	17	43	21	79	40	10	5	17	18
Iowa	41	51	26	86	35	33	16	56	35	11	6	17	25
Kansas	33	60	30	103	22	41	20	72	41	10	6	15	19
Kentucky	22	66	34	114	12	49	24	86	48	6	4	10	11
Louisiana§	18	70	36	118	13	49	26	83	39	10	5	17	17
Maine	48	43	21	75	45	24	11	45	29	12	7	19	33
Maryland§	23	65	34	115	37	32	17	56	8	25	13	43	44
Massachusetts	43	49	26	86	48	22	11	38	11	21	11	36	49
Michigan	32	60	32	105	36	32	17	57	13	19	11	33	37
Minnesota	47	43	21	75	44	26	13	46	36	11	6	18	29
Mississippi	5	85	46	145	3	61	33	102	33	11	6	20	16
Missouri	25	63	32	111	20	42	21	74	34	11	6	20	21
Montana	37	56	32	92	30	35	18	60	28	13	10	18	27
Nebraska	42	50	28	81	32	34	19	56	47	8	5	12	19
Nevada	2	90	51	155	10	50	28	87	3	28	16	46	35
New Hampshire**	50	33	15	62	50	18	7	35	37	11	6	18	37
New Jersey	20	68	41	113	46	23	12	42	2	36	24	57	61
New Mexico	1	93	58	145	2	62	37	97	16	18	12	26	22
New York	11	77	47	125	43	27	14	46	1	41	28	63	61
North Carolina	14	76	40	132	14	48	26	85	22	16	9	27	25
North Dakota	46	45	22	75	42	30	14	50	46	8	4	13	22
Ohio	28	62	33	107	23	39	20	68	26	14	8	23	27
Oklahoma	13	76	40	128	7	54	28	92	38	10	6	16	15
Oregon	35	57	29	100	34	33	16	60	21	16	10	26	33
Pennsylvania	39	53	28	91	40	30	16	52	24	15	8	25	33
Rhode Island	27	62	32	109	38	31	17	54	10	22	11	40	42
South Carolina	10	79	45	133	9	51	28	88	19	16	11	25	24
South Dakota	40	51	28	85	27	38	19	63	50	6	4	8	13
Tennessee	9	79	41	137	6	55	28	96	31	12	7	20	18
Texas	4	88	50	146	1	62	36	101	27	13	7	23	17
Utah	45	47	24	80	33	33	16	57	49	6	3	10	15
Vermont	49	40	19	71	49	19	8	34	20	16	9	27	47
Virginia	30	61	30	109	31	34	16	62	15	18	9	31	34
Washington	34	59	32	100	39	31	15	55	12	20	12	31	39
West Virginia	29	62	30	108	16	43	21	77	44	9	5	14	17
Wisconsin	44	47	24	80	41	30	15	53	42	10	5	16	24
Wyoming**	24	65	31	110	18	43	19	76	32	12	7	18	21

\*All rates are the number of events per 1,000 women aged 15-19; pregnancy rate includes estimated number of pregnancies ending in miscarriage or stillbirth; †Abortions per 100 pregnancies ending in abortion or live birth. ‡Abortion estimates are based on the number of abortions among all women in the state and the proportion of abortions obtained by women of the same age nationally. §Abortion estimates are based on the number of abortions among all women in the state and those aged 15-17 and those aged 18-19, according to the proportions in neighboring states. \*\*Abortion estimates are based on the number of abortions among all women in the state and the proportion of abortions obtained by women of the same age in neighboring states.

Notes: Even though abortions have been tabulated according to state of residence where possible, in states with parental notification or consent requirements for minors, the pregnancy and abortion rates may be too low because minors have traveled to other states for abortion services, and the rates in neighboring states may be too high. na=not applicable.

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