



Review article

State Policy and Teen Childbearing: A Review of Research Studies

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A B S T R A C T

Teen childbearing is affected by many individual, family, and community factors; however, another potential influence is state policy. Rigorous studies of the relationship between state policy and teen birth rates are few in number but represent a body of knowledge that can inform policy and practice. This article reviews research assessing associations between state-level policies and teen birth rates, focusing on five policy areas: access to family planning, education, sex education, public assistance, and access to abortion services. Overall, several studies have found that measures related to access to and use of family planning services and contraceptives are related to lower state-level teen birth rates. These include adolescent enrollment in clinics, minors' access to contraception, conscience laws, family planning expenditures, and Medicaid waivers. Other studies, although largely cross-sectional analyses, have concluded that policies and practices to expand or improve public education are also associated with lower teen birth rates. These include expenditures on education, teacher-to-student ratios, and graduation requirements. However, the evidence regarding the role of public assistance, abortion access, and sex education policies in reducing teen birth rates is mixed and inconclusive. These conclusions must be viewed as tentative because of the limited number of rigorous studies that examine the relationship between state policy and teen birth rates over time. Many specific policies have only been analyzed by a single study, and few findings are based on recent data. As such, more research is needed to strengthen our understanding of the role of state policies in teen birth rates.

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IMPLICATIONS AND
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A review of research suggests that state policies supporting family planning and education are associated with lower teen birth rates, although there is no clear evidence of an association between teen birth rates and policies related to public assistance, access to abortion, or in-school sex education. However, studies are limited, and more research is needed to strengthen these conclusions.

Other than small increases in 2006 and 2007, the teen birth rate in the United States has been declining for more than two decades. Between 1990 and 2013, the birth rate declined by more than 50%, from 61.8 to 26.6 births per 1,000 females ages 15–19 years [1]. Although considerable research has focused on the individual, family, and peer factors that influence teen childbearing over the last 20 years, the role of state policies has received relatively less attention from researchers. In particular, there is limited longitudinal research on the relationship between teen childbearing and state policy. The research that exists focuses primarily on five areas

of policy and expenditures, including family planning, education, sex education in schools, public assistance (specifically, Temporary Assistance for Needy Families [TANF] and Aid to Families with Dependent Children [AFDC]), and abortion.

Although teen pregnancy rates and teen birth rates have followed a similar trend, researchers tend to study teen births, given the greater reliability of teen birth data. A given policy may be associated with lower teen birth rates because it is related to a lower teen pregnancy rate or because it is unrelated to teen pregnancy rates but related to higher teen abortion rates. As such, the reader should not assume that research that finds that a policy is associated with lower teen birth rates necessarily has found that the policy reduces teen pregnancy, although that is one plausible explanation.

Existing hypotheses for why and how state policies could be related to teen childbearing point in different directions. Family

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planning services are intended to provide greater access to contraception and reproductive health services for teens and adults alike, and supporters anticipate that family planning availability will decrease pregnancy and therefore childbearing [2]. Also, teens may be especially sensitive to the cost of contraception, given that they are unlikely to have their own earnings or health insurance coverage outside their parents or guardians [3]. Others argue that the availability of contraception promotes sexual risk taking and thus increases the teen birth rate by increasing pregnancy rates [4]. At an individual level, more highly educated teens are less likely to become teen parents [5]. At a state level, researchers consider whether more generous spending on education and indicators such as higher teacher-to-student ratios are linked to reduced teen births, with the assumption that greater access to, or higher quality of, education will be a deterrent to teen childbearing. Some policymakers contend that more generous or widely available public assistance could be an incentive to have (or at least a reason not to avoid having) children because it provides a financial safety net that insulates people from the costs associated with childbearing. Others argue that public assistance can enable families to provide a supportive environment for their children that discourages early childbearing [6]. Greater availability of abortion services could be linked to higher abortion rates and therefore lower teen birth rates, but others argue that abortion availability encourages sexual risk taking or discourages contraception, thus potentially increasing the teen birth rate (assuming the increase in pregnancy is greater than the increase in abortion) [7]. There is a similar debate regarding sex education. Some argue that teaching teens about safe-sex practices will encourage sexual initiation and experimentation; however, others argue that when teenagers inevitably become sexually active, abstinence-only education is not sufficient to equip teens with the skills and knowledge they need to protect themselves [8]. All of these hypotheses assume that teens' behavior is influenced by the implementation of a policy. However, in the real-world application of these policies, the direction of causality is much less clear—state policymakers often implement policies in response to high teen birth rates in their state as opposed to pre-emptively passing policy to prevent teen childbearing. Although the studies included in this review use statistical methods to account for reverse causality, findings should be considered with this relationship between policy and birth rates in mind.

In each of these policy areas, the relationship between policies and teen birth rates could also reflect other state-level characteristics. For example, states that promote education (through spending and policies) could have cultures and/or economic conditions in which the perceived opportunity cost of early childbearing is high, incentivizing teens to avoid or delay childbearing [5]. Accordingly, it is important for researchers to take into account such differences in their analyses.

Methodology

This review of the literature was conducted in two phases. First, we used four criteria to identify studies to present the strongest evidence for the relationship between teen birth rates and policy. We identified peer-reviewed studies and working articles that (1) used state teen birth rates as the dependent variable; (2) assessed one or more policies, practices, or expenditures from our five policy areas of interest as a key independent variable; (3) used state-level data for all or nearly all states; and (4) used multiple years of data to allow for policies to be fully

implemented and have the opportunity for impact. We focus on studies that used state-level data because we are particularly interested in the relevance of these conclusions for state policymakers and stakeholders. Additionally, many of these policies are made at the state level and implemented at the state and local level. It should be noted that these analyses only describe relationships at the state level; therefore, the findings should not be interpreted as applicable to a given individual [9,10].

There were two notable exceptions to our criteria. In the education and the sex education policy areas, we identified only two studies for each that met the fourth criteria. For this reason, we included four studies that used a single year of data (cross-sectional studies) in our review of these policy areas, but excluded cross-sectional studies for the other policy areas, all of which had available at least three studies using multiple years of data.

There is a large body of literature that examines public assistance policies, in particular the implementation of TANF and the availability of cash assistance, and teen childbearing before the Personal Responsibility and Work Opportunity Act of 1996 (welfare reform). However, because the structure of welfare changed dramatically in the years leading up to and following welfare reform, we excluded those studies examining public assistance that used only pre-welfare reform data, with the rationale that more recent policies are more relevant to today's policymaking decisions. Several of the studies included in this review use data from both before and after TANF implementation.

Overall, 13 studies are included in this review. Many studies examine multiple policy areas, and all studies control for at least some state and demographic factors in their models, such as poverty levels, average income, and racial composition. Four studies only analyze results by subgroup (such as white and nonwhite teens), offering insight into the impact of these policies on specific populations, rather than the population as a whole. It is important to note that the studies included in this review reveal associations, rather than causality. Although many studies use sophisticated statistical methods to capture the temporal sequencing of policy and birth rates, or to control for as many unobserved factors that could explain both the presence of a policy and teen birth rates as possible, none can definitively identify a direct causal relationship between state policy and teen childbearing.

Review of the Relevant Literature

Access to family planning

Since oral contraceptives became legal in 1972 [11], state family planning policies have focused on facilitating access to contraceptives and/or services, typically by making them more affordable or reducing other barriers to access. Table 1 shows the results of six studies that examined the association between teen birth rates and state-level policies designed to increase access to and affordability of family planning services. Studies included in this review generally found that policies that expand access to services are associated with lower teen birth rates for at least one sub-population of teens. Using data from the 1970s, Guldi [12] estimated a difference-of-difference-of-difference model to assess how laws that allow minors to access the birth control pill without parental involvement are related to teen birth rates and found that, among white teens, minor access is associated with lower birth rates, whereas there is no significant association for

Table 1

Family planning

	Control variables	Data	Sample	Minor access to contraception (age)	Conscience law	Family planning expenditures by the state	Medicaid family planning waivers
Guldi [12]	<ul style="list-style-type: none"> • Age, state, year, and state–year fixed effects • Separate models by race 	1968–1980	White and nonwhite minors	<ul style="list-style-type: none"> • Lower TBR for white teens • No association for nonwhite teens 			
Kearney and Levine [13]	<ul style="list-style-type: none"> • Abortion restrictions (parental notification/consent, waiting periods, and Medicaid funding of abortion); welfare policy (maximum AFDC/TANF benefit for a family of three, a welfare reform indicator, and a “family cap” indicator); other Medicaid policies (an indicator for “S-CHIP” implementation) 	1990–2003	Women aged 15–19 years				Lower TBR
Kearney and Levine [14]	<ul style="list-style-type: none"> • Demographic composition of the state; female teenage population in each year 	1981–2001	Women aged 15–19 years				Lower TBR
Meier and McFarlane [15]	<ul style="list-style-type: none"> • Black and Latino population; Catholic population; per capita income; female labor force participation; counties with abortion facilities 	1982–1989	Women aged 14–19 years			No association	
Moore et al. [16]	<ul style="list-style-type: none"> • Female labor force participation rate; unemployment rate; freshman graduation rate; educational attainment; violent crime rate, child population without health insurance, nonmarital child-bearing, male-to-female ratio, “fundamentalist” Christian population, urbanicity, black population, Hispanic population, and poverty rate 	1989–2007	Women aged 15–19 years			Lower TBR	
Yang and Gaydos [17]	<ul style="list-style-type: none"> • Conservatism of a state’s Congress members • Conducted separate analyses based on age and race (Hispanic, nonwhite; younger teens and older teens). Age, state, and year fixed effects 	2000–2006	Women aged 14–19 years		<ul style="list-style-type: none"> • Higher TBR for whites, age 18–19 years • No association for any other teens 18–19 or 15–17 years or any race 		Lower TBR

AFDC = Aid to Families with Dependent Children; TANF = Temporary Assistance for Needy Families; TBR = teen birth rate.

nonwhites. Yang and Gaydos used more recent data and examined the relationship between teen birth rates and several family planning policies in place between 2000 and 2006. They found that the implementation of a contraceptive conscience clause—a restrictive law permitting health care providers to refuse certain medical services for personal or religious beliefs—is associated with higher teen birth rates among older white teens aged 18–19 years, but there was no association for black or Hispanic 18- to 19-year-olds or for younger teens (aged 15–17 years) of any race [17]. Together, these two studies suggest that, for older white teens, increased access to contraception is linked to lower birth rates, whereas restricted access is associated with higher teen birth rates.

Two studies assessed the association between state spending on family planning services and/or contraceptives and teen birth rates. Meier and McFarlane [15] examined per capita family planning expenditures, including all federal and state funds, between 1982 and 1988, using a pooled time series analysis, and found no association with teen birth rates. Moore et al. examined

state family planning expenditures per female aged 15–44 years using data for the years 1989–2007, using a time-varying effects model to identify variations over time in the relationship between these expenditures and teen birth rates. They concluded that greater family planning expenditures are associated with lower teen birth rates and that this relationship was consistent over time [16].

Several studies have examined family planning access by analyzing the teen birth rates of states that use Medicaid family planning waivers, which allow states to expand Medicaid coverage to include family planning services for women who would be otherwise ineligible under regular Medicaid rules. Kearney and Levine (in their 2009 and 2012 articles) [13,14] and Yang and Gaydos [17] found that the implementation of Medicaid family planning waivers was related to lower teen birth rates. Kearney and Levine’s 2009 and 2012 analyses examined the introduction of waivers that expanded access to women whose incomes exceeded the Medicaid threshold (income-based waivers). Specifically, using the conservatism of state’s members

of Congress as an instrumental variable for policy, and estimating the association for subgroups of teens by age and race/ethnicity, Yang and Gaydos studied low-income teens' use of waivers and found that Medicaid family planning waivers are associated with lower teen birth rates among all subgroups. These studies collectively analyzed state-level data from 1980 to 2006, accounting for state demographic characteristics and other relevant state-policy changes.

In sum, most studies found that state policies that make family planning services or contraception more widely available, either by making them more affordable or by facilitating access to them, are associated with lower teen birth rates for at least some teens. However, both Guldi and Yang and Gaydos found associations between changes in contraceptive access (minor access to contraception and implementation of conscience law) and white teen birth rates, whereas there were no such relationships for black or Hispanic teen birth rates. More research is needed on subgroup differences for other family planning policies such as Medicaid waivers and expenditures to further understand how these policies are related to birth rates among black or Hispanic teens.

Education

In this review, we examine the relationship between teen birth rates and general education policies and funding (we discuss sex education policies separately in the following section). Table 2 shows the findings of five studies that examined how funding for education and teacher-to-student ratios relate to teen birth rates. Research assessing state education policies has found that policies intended to improve the education of the population, and measures of education quality are associated with lower teen birth rates. Specifically, higher teacher-to-student ratios [20], higher state-level education expenditures per child [18], higher per capita expenditures on education [21], and higher public funding per student [16] are associated with lower state-level teen birth rates. Harknett [18] found that higher education expenditures per child are associated with lower teen birth rates, for both older and younger teens, controlling for aggregate parental monetary investments in children, educational attainment of the population, family structure, and racial and ethnic composition at the state level. Similarly, Zimmerman [20] found that per capita expenditures on education are associated with lower teen birth rates, controlling for population density and state demographics including ethnicity, age, gender, income, population who were born in state, divorce rates, educational attainment level, and unemployment rate. After controlling for other educational variation between states (including teacher salary, pupil-to-teacher ratio, dropout age, and per-pupil expenditures) and economic differences (including state employment-to-population ratio, income, medical transfer payments, and unemployment payments), Larsen found that stricter graduation requirements are associated with lower teen birth rates [19]. The study estimated that each additional course required for high school graduation decreases the birth rate by 1% for white teens and .7% for black teens. The author suggests that students who face more rigorous requirements have less time to engage in sexual activity [19]. Only one study has found a negative association between education policy and teen birth rates. Using data from 1980 and controlling for the percentage of the state population who are black, poor, and living in metropolitan

Table 2
Education

	Control variables	Data	Sample	Higher per child expenditures on education	Higher per capita expenditures on education	Higher per student public funding	Higher teacher-to-student ratio	Strict graduation requirements
Harknett et al. [18]	<ul style="list-style-type: none"> State-level parental (monetary) investments in children; educational attainment of adult population; proportion of single-family households; race and ethnicity 	1996	Older teens (18–19 years); younger teens (15–17 years)	<ul style="list-style-type: none"> Lower TBR for ages 18–19 years Lower TBR for ages 15–17 years 				
Larsen [19]	<ul style="list-style-type: none"> State-by-year and cohort-by-year differences 	1980–2000	Women aged 14–18 years					Lower TBR
Moore et al. [16]	<ul style="list-style-type: none"> Female labor force participation rate; unemployment rate; freshman graduation rate; educational attainment; violent crime rate; child population without health insurance; nonmarital childbearing; male-to-female ratio; “fundamentalist” Christian population; urbanicity; black population; Hispanic population; and poverty rate 	1989–2007	Women aged 15–19 years			Lower TBR		
Singh [21]	<ul style="list-style-type: none"> Percentages black, poor, and living in metropolitan areas in each state 	1980	White teens; black teens				Lower TBR	
Zimmerman [20]	<ul style="list-style-type: none"> Population density; composition of state by ethnicity/race, gender, age, born in state, divorce, education, employment, and income 	1980 (policy variables) and 1982 (TBR)	All teens; aged 15–19 years		Lower TBR	Higher TBR		

TBR = teen birth rate.

areas, Singh [21] found that greater public funding per student was associated with higher teen birth rates. However, Moore et al. [16] used 18 years of data to examine expenditures per student and found that, on average over time, greater public funding is associated with lower teen birth rates.

Nearly all these findings suggest that states that invest more in education, or that have indicators of higher quality education, have lower teen birth rates, after accounting for state demographic and economic characteristics. The association between education policies and teen birth rates is particularly hard to parse out, given the distal relationship between educational opportunities and teen childbearing (e.g., as opposed to the more direct relationship between access to contraception and childbearing). Although we can hypothesize that increased access to quality education will motivate teens to avoid early childbearing, other economic and social factors can explain both high levels of educational attainment and low teen birth rates. Although studies in this review largely control for many of these factors, we must keep in mind that the direction of causality is largely unknown when examining the relationship between state policies that promote education and teen birth rates. Furthermore, although each of the studies we identified took into account other factors that could be related to teen birth rates on a state level, such as race and ethnicity of the state's population, all but two are cross-sectional. Examining these trends using data for multiple years would allow the field to draw stronger conclusions about the relationship between state education policies and teen birth rates. Another limitation of these studies is the age of the data—only Larsen and Moore et al. [19,16] used data from the last 10 years.

Sex education

We found four studies that examined state policies related to sex education, two of which are cross-sectional. Although one study found that state policies supporting exclusively abstinence-only sex education (compared with comprehensive sex education or a combination of the two) were associated with higher teen birth rates [8], most studies found that there was no association between state-level sex education policies and teen birth rates (see Table 3). Specifically, the analysis by Kearney and Levine [14] examined state-required contraception instruction in sex education classes, state-required sexual education, and whether a state accepts federal Title V-510 abstinence education funding, while controlling for state demographic composition and the female teenage population, and found no association with teen birth rates among women aged 15–19 years. Yang and Gaydos [17] examined the amount of funding for abstinence-only education per 1,000 female teens and found no association with teen birth rate. However, using data for 2005 and controlling for a number of state characteristics, including income and ethnic composition, Stanger-Hall found that state receipt of abstinence-only education funding was associated with higher teen birth rates [8].

Using limited² data from 1986, Singh examined a number of sex education policies as they related to teen birth rate. These analyses found that for white teens, there is a negative relationship between students receiving sex education in high school

² Singh's 1989 analysis of sex education only included data from select urban school districts across 34 states.

Table 3
Sex education

Control variables	Data	Sample	State-required contraception instruction in sex education classes	State-required sexual education	Number of class periods of sex education	Percentage who received sex education in senior high school	Percentage who received sex education in junior high school	Parental consent required for sex education	Abstinence-only education	Abstinence-only education funding (V-510)
Kearney and Levine [14]	1981–2001	Women aged 15–19 years	No association	No association	No association	No association	No association	No association	No association	No association
• Demographic composition of the state • Female teenage population in each year • Percentages black, poor, and living in metropolitan areas in each state										
Singh [21]	1980	White teens; black teens	No association	No association	No association	• Lower TBR: white teens • No association: black teens	No association	No association	No association	No association
Yang and Gaydos [17]	2000–2006	Women aged 14–19 years	No association	No association	No association	No association	No association	No association	No association	No association
• Did separate analyses based on age and race (Hispanic, nonwhite; younger teens, and older teens). Age, state, and year fixed effects • Controlled for conservatism of a state's Congress members										
Stanger-Hall and Hall [8]	2005	Women aged 14–19 years	No association	No association	No association	No association	No association	No association	No association	No association
• Socioeconomic (income) • Educational attainment • Ethnic composition (white, black, Hispanic)										

TBR = teen birth rate.

and the teen birth rate; however, no association was found for black teens [21]. Singh also examined students receiving sex education in middle school, parental consent requirements, and the number of class periods of sex education; however, no association was found for any population. Although analyses by Singh [16] are informative, it is difficult to draw strong conclusions given the limited data used in analyses.

The findings on sex education and teen birth rates are mixed and inconclusive. Sex education policies, relative to other policies considered in this review, are less frequently set at the state level. When statewide policies are set, local school districts interpret and apply these policies in different ways [8]. It is difficult to draw strong conclusions from these analyses because the way local authorities implement these policies is unknown and could vary greatly. However, sex education is an important and highly debated policy in relation to teen birth rates, thus further research is needed to better understand how local bodies are implementing sex education policies at the state level. Additionally, the studies that met the criteria for inclusion in this review are those that examine state-level policies about sex education, rather than the large body of evaluation research on the effectiveness of specific sex education programs and curricula.

Public assistance

We found only three studies that examined the relationship between public assistance policies and teen birth rates that used state-level data over multiple years, controlled for state-specific variables, and used at least some data from post-welfare reform years (see Table 4). These studies come to somewhat different conclusions. Kearney and Levine's 2012 analysis examined three different policies while allowing for state-specific effects to vary nonlinearly, controlling for demographic variables. They found no association between teen birth rates and whether TANF was being implemented in the state before welfare reform in 1996. They also found no association between the implementation of a family cap (a policy under which a state can choose not to provide additional public assistance to a recipient family because of the birth of another child) and teen birth rates. However, this study found a positive association between maximum levels of AFDC/TANF and food stamp benefits and teen birth rates using data from 1981 to 2001 [14]. In contrast, using slightly more recent data (1989–2007), a different analytic method, and a different set of state-level demographic controls, Moore et al. found that higher maximum levels of AFDC/TANF and food stamp benefits are associated with lower teen birth rates [16].

Using a state fixed-effects model, Lopoo and DeLeire [22] examined TANF minor parent rules, which prohibit providing aid to teen mothers unless they live "in a place of residence maintained by a parent, legal guardian, or other adult relative of the individual as such parent's, guardian's, or adult relative's own home." They found that states with these policies are associated with lower teen birth rates [16].

In sum, the findings on post-welfare reform public assistance policies and teen birth rates are mixed; however, these three analyses represent a very modest knowledge base, and further research is warranted.

Access to abortion

Our review of six studies that analyze state-level abortion-related policies indicates that most of these studies found no

association between abortion laws and teen birth rates (see Table 5). Although a few studies found positive or negative associations between abortion access and teen birth rates for certain subgroups, it is difficult to draw a definitive conclusion. The analysis by Kearney and Levine [14] examined three policies that decrease access to abortion, and all were found to have no association with the teen birth rate (mandatory delay laws that require a waiting period before a woman can receive an abortion, parental involvement laws, and restrictions on the use of state Medicaid funds for abortion). This study controlled for state-level factors through year-of-birth fixed effects and state fixed effects, in addition to controlling for state demographics and time-varying labor market conditions. Kearney and Levine did not include abortion rates in their analyses, given that abortion rates declined similarly to teen birth rates during the period of their analysis, which they conclude is an indication that abortion rates were not a determinant of teen birth rates.

Five additional studies examined abortion policies, and none found a relationship with overall teen birth rates [7,12,14,17]. However, one of these studies (Guldi [12]) also conducted analyses by subgroup for age, race, and gender and found that parental involvement laws were related to a lower birth rate for white minor teens but had no association with nonwhite minor teens, whereas Kearney and Levine's 2012 analysis found no association (discussed above). Alternatively, Meier and McFarlane [15] examined data using state fixed-effect methods and found that a higher funded abortion rate (the number of publicly funded abortions in the state per 1,000 women aged 15–44 years) was associated with lower teen birth rates. Additionally, using data from 1989 to 2007, Moore et al. constructed a measure to assess the restrictiveness of state abortion laws. This measure took into account public funding for abortions and parental consent or notification; however, their analysis found no relationship between the presence of these policies and teen birth rates [16].

Although the overall findings are mixed, the majority of studies included in this review found that there is no association between access to abortion and teen birth rate; however, two studies did find that there was a negative relationship between access to abortion and teen birth rate, suggesting that states where access to abortion is more widely available tend to have lower teen birth rates. It is important to note that these studies did not estimate the relationship between policies and abortion rates, but rather examined the teen birth rate. As with other studies in this review, many of the studies that examine abortion policies use data from the 1970s and 1980s. Additional analyses using more recent data would be a meaningful addition to the field. Moreover, although our review included only studies that examined state-level policies, federal funding or policies also play a role in the availability of abortion services in a state.

Discussion

Overall, 13 studies were identified that included multiple years of data³ and used analytic methods that are appropriate for repeated measures of a variable in a state over time, including state fixed-effects and year fixed-effects models. Typically,

³ We included a total of four cross-sectional studies examining education and sex education because there were extremely limited studies (three for education; two for sex education) that used multiple years of data.

Table 4

Public assistance

	Control variables	Data	Sample	TANF implemented	Family cap implemented	Maximum AFDC/TANF plus food stamps for a family of three	TANF minor parent rules
Lopoo and DeLeire [22]	<ul style="list-style-type: none"> Welfare benefit for a family of two (inflated to \$1,999 using the CPI-U-X1), state unemployment rates, and abortion policies as controls. 	1992–1999	Women aged 15–18 years				Lower TBR
Kearney and Levine [14]	<ul style="list-style-type: none"> Demographic composition of the state; female teenage population in each year 	1981–2001	Women aged 15–19 years	No association	No association	Higher TBR	
Moore et al. [16]	<ul style="list-style-type: none"> Female labor force participation rate; unemployment rate; freshman graduation rate; educational attainment; violent crime rate, child population without health insurance, nonmarital child-bearing, male-to-female ratio, “fundamentalist” Christian population, urbanicity, black population, Hispanic population, and poverty rate 	1989–2007	Women aged 15–19 years			Lower TBR	

AFDC = Aid to Families with Dependent Children; CPI-U-X1 = Consumer Price Index; TANF = Temporary Assistance for Needy Families; TBR = teen birth rate.

authors conducted multivariate analyses that controlled for relevant state-specific variables, such as demographic composition. Nevertheless, it is extremely difficult to take into account all factors that could influence teen birth rates. In general, the findings of this review must be considered with caution for several reasons. First, very few studies have examined state policies over time. Second, only a limited number of studies use data from all states. Third, very few of the studies that do examine policy over time from all states include the same measure of a policy so that within any one of these five policy areas, there is typically only one study that looks at any single measure of policy. For example, abortion access is regulated by many different policies, from parental consent laws to Medicaid waivers. This, in turn, is reflected by the variety of policies examined by researchers, and therefore it is difficult to draw conclusions about a specific policy or expenditure that impacts access to abortion. As previously noted, education is relatively less studied in connection with teen birth rates, and all but two of the existing studies on education only used data from a single year. Additionally, it is important to reiterate that because this review specifically examines teen birth rates, we are unable to draw conclusions on how these policies are related to teen pregnancy. Finally, the data used in many of these studies are anywhere from eight to 33 years old. Even in the last decade, policies, teen birth rates, and the political and social environment in states have changed, often dramatically.

Although examining state-level data is informative to understand how differences in policy by state are related to teen childbearing, there are also several inherent weaknesses. There is no measure of how states are actually implementing these policies. Implementation may be done on a local level, which could add greater variability to the ways in which policies are actually put into action. This is particularly relevant to the discussion of sex education policies. Although states can have funding structures that define whether and how sex education is represented in public schools, the way in which these policies are interpreted by local bodies is highly variable [8]. This means that the application of that policy is also going to be highly variable.

Although this is specifically true for sex education policy, it is also true for other policy areas. It is important to realize that although a policy may be found to be related to teen childbearing, it is unclear how that policy was actually carried out.

Having noted these cautions, we can draw some initial conclusions from this review, as well as directions for further research to strengthen this field of study. Policies that increase access to family planning services and contraceptives, as well as policies that fund education or indicators of a strong education system, appear to be associated with lower teen birth rates. On the other hand, the body of literature on abortion, sex education, and public assistance are inconclusive and do not have any definitive associations between these policies and teen birth rates.

Although teen birth rates in the United States have declined dramatically over time, they remain higher than any other developed country, indicating there is a need for evidence-based policies and practices to lower teen birth rates. There are many more studies not included in this review that examine specific policies in a single state that can inform our understanding; however, these studies cannot give a full picture of the counterfactual situation that a comparison between states aims to provide (specifically, what would happen to teen birth rates if a state did or did not implement a given policy). There are many challenges to rigorous policy analysis; however, the relative paucity of studies linking state policy and teen birth rates leaves much room on the agenda for future research. Most critically, there is a need for studies that use more recent data, particularly in studying family planning, public assistance, and abortion policies. Specifically, the implementation of the Patient Protection and Affordable Care Act is changing the way insurers cover contraceptive and family planning health care services. States have also passed a striking number of laws restricting abortion access in the last several years [23]. Furthermore, the public financial safety net for teen mothers has shifted away from TANF and toward other programs [24]. These kinds of policy changes afford researchers a rare opportunity to study how teen birth rates are affected by the implementation of new policies.

Table 5
Abortion

	Control variables	Data	Sample	Mandatory delay	Restriction on Medicaid funding for abortion	Parental involvement law (consent and/or notification)	Publically funded abortion (number of publicly funded abortion in the state per 1,000 women aged 15–44 years)	Restrictive abortion laws
Guldi [12]	<ul style="list-style-type: none"> • Age, state, year, and state–year fixed effects • Separate models by race 	1968–1980	White and nonwhite minors			<ul style="list-style-type: none"> • Lower TBR for white minors • No association for nonwhite minors 		
Kane and Staiger [7]	<ul style="list-style-type: none"> • Controlled by county for race, income, employment/unemployment, and poverty 	1973–1988	Women aged 15–19 years			No association		
Kearney and Levine [14]	<ul style="list-style-type: none"> • Demographic composition of the state; female teenage population in each year 	1981–2001	Women aged 15–19 years	No association	No association	No association		
Meier and McFarlane [15]	<ul style="list-style-type: none"> • Percentage of state that is Catholic; percentage of women in the labor force; per capita income; percentage state population black and Latino; percentage of a state's population living in counties with large providers of abortion 	1982–1989	Women aged 14–19 years				Lower TBR	
Moore et al. [16]	<ul style="list-style-type: none"> • Female labor force participation rate; unemployment rate; freshman graduation rate; educational attainment; violent crime rate; child population without health insurance; nonmarital childbearing; male-to-female ratio; “fundamentalist” Christian population; urbanicity; black population; Hispanic population; and poverty rate 	1989–2007	Women aged 15–19 years					No association
Yang and Gaydos [17]	<ul style="list-style-type: none"> • Conservatism of a state's Congress members • Conducted separate analyses based on age and race (Hispanic, nonwhite; younger teens, and older teens). Age, state, and year fixed effects 	2000–2006	Women aged 14–19 years			No association		

TBR = teen birth rate.

In addition, there is a need for analysis to decipher which policies could have a greater effect on various subgroups (like certain age and racial or ethnic groups) and which policies could have a more universal impact. Only four of the 13 studies in this review analyzed outcomes by age or race/ethnicity subgroups. It would be extremely valuable to examine these policies in greater detail by demographic factors, such as income level and race. In addition, because programs to prevent teen pregnancy tend to serve school-age adolescents, there are gaps in understanding of how to reduce unintended childbearing among 18- and 19-year-olds. Assessing the implications of state policies for younger and older teens could help identify effective strategies for older teens. This would inform policymakers and implementers as to how to better focus teen childbearing efforts within specific demographic populations.

Addressing the relationship between teen childbearing and policy is a sensitive political issue. Family planning services and sex education are two of the most debated topics in today's political world. Strengthening the body of research around these topics will help policymakers and voters understand and implement informed policies that can help to further reduce the teen birth rate.

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