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The Impact of State Policy on Adverse Teen Sexual Health Outcomes in the United States: A Scoping Review

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Abstract

Introduction Adolescent sexually transmitted infections (STIs) and unintended birth are critical public health issues, with a need for continued prevention and an essential focus on health equity. This scoping review systematically examines the existing literature on the impact of state policies in the USA on both teen pregnancy/birth and STIs, including the impact of policy on racial disparities.

Methods A comprehensive scoping review approach was used to systematically identify relevant studies. Articles were assessed by three reviewers for relevance based on predetermined inclusion criteria.

Results Thirty-two peer-reviewed articles met all inclusion criteria. Years of publication ranged from 1986 to 2022. Broadly, policies evaluated can be grouped into seven categories: abortion access/restrictions; sex education; welfare reform and public assistance policies; family planning expenditures; contraception access/restrictions; state public education expenditures; and child support enforcement. Nine articles discussed multiple policies and their association with the selected outcomes.

Conclusions State policies supporting family planning, including contraceptive access, were consistently associated with lower rates of teen pregnancy/birth. Evidence related to abortion, sex education, and public assistance policies was inconclusive. Few studies examined state policy's impact on STIs, or the association with minority health disparities, illustrating critical gaps in the literature.

Policy Implications Evidence on policy effectiveness is a vital tool in health promotion and may be particularly influential in promoting improved health behaviors and outcomes among adolescents. Collectively, this study offers a comprehensive summary of existing evidence on the association between state-level policies and adolescent sexual health outcomes, highlighting essential areas for future research in policy and adolescent sexual health.

Keywords Policy · Adolescents · Teen pregnancy · Teen birth · Sexually transmitted infections

Introduction

Despite a steep decline in recent decades, rates of teen birth in the USA remain higher than in nearly any other developed country with wide disparities among sociodemographic factors such as race and ethnicity (Lugo-Gil et al., 2018). There is a well-documented association between early parenthood and an array of adverse outcomes for both parent and child, particularly in underserved populations (Brindis, 2006; Centers for Disease Control and Prevention [CDC], 2021a). Additionally, rates of sexually transmitted infections (STIs) in the USA have increased dramatically over the past decade. As an illustration, there were more than 2.5 million cases of chlamydia, gonorrhea, and syphilis reported in the USA in 2019, the highest number ever recorded and representing the sixth consecutive record-breaking year (CDC,

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2021b). A combination of biological, developmental, and social characteristics places adolescents at particularly high risk for STIs, and adolescents aged 15 to 24 disproportionately account for more than half of all new cases (Shannon & Klausner, 2018). Though many STIs are curable with prompt treatment, untreated infections can carry significant negative health consequences such as pelvic inflammatory disease, infertility, and cervical cancer (Ghanem & Tuddenham, 2021).

Nationally, the teen birth rate among females aged 15–19 declined over 40% between 2006 and 2014 in the USA, a decrease that was seen across all racial and ethnic groups (Hamilton et al., 2015). Nonetheless, disparities persist, and both Black and Hispanic teens had a birth rate more than double that of White teens in 2017, a trend which is seen year after year (Hamilton, 2020). As with births, vast disparities exist in rates of STIs among adolescents in the USA by race and ethnicity (CDC, 2021b). More specifically, in 2019, the rate of gonorrhea for both Black and Hispanic adolescents was more than five times higher than that of White non-Hispanic adolescents (CDC, 2021b). Though the level of variance by race and ethnicity differs across infections, the pattern of racial and ethnic disparities is seen across all STIs.

In addition to the demonstrated disparities by race/ethnicity, wide differences in rates of adverse adolescent sexual health outcomes exist by state in the USA (CDC, 2019, 2021c, n.d.). In 2018, state rates of chlamydia among adolescents aged 15–19, for example, ranged from a low of 824.1 to 3932.3 per 100,000 (CDC, 2019). Additionally, state teen birth rates that same year ranged from 6.6 to 30.0 per 1,000 (CDC, n.d.). The prevalence of these outcomes, coupled with high levels of disparity across sociodemographic characteristics and geographic boundaries, illustrates the need for continued prevention measures with an essential focus on the elimination of health disparities (Romero et al., 2016).

Though there is broad consensus on the necessity of a continued public health focus on the prevention of STIs and unintended births among adolescents, there are divergent schools of thought on which strategies, including policies, will be most effective and should be prioritized. Given the wide variation in rates of adverse sexual health outcomes at the state level, an understanding of factors driving state health outcomes is crucial. Both social and demographic characteristics of states, such as social capital, poverty and income inequality, religious beliefs and racial/ethnic differences, and state policies can have strong relationships with adolescent sexual health outcomes (Colen et al., 2006; Crosby & Holtgrave, 2006; Santelli & Kirby, 2010; Strayhorn & Strayhorn, 2009). In addition, teenagers become increasingly independent and have unique developmental needs in the transition from childhood to adulthood; thus, external structural factors can be particularly important in preventing adverse sexual health outcomes (Fuller et al., 2018.) Policy, defined as a "law, regulation, procedure, administrative action, incentive or voluntary practice" and including funding priorities (CDC, 2015), influences adolescent sexual health in myriad direct and indirect ways (Brindis, 2006) and may play a key role in addressing adolescent health outcomes as environmental factors external to the home become increasingly influential during adolescent development in shaping health behaviors (Bleakley & Ellis, 2003).

Several social determinants of health, such as education and employment opportunities, neighborhood characteristics, access to quality health care, and community-level economic structures, have been found to be significantly associated with both adolescent sexual health behaviors and outcomes, as well as related health disparities, independent of individual-level factors (Fuller et al., 2018). Existing literature points to socioeconomic factors as a predominant driver of adolescent pregnancy risk for both Black and White adolescents (Cox, 2020). Furthermore, a growing body of research highlights how racism in the USA, both interpersonal and structural, leads to inequities in access to a range of social and economic benefits and further points to the social determinants of health as key drivers of health disparities among racial and ethnic minority groups (CDC, 2021c). To meaningfully prevent adverse sexual health outcomes among adolescents in the USA, and to address the pervasive health disparities in adolescent birth and STIs, further understanding of the impact of upstream factors, including policies, is needed.

A prior systematic review by Beltz et al. (2015) examined research assessing the association between state-level policies and teen birth, focusing on five key policy areas: access to family planning, education, sex education, public assistance, and access to abortion services. Across studies included in the review, policies that increased access to family planning services and those that support public education were associated with lower state-level teen birth rates (Beltz et al., 2015). Evidence on policies related to abortion access, sex education, and public assistance policies was inconclusive (Beltz et al., 2015).

Additionally, several previous reviews have examined the impact of sex education policies on adolescent sexual health outcomes. Santelli et al. (2017) reviewed the relevant literature and found that comprehensive sex education programs were an effective strategy for reducing adolescent pregnancy and STIs among adolescents whereas abstinence-only until marriage (AOUM) programs fail to meaningfully prevent teen birth and STIs, despite the theoretical effectiveness of abstinence from sexual activity as a preventive behavior. Further, AOUM was not found to be effective in delaying sexual initiation or altering other sexual risk behaviors (Santelli et al, 2017). Similarly, a review focused on state policy influence on sexual health education in schools in the USA found that while abstinence-only education programs (AOE)

do not effectively delay initiation (Rabbitte & Enriquez, 2019).

While studies have examined the association between state-level policies and teen pregnancy or birth, the evidence regarding the impact of state policies on teen sexual health outcomes is limited with mixed results. Furthermore, very few published studies, and no systematic reviews, provide evidence on the impact of state policies on rates of STIs among teens. Additionally, many studies examining the effect of policy on adolescent sexual health offer valuable insight into the policy impact on mediating behavioral outcomes such as contraceptive use or initiation of sexual activity but do not directly assess the impact of policy on teen sexual health outcomes (Kantor et al., 2008; Santelli et al., 2006).

Evidence on policy effectiveness can be a valuable tool in reducing adverse adolescent sexual health outcomes. The profound and persistent disparities by race and ethnicity further necessitate an understanding of policy's role. Given the legal and policy structure of the USA affording broad authority to states in policy development and implementation, as well as the well-documented differences among states in health outcomes, a broad understanding of policy impacts related to adolescent sexual health at the state level is vital. Thus, the purpose of this scoping review is to systematically examine the current research on the impact of state policies in the USA on both teen pregnancy/birth and STIs, as well as the impact of state policies on racial disparities in these teen sexual health outcomes. This review contributes to a limited body of research systematically reviewing the effect of state-level policy on teen sexual health outcomes in the USA, and through inclusion of pregnancy, birth, and STIs as outcomes of interest, offers a comprehensive, updated examination of current evidence on policy effects on adolescent sexual health outcomes. This review can be informative for both policy development and in guiding recommendations for essential future research.

Methods

Scoping reviews share similarities with systematic reviews through the utilization of rigorous methodology to gather and synthesize studies, though scoping studies are particularly useful for examining bodies of literature that have not yet been comprehensively reviewed and identifying gaps in current literature (Peters et al., 2015). In comparison to systematic reviews, scoping reviews may address broad research questions, examine evidence from multiple study types, and do not necessarily include an assessment of methodological quality or rigor (Munn et al., 2018; Peters et al., 2015; Pham et al., 2014). Given the limited and inconclusive nature of evidence on the association between state policy and teen birth, and the absence of systematic or scoping reviews on the relationship between state policy and STIs among adolescents, a scoping review was conducted to examine the current level of evidence on the impact of state policies in the USA on these selected adverse teen sexual health outcomes, as well as the impact on racial disparities. This study followed the methodology for conducting a scoping review first outlined by Arksey and O'Malley (2005) and further refined by Levac, Colquhon, and O'Brien (2010). Following these guidelines, a scoping review requires the following steps: (1) identification of research question(s), (2) identification of relevant studies, (3) study selection, (4) charting the data, and (5) collating, summarizing, and reporting the results (Arksey & O'Malley, 2005; Levac et al., 2010).

Research Questions

This scoping review addressed the following primary research question: "What is known about the impact of state policies, laws or legislation in the U.S. on adverse teen sexual health outcomes, including pregnancy or birth and STIs?" Primary questions are core questions directly related to the scoping review topic; all included studies must address the primary research question. In line with the broad purpose of a scoping review to map the extent and nature of available evidence on a research topic (Arksey & O'Malley, 2005), pregnancy and birth were both deemed important for inclusion. Though they have similar policy associations, there are key differences in the measurement and meaning captured by each, particularly as pregnancy rates necessarily involve some level of estimation to represent the range of possible pregnancy resolution outcomes (Kost et al., 2017). Additionally, this review addressed the following secondary question: "What is known about the impact of state policies, laws, or legislation in the U.S. on racial disparities in adverse teen sexual health outcomes, including pregnancy or birth and STIs?" Studies that met all inclusion criteria and address the primary question were further assessed for evidence related to the secondary research question.

Identification of Relevant Studies

A comprehensive search of multiple databases was used to identify relevant studies, including PubMed, ERIC(ProQuest), and EBSCO Host. Following guidance from Arksey and O'Malley (2005), key publications, as well as reference lists of included articles, were hand searched for identification of additional relevant articles, and potentially relevant identified sources were assessed for inclusion. The searches were conducted March 26–30, 2021, and updated May 25–26, 2022, with no limits on publication date. Specific search terms included: teens, teenagers, adolescents, pregnancy, pregnant, birth, sexually transmitted infections, sexually transmitted

diseases, human immunodeficiency virus, STD, STI, HIV, sexual health, reproductive health, state policy, state policies, state law, state laws, and state legislation. The initial search produced a total of 690 journal articles. Duplicate articles were removed to produce a total of 583 articles.

Study Selection

Articles were reviewed for relevance based on predetermined inclusion and exclusion criteria. Following scoping review guidelines, these criteria may be based on applicability to the research questions rather than study rigor or methodological quality (Levac et al., 2010; Peters et al., 2015). Inclusion criteria for articles were as follows: (1) include US-based study population; (2) include pregnancy, birth or STIs among teens (less than 20 years old) as an outcome; (3) focus on state policy, laws, or legislation related to one or more of the selected teen sexual health outcomes; (4) original research; (5) from academic, peer-reviewed journals; and (6) published in English.

The title and abstract of 583 articles were reviewed for inclusion, among which 495 were excluded for failure to meet inclusion criteria. The full text of the remaining 88 articles were carefully reviewed for eligibility. The primary author reviewed all articles for inclusion decisions. To reduce the risk of bias in the article selection process, two additional reviewers evaluated a randomly selected subset representing 20% of articles at both the title/abstract review and full text review phases. This approach balanced the updated guidance to include multiple reviewers in the scoping review process (Colquhoun et al., 2014; Levac et al., 2010) with available resources and feasibility. An average Cohen's kappa was calculated to measure interrater reliability (IRR) at each phase, ensuring an appropriate level of agreement among all three authors before progressing to the next stage of review, with an established a priori standard of least 0.70 at each phase (McHugh, 2012). In the title/abstract review and full text review phases the calculated IRR among all three reviewers was 0.86 and 0.79, respectively, which is considered substantial agreement (Landis & Koch, 1977). Figure 1 visually presents the article selection process.

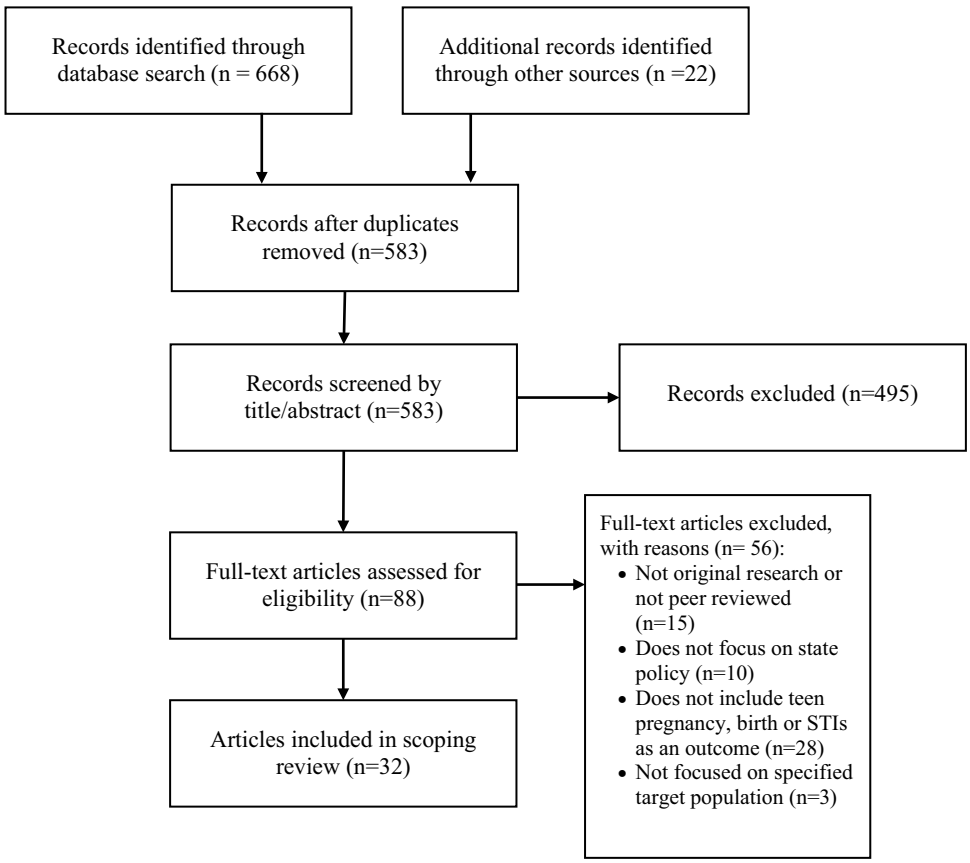

Fig. 1 Article selection process

Results

The search and screening process yielded 32 peer-reviewed articles that met all inclusion criteria. Years of publication ranged from 1986 to 2022. Of included articles, 94% (n=30) focused on the association of state policy with either teen pregnancy (n=4) or birth (n=26), with only three studies focused on STIs. Note that one study included both birth and STIs as outcomes of interest (Carr & Packham, 2017). Collectively, the policies evaluated can largely be grouped into seven categories: abortion access and restrictions (n=15); sex education (n=8); welfare reform and other public assistance policies (n=7); family planning expenditures (n=4); contraception access and restrictions (n=4); state public education expenditures (n=3); and child support enforcement (n=3). Nine articles discussed multiple policies and their association with the selected outcomes. Additional policies addressed by individual studies include minimum wage laws, statutory rape laws, common law marriage, out-of-state tuition laws, and state expenditures as they related to policy decisions. Table 1 presents a summary of included studies, including study purpose, policy addressed, outcome addressed, age group included in analysis, study methods, and relevant key findings. Results below are categorized first by sexual health outcome and then by relevant state policy or policy category.

Teen Pregnancy or Birth

Abortion Access and Restrictions

Fifteen articles examined the association between abortion policies and teen pregnancy or birth. This includes parental notification and/or consent laws (n=13), funding limitations (n=6), mandatory counseling or informed consent (n=4), and legalization (n=2) or age-restricted access (n=1), with six studies analyzing multiple policies.

Broadly, two studies presented analyses that found that teen births decreased when minors had access to legal abortion (Guldi, 2008; Joyce & Mocan, 1990). The majority of states require parental involvement in a minor's decision to have an abortion in some capacity, including either parental notification or consent (GI, 2022a). This review yielded inconclusive evidence on the effects of parental involvement policies for abortion on teen pregnancy/birth. Tomal (1999) found that parental consent and notification laws were associated with significantly higher teen birth rates, whereas Altman-Palm and Tremblay (1998) found lower teen pregnancy rates in states with parental involvement laws. Cartoof and Klerman (1986) identified a small increase in births potentially related to implementation of a parental consent law, but the results were not definitive. Myers and Ladd (2020) found that though there is not clear evidence that parental involvement laws increased teen birth rates in the 1980s and early 1990s, these laws have led to increased teen birth in recent decades. Their analysis examined whether the effects of parental involvement laws vary by distances teens must travel to access an abortion provider who is not subject to parental involvement law, reporting that larger avoidance travel distances increased teen births (Myers & Ladd, 2020). Six additional included studies did not find a statistically significant association between parental involvement laws for abortion and teen birth (Chevrette & Abenhaim, 2015; Kearney & Levine, 2015; Kelly & Grant, 2007; Levine, 2003; Moore et al., 2014; Yang & Gaydos, 2010).

The Hyde Amendment (1977) restricts the use of federal Medicaid funds for abortion services except in cases of life endangerment, rape, or incest (GI, 2022b). The majority of states follow the federal standard and allow Medicaid funding for abortion only in those circumstances, but some allow state Medicaid funds to cover medically necessary abortions (GI, 2022b). Five included studies assessed whether state restrictions on the use of Medicaid funds were associated with teen birth. Singh (1986) found that the availability of Medicaid funds for abortion reduced teen births, but the remaining studies found no significant effects (Kearney & Levine, 2015; Kelly & Grant, 2007; Medoff, 2010; Moore et al., 2014). Of note, Kearney and Levine (2015) suggested that Medicaid funding restrictions may not demonstrate significance because the policy affects a small population proportion, making it difficult to identify an association.

The final abortion restrictions assessed through this review were mandatory counseling laws, which provide specific requirements for pre-procedural information provided to individuals seeking abortion, and mandatory waiting periods that require an individual seeking an abortion to wait a specified amount of time between receipt of counseling and the abortion procedure (GI, 2022a). Four studies assessed these restrictions, none of which found an association with rates of teen birth (Chevrette & Abenhaim, 2015; Kearney & Levine, 2015; Kelly & Grant, 2007) or pregnancy (Medoff, 2010).

Sex Education

Four identified studies evaluated whether state sex education policies were associated with teen birth. Stanger-Hall and Hall (2011) categorized state sex education policies and found that increasing emphasis on abstinence was associated with higher rates of teen pregnancy and birth. However, the remaining three studies found mandatory sex education policies or policies related to required levels of abstinence content were not significantly associated with teen birth (Carr

Table 1 Summary of included studies

Author (year)	Aim/purpose	Policy addressed	Outcome addressed (age group)	Methods (years of analysis)	Relevant key findings
Altman-Palm and Tremblay (1998)	Explore the effects of parental notification laws for abortion and risk of AIDS infection on adolescent pregnancy and abortion rates	Parental involvement law—abortion	Teen pregnancy (15–17 years old)	State-level multivariate regression (1989, 1992)	Mean pregnancy rates were higher in states without parental involvement laws
Bullinger (2017)	Investigate the effect of minimum wage laws on adolescent birth rates in the USA	Minimum wage laws	Teen birth (15–19 years old)	Difference-in-difference (2003–2014)	Higher minimum wages were found to reduce adolescent birth rates, particularly among non-Hispanic White and Hispanic adolescents
Carr and Packham (2017)	Examine the causal effect of state-mandated abstinence education on teen pregnancy and STD rates	State abstinence-education mandates	Teen birth, abortion, and STDs (15–19 years old)	Difference-in-difference (2000–2011)	State-level abstinence mandates have no effect on teen birth rates or STD. Abstinence mandates may increase STD rates in states that previously had no policy in effect
Cartoof and Klerman (1986)	Assess the impact of Massachusetts' parental consent for abortion law on adolescent birth and abortion	Parental consent for abortion	Teen birth (18 years old and under)	Box-Jenkins univariate time series analysis (1977–1982)	Law resulted in abrupt decrease in adolescent abortion rate. Evidence on minor births was not as definitive
Chevrette and Abenhaim (2015)	Assess whether US state-level sexual education and abortion policies are associated with differing teen birth and abortion rates	Multiple restrictive abortion policies and multiple sex education policies	Teen birth (15–19 years old)	Descriptive statistics, Mann–Whitney-Wilcoxon test, and stepwise multiple linear regression (2008)	Teen birth rates do not appear to be influenced by state-level education policies, mandatory consent for abortion, or other deterrents to abortion
Elo et al. (1999)	Investigate the potential impact of statutory rape laws on teen births and sexual activity among teens	Statutory rape laws	Teen birth (multiple age groups)	Recalculation of outcomes under assumption that all sex illegal under statutory rape law would not have taken place (1988)	Enforcement of statutory rape laws is unlikely to lead to substantial reductions in teen childbearing
Fox et al. (2019)	Examine the relationship between abstinence-only education and adolescent pregnancy prevention funding with adolescent birth rates	State sex education funding	Teen birth (15–19 years old)	Two-way fixed-effects repeated measures regression (1998–2016)	Neither funding source was found to influence adolescent birth rates over time. Effects of funding may vary by state ideology
Grossbard and Vernon (2017)	Assess whether common law marriage affects teen birth rates in the USA	Common law marriage	Teen birth (15–19 years old)	State and individual level ordinary least squares regression (1988–2012)	Common law marriage availability was negatively associated with teen births

Table 1 (continued)

Author (year)	Aim/purpose	Policy addressed	Outcome addressed (age group)	Methods (years of analysis)	Relevant key findings
Guldi (2008)	Empirically assess whether age-restricted access to abortion and oral contraceptives influence minor births	Minor consent/access to abortion and contraceptives	Teen birth (18 years old and under)	Difference-in-difference-in-difference (1968–1979)	Teen birth rates decreased with minors' access to abortion. Access to the birth control pill was associated with a decrease in White teen birth rates
Hao and Cherlin (2004)	Assess the effect of welfare reform on teenage pregnancy, childbirth, and school dropout	Welfare reform	Teen pregnancy and birth (14–16 years old)	Difference-in-difference (1994–2000)	Analysis suggests that welfare reform has not reduced teenage pregnancy or childbirth
Harknett et al. (2005)	Examine the relationship between public expenditures on children and child outcomes	Aggregate state-level public expenditures	Teen birth (under 20 years old)	Ordinary least squares regression (1996)	Larger expenditures on education were associated with lower rates of teen birth
Hogben et al. (2010)	Test for relationships between state-level educational policies and STD rates	Abstinence coverage in sexuality education	Teen STDs (15–19 years old)	Mixed model multivariate analysis of variance (2001–2005)	States with no abstinence mandates had the lowest STD rates; states with mandates emphasizing abstinence had the highest
Joyce and Mocan (1990)	Estimate the impact of the law legalizing abortion in New York in 1970 on adolescent childbearing	Legalization of abortion	Teen birth (aged less than 20 years)	Box-Jenkins time series analysis (1963–1987)	Legalization significantly reduced abortion rates, suggests a modern ban on legal abortion would have a major impact on adolescent birth
Kearney and Levine (2015)	Empirically investigate the role of state-level demographic changes, economic conditions, and targeted policies in reducing aggregate teen birth rates from 1981 to 2010	Sex education policies, Medicaid family planning waivers, welfare generosity, welfare reform, child support enforcement, and restrictive abortion policies	Teen birth (15–19 years old)	Regression with panel data methods (1981–2010)	The only targeted policies to have a significant impact on teen birth rates were welfare benefits and expanded access to family services
Kelly and Grant (2007)	Analyze the effects of state policies enacted following welfare reform	Multiple abortion restrictions, food stamps and TANF, family caps, and state work exemptions	Non-marital teen births (15–19 years old)	Ordinary least squares regression (1996, 2000)	No significant effects of Medicaid availability, abortion restrictions, publicly funded contraception, or child support enforcement on statewide rates of unwed teen births

Table 1 (continued)

Author (year)	Aim/purpose	Policy addressed	Outcome addressed (age group)	Methods (years of analysis)	Relevant key findings
Klick and Stratmann (2007)	Assess whether abortion restrictions impact high-risk sexual behaviors among adolescents, as indicated by observed rates of gonorrhea	Parental notification or consent for abortion	Gonorrhea among women (under 20 years old)	Difference-in-difference (1981–1998)	Parental involvement laws were negatively associated with gonorrhea rates, with differences by race and ethnicity
Koohi (2017)	Examine how in-state tuition policies impact teen birth rates	Out-of-state college tuition policy for undocumented teens	Teen birth (first birth prior to age 20)	Difference-in-difference (2001–2015)	Presence of policies allowing in-state tuition of undocumented individuals before age 18 reduces the incidence of teen motherhood
Levine (2003)	Examine impact of parental involvement laws on abortion and fertility behavior	Parental involvement law for abortion	Teen pregnancy and birth (15–17 and 18–19 years old)	Difference-in-difference (1985–1996)	Parental involvement laws resulted in fewer abortions for minors with no statistically significant impact on births
Lopoo and DeLeire (2006)	Assess whether welfare reform reduced teen childbearing	Welfare reform (minor parent provisions)	Teen birth (under 18 years old)	Fixed effects weighted least squares regression (1992–1999)	Minor parent rules were found to reduce births among young teenagers (15–17 years old)
Medoff (2010)	Examine the impact of restrictive state abortion laws on teen pregnancy	Multiple abortion restrictions	Teen pregnancy (15–19 years old)	Multivariate regression (1982, 1992, 2000)	State parental involvement laws were found to reduce teen pregnancy rates. No other policies had a statistically significant impact
Moore et al. (2014)	Examine the association between state policies intended to reduce teen births or enhance opportunity and teen birth rate	Public expenditures on family planning and public education, restrictive abortion policies, public assistance benefit levels	Teen birth (15–19 years old)	Combined time-varying effects models with multilevel models (1989–2008)	States with higher levels of expenditures on family planning and education, as well as higher monthly public assistance, were found to have lower teen birth rates. Study found no relationship between restrictive abortion policies and teen birth rate
Myers and Ladd (2020)	Estimate the effects of abortion parental involvement laws, and whether the effects vary with distances minors might travel to avoid them	Enforcement of abortion parental involvement law	Teen birth (15–18 years old)	Difference-in-difference (1980–2016)	Parental involvement laws have increased teen birth in recent decades. These effects were more pronounced with increasing distances teens must travel to avoid parental involvement laws

Table 1 (continued)

Author (year)	Aim/purpose	Policy addressed	Outcome addressed (age group)	Methods (years of analysis)	Relevant key findings
Offner (2005)	Assess the effect of 1996 welfare reform legislation on teen girls	Temporary Assistance to Needy Families (TANF)	Unwed teen birth (16–17 years old)	Difference-in-difference (1989–2001)	Welfare reform was found to be associated with a reduced school drop-out rate and reduced out-of-wedlock births for teens aged 16 to 17 years old
Packham (2017)	Examine the impact of reductions in funding for family planning services on teen childbirth	Reduced public expenditures on family planning services	Teen birth (15–19 years old)	Difference-in-difference (2005–2013)	Reducing funding for family planning services in Texas was found to increase teen birth rates
Plotnick et al. (2004)	Assess the effect of stricter child support enforcement on unwed teen childbearing	Child support enforcement	Unwed teen birth (less than 20 years)	Cross-sectional simple and multinomial logistic regression (1979–1985)	Tentative evidence suggests higher rates of child support enforcement reduce unwed teen birth
Singh (1986)	Examine the relationships between state demographic, social and economic attributes, as well as policy-related factors, and teen pregnancy in the USA	State public education expenditures, aid to families with dependent children, school sex education, and Medicaid funding for abortion	Teen pregnancy and birth (15–19 years old)	Multivariate regression analyses (1980)	Demographic, social, and economic characteristics of a state were found to be more influential than policy measures on teen pregnancy, birth, and abortion
Stanger-Hall and Hall (2011)	Assess whether abstinence-only education is effective in reducing teen pregnancy rates in the USA	State sex education laws and policies	Teen pregnancy and birth (15–19 years old)	Multivariate analysis of variance (2005)	Increasing emphasis on abstinence education was associated with higher teen pregnancy and birth rates
Tomal (1999)	Assess the effect of parental notice and consent laws on abortion and birth rates for minor and non-minor teens	Parental notice and consent laws for abortion	Teen birth (15–17 years old and 18–19 years old)	Multivariate regression analyses (1995)	Parental consent/notification laws and funding restrictions were associated with lower abortion and higher birth rates for both age groups
Wells et al. (2022)	Examine the association of state-specific emergency contraception (EC) legislation and teen births	Emergency contraception legislation	Teen birth (15–19 years old)	Poisson regression (2000–2014)	Restrictive (EC) policies were associated with higher teen birth estimates, while expansive EC policies are associated with lower teen birth estimates
Yang and Gaydos (2010)	Investigate the effect of policy and demographic changes on teen birth rates	Federal abstinence-only sex education funding, parental consent for abortion, state conscience laws, and Medicaid family planning waivers	Teen birth (15–19 years old)	Descriptive analyses and multivariate regression (2000–2006)	Medicaid family planning waivers were associated with a reduction in teen birth rates, and abstinence-only education programs were found to increase teen birth rates among White and Black teens

Table 1 (continued)

Author (year)	Aim/purpose	Policy addressed	Outcome addressed (age group)	Methods (years of analysis)	Relevant key findings
Zavodny (2004)	Examine the effect of parental consent requirement for contraceptives on teen birth and abortion	Parental consent for contraception	Teen birth (less than 19 years old)	Difference-in-difference (1997–2000)	Parental consent requirement was found to increase pregnancies and births among teens
Zimmerman (1988)	Examine the relationship between state-level public policies and teen birth rates	State policy choices, as evident by expenditures	Teen birth (less than 20 years old)	Exploratory stepwise multiple regression analysis (1980–1982)	Lower expenditures on education and public welfare were associated with higher rates of teen birth

& Packham, 2017; Chevrette & Abenhaim, 2015; Kearney & Levine, 2015).

Similarly, three studies examined the association between state sex education funding and teen birth. Fox et al. (2019) assessed whether federal abstinence-only education block grants or adolescent pregnancy prevention funding had an effect on birth rates over time, while Kearney and Levine (2015) included whether a state accepted Title V, Sect. 510 abstinence funding in their analysis. Beginning in 1998, Title V, Sect. 510 funding provided federal support for abstinence education programs (Trenholm et al., 2007). Neither study found a significant association with adolescent birth rates. Yang and Gaydos (2010), conversely, found higher abstinence-only education funding per capita to be associated with higher rates of birth for Black and White teens, though the relationship was not significant among Hispanic teens. Across included studies, the evidence on the impact of state sex education policy and funding on teen pregnancy and birth rates was inconclusive.

Welfare Reform and Public Assistance Policies

In 1996, welfare reform was implemented at the federal level through the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) (Lopoo & DeLeire, 2006). A major result of this reform was the elimination of Aid to Families and Dependent Children (AFDC), which had provided indefinite cash assistance to low-income mothers and their children, and the creation of Temporary Aid to Needy Families (TANF), a cash assistance program that enforced work requirements and strict limits on length of enrollment (Kelly & Grant, 2007). Additionally, an explicit goal of welfare reform was to reduce teen births and further included the creation of a federal funding source for abstinence-only education (Lopoo & DeLeire, 2006). By the time PRWORA was enacted, 15 states had also implemented policies known as minor parent provisions (MPP) that required unmarried mothers under age 18 to attend school or a training program and live with a parent or guardian to receive benefits (Lopoo & DeLeire, 2006).

Three studies included in this review broadly assessed the effect of welfare reform on teen fertility with inconclusive results. Hao and Cherlin (2004) found no significant association between welfare reform and teen pregnancy or birth, and the analysis by Kelly and Grant (2007) indicated that economic-based incentives had only minor, inconsistent effects on teen birth. Finally, Offner (2005) found that the implementation of TANF was associated with a minor reduction in unmarried births for teens aged 16 to 17.

The generosity of state welfare benefits and public assistance was discussed in three additional studies, again with conflicting findings. Prior to welfare reform, Singh (1986) found that AFDC programs with higher levels of benefits were

not associated with an increase in teen birth rates. Similarly, in an analysis spanning years both before and after welfare reform (1989–2007), Moore et al. (2014) found that higher maximum benefit levels of public assistance were associated with lower rates of teen birth. Conversely, Kearney and Levine (2015) found that lower maximum benefit levels were associated with decreased rates of teen birth.

A final study assessing the impact of public assistance policies on teen birth examined the association between MPP and teen birth. Lopoo and DeLeire (2006) used state-level data to estimate trends in teen sexual health outcomes before and after the enactment of MPP and found that MPP were associated with lower levels of birth among teens aged 15 to 17.

Family Planning Expenditures

Across all included studies assessing the impact of state-level family planning expenditures, higher levels of funding allowing for greater coverage of contraceptive access were associated with lower teen birth rates. Medicaid traditionally provides coverage for comprehensive family planning services, but participation is primarily restricted to individuals receiving welfare benefits; family planning waivers allow states to expand family planning coverage to a wider population (Beltz et al., 2015; Kearney & Levine, 2015). Kearney and Levine (2015) and Yang and Gaydos (2010) studied the effect of Medicaid family planning waivers on teen birth, and both analyses found the waivers to be significantly associated with lower rates of teen birth. Similarly, Moore et al. (2014) found that higher levels of state public expenditures on family planning were associated with a decrease in teen births, while Packham (2017) found that reduced family planning funding in Texas was followed by an increase in teen births. These findings were echoed in the systematic review by Beltz et al. (2015) who found that, across studies, policies that increase access to family planning services are associated with lower teen birth rates.

Contraception Access and Restrictions

Four included studies addressed policies related to contraception access and restrictions, including one examining the effect of emergency contraception legislation (Wells et al., 2022); collectively, their analyses demonstrate that policies restricting minors' access to contraception are associated with higher rates of teen birth, though the association may vary by race or ethnicity (Guldi, 2008; Santelli & Kirby, 2010; Zavodny, 2004). Guldi (2008) tracked historical access to the birth control pill from 1968 to 1979 coinciding with the advent of legal access and found that, among White teens, access to oral contraceptives lead to a reduction in births. Zavodny (2004) found that a parental consent requirement for contraceptive access was associated with an increase in teen pregnancy and birth rates. Yang and Gaydos (2010) found that the implementation of a conscience clause, which permits healthcare providers to refuse some medical services for personal or religious reasons, was associated with higher teen birth rates among older, White teens. Finally, Wells et al. (2022) found that policies that restrict access to emergency contraception (EC) are associated with increased teen births, while policies that expand access to EC are associated with decreased teen births. Restrictive EC policies included age-related restrictions for distribution, allowance for pharmacist refusal to dispense, or allowance for insurance coverage to exclude EC; conversely, expansive EC policies required emergency department providers to distribute information about EC, required distribution of EC prescription upon patient request, required insurance coverage for EC, or required pharmacists to fill valid EC prescriptions (Wells et al., 2022).

State Public Education Expenditures

Of three studies to assess the relationship between state public education expenditures and teen sexual health outcomes, two found that higher state expenditures per student were associated with lower teen birth rates (Harknett et al., 2005; Moore et al., 2014). Similarly, Zimmerman (1988) found that lower levels of expenditure on education were associated with higher rates of teen birth. On the contrary, Singh (1986) found an association between increased state expenditures per student and higher rates of teen pregnancy. However, Singh (1986) also found that a higher teacher-to-student ratio was significantly associated with lower teen birth rates and suggests this may be a better measure of education quality. Broadly, these findings are supported by Beltz et al. (2015), who indicated that policies that support or fund a strong education system are associated with lower teen birth rates.

Child Support Enforcement

The federal Child Support Enforcement (CSE) program, established in 1974, recognizes the responsibility of nonresident parents to make financial contributions toward childcare (Kearney & Levine, 2015). Two studies to analyze the association between CSE and teen pregnancy or birth found no significant association, but findings collectively are mixed. Kearney and Levine (2015) included total annual state-level CSE expenditures in their analysis, while Kelly and Grant (2007) included a measurement of the percentage of all child support cases enforced; neither found a significant association with teen birth. Plotnick et al. (2004) presented evidence that teens in states with higher rates of CSE were less likely to have a pregnancy outside of marriage.

Other Related Policies

The associations with several other policies and teen pregnancy or birth were addressed by single studies. Bullinger (2017) found higher minimum wage laws were associated with reduced adolescent birth rates, especially among White and Hispanic adolescents. Koohi (2017) found that the implementation of policies allowing in-state college tuition for undocumented individuals before age 18 reduced teen births among undocumented Mexican youth. Though these results were specific to one population, they align with evidence demonstrating that increased educational opportunities are associated with lower rates of teen birth (Moore et al., 2014; Zimmerman, 1988). An analysis by Grossbard and Vernon (2017) found that common law marriage availability was associated with a reduction in teen births. And, finally, Elo, King, and Furstenberg (1999) found that enforcement of statutory rape laws is unlikely to lead to a significant decrease in teen birth rates.

Sexually Transmitted Infections

As previously mentioned, only three studies included in this review assessed the impact of state policy on rates of teen STIs. Klick and Stratmann (2007) found that parental notification or consent laws for abortion were associated with decreased rates of gonorrhea, a measure used as a proxy to assess policy impact on risky sexual behaviors among adolescents. Two studies analyzed whether abstinence education mandates were associated with rates of STIs among teens, with mixed results. Carr and Packham (2017) found that state-level abstinence mandates had no effect on STI rates, though indicated mandates may be associated with an increase in STI rates when implemented in a state that previously had no policy in effect. Hogben et al. (2010) found increasing rates of chlamydia and gonorrhea with a state-mandated emphasis on abstinence. The resulting inconclusive findings related to sex education policies mirror those of the association with teen pregnancy and birth, as previously discussed.

Policy Impact on Racial and Ethnic Health Disparities

Though few included studies explicitly sought to address the impact of state-level policies on health disparities in teen sexual health outcomes, nine presented evidence of differential policy effects on various racial and ethnic groups. Of these, eight included teen pregnancy or birth as an outcome, with only one study focused on STIs.

Six included studies examined the effect of abortion policies on teen pregnancy or birth by race and ethnicity. Joyce and Moycan (1990) broadly sought to estimate the impact of the legalization of abortion in New York in 1970 and present results demonstrating a greater decrease in Black adolescent birth rates than White adolescent birth rates following legalization. The authors suggest these findings may indicate that White adolescents were more able to access abortion in the era prior to legalization (Joyce & Moycan, 1990).

Three studies presented a discussion of the differential impact in laws related to consent for abortion services (Guldi, 2008; Kearney & Levine, 2015; Myers & Ladd, 2020). Guldi (2008) reported a larger decrease in teen birth rates with minor access to abortion services for White than non-White teens. Kearney and Levine (2015) found that policies requiring parental consent for abortion were associated with higher birth rates among Hispanic teens, whereas mandatory waiting periods for abortion were associated with lower birth rates among Hispanic teens. However, the authors caution that further exploration of these results is needed prior to drawing strong conclusions. In their analysis, Myers and Ladd (2020) found that parental involvement laws increase teen birth rates for both Black and White teens, but the impact of greater travel distances to access abortion without required parental involvement had a significantly larger effect on birth rates for Black teens. Myers and Ladd (2020) note that the differential impact could reflect a variety of factors directly related to race and ethnicity, such as cultural norms or healthcare discrimination, or indirect factors arising from socioeconomic status. Relatedly, Singh (1986) found that the availability of Medicaid funds for abortion services was significantly associated with lower birth rates among Black but not White adolescents, noting that this may be in due, at least in part, to greater Medicaid enrollment among Black adolescents.

Included studies identified several other policies associated with differences in effect on teen birth by race and ethnicity. In their analysis using a difference-in-differences approach, Guldi (2008) found that access to oral contraceptives was negatively associated with teen birth rates among White teens. Yang and Gaydos (2010) investigated the impact of several policies, with results indicating that higher abstinence-only education funding per capita increased birth rates among White and Black teens, but not Hispanic teens. Furthermore, Medicaid family planning waivers were found to have a greater impact on Black and Hispanic teen birth rates than those of White teens (Yang & Gaydos, 2010). In two single studies, minimum wage changes were found to have stronger effects on non-Hispanic White and Hispanic adolescent birth rates (Bullinger, 2017), and paternity establishment had a stronger negative association with unwed teen birth in non-Hispanic White than non-Hispanic Black teens (Plotnick et al., 2004).

Notably, only one included study presented evidence of differences in policy impact on rates of STIs by race and ethnicity. In their analysis aimed at assessing whether abortion restrictions impact high-risk sexual behaviors, using rates of

gonorrhea as a proxy measure, Klick and Stratmann (2007) found that parental involvement laws for abortion were negatively associated with rates of gonorrhea, with differences by race and ethnicity. More specifically, they found that both parental notification and consent laws led to reduced rates of gonorrhea in White and Hispanic adolescents, but results were not statistically significant among Black adolescents.

Collectively, the clear racial and ethnic disparities in rates of adolescent sexual health outcomes, limited number of studies, breadth of policies and racial/ethnic groups considered, and inconsistency of findings highlight the importance of further research addressing the effect of state policy on these disparities. This is particularly true for research examining the policy impacts on STIs, as only one identified study that presented differential evidence by race/ethnicity addressed rates of adolescent STIs as an outcome of interest.

Discussion

This scoping review systematically examined the existing literature on the impact of state policies in the USA on both teen pregnancy/birth and STIs, including the impact of policy on racial disparities. A large majority of the articles identified in this review focused on rates of teen pregnancy or birth, with only three evaluating policy impacts on STIs. Of note, several excluded studies identified during the review discussed policies that may be of particular importance to adolescent STIs including expedited partner therapy, pre-exposure prophylaxis for HIV (PrEP), and policies impacting uptake of human papilloma virus (HPV) vaccination. These studies were excluded due to an assessment of policy association with potentially mediating behavioral outcomes such as HIV testing or other sexual risk behaviors rather than the selected teen sexual health outcomes. Further studies examining the association between these policies and adolescent STIs may be especially useful. Though many of the long-term adverse effects of STIs are preventable with prompt treatment, if not identified and treated in a timely fashion there may be grave adverse health effects. Combined with the high rates of STIs among adolescents, and the wide disparities by race/ethnicity and geographic location, a better understanding of the role of state policy in effective prevention of STIs is needed.

Across studies addressing the association between state policy and teen pregnancy or birth, greater state-level expenditures on family planning and policies that increased minors' access to contraceptive services were consistently found to be associated with lower rates of teen pregnancy and birth. This may be particularly relevant as Title X federal family planning funding remains politically divisive and funding eligibility guidelines evolve, having a potentially profound impact on access to reproductive healthcare and highlighting the need for policies protecting adolescents' rights and abilities to access sexual health services (Dawson, 2021). Additionally, policies that support and fund strong public education were found to be associated with decreased birth rates.

Beyond these policies, the evidence on the impact of parental involvement for abortion, availability of Medicaid funding for abortion, sex education, as well as welfare reform and related policies was mixed. This incongruence in available evidence, combined with a relatively small number of relevant publications, illustrates a need for additional high-quality studies addressing the state policy impacts on teen pregnancy and birth. Further, two included studies found that rates of teen birth decreased when minors had access to legal abortion (Guldi, 2008; Joyce & Mocan, 1990). These findings may be particularly salient as the policy landscape regarding access to abortion in the United States is dramatically evolving. In June 2022, the US Supreme Court issued a decision on *Dobbs v. Jackson Women's Health Organization* indicating that the US Constitution does not confer a right to abortion, overturning *Roe v. Wade* (Supreme Court of the United States, 2022), and granting states the authority to ban abortion outright. Future research on the impact of state-level abortion bans on adolescent sexual health outcomes in the USA, including disparate effects for racial and ethnic minority adolescents, will be crucial.

In addition, further research on sex education policy would be beneficial. Substantial evidence supports comprehensive sex education as an effective means of reducing adverse sexual health outcomes (Kirby, 2008; Kohler et al., 2008; Santelli et al., 2017), yet evidence on the impact of state sex education policy on both rates of teen pregnancy/birth and STIs remains inconclusive. Research into factors driving this discrepancy, such as alignment of sex education programs and practices with stated policy, are recommended. Several studies included in this review highlight the potential for interpretation and implementation of sex education policy at the county or local level in the USA, adding to the need for further research on the implementation of sex education policy (Bleakley & Ellis, 2003; Chevrette & Abenhaim, 2015; Stanger-Hall & Hall, 2011). Given the rapid pace of policy change and mixed nature of existing available evidence, updated studies utilizing current data on policies that impact adolescents' access to abortion, contraceptives, or other sexual health services would be highly informative (Beltz et al., 2015). Finally, in light of the deep disparities in sexual health outcomes among racial and ethnic minorities in the USA, and a relative paucity of research on the impact of policies on these discrepant outcomes, future research on the association between state policies and disparities in teen sexual health outcomes should be a priority.

Policy Implications

Prevention of both STIs and unintended pregnancy among adolescents remains a critical public health issue in the USA, demonstrating a need for a continued focus on evidence-based policies and practices aimed at prevention of adverse adolescent sexual health outcomes, as well as the promotion of health equity and reduction of racial and ethnic health disparities. Evidence on policy effectiveness is a vital tool in health promotion and may be particularly influential in promoting improved health behaviors and outcomes among adolescents. There is a need for further, current research on the impact of state policies on both teen pregnancy/birth and STIs, with an emphasis on STIs given the relatively limited number of available studies. Longitudinal studies examining the effects of state-level policy over time would be beneficial, as well as studies examining the effects of state-level sex education policies. Future research into local implementation of state-level policies may be particularly useful. The role of state policy in adolescent sexual health outcomes is a sensitive and highly political issue. Further evidence on these topics is essential to guide policy development and program planning aimed at effective prevention of adverse adolescent sexual health outcomes.

Limitations

In line with the broad nature of a scoping review, there are several limitations that deserve consideration. First, few included studies assess identical measures of a policy, even when examining the same state-level policy, presenting a challenge in collating results. Second, inclusion criteria did not require that studies include all states in their analysis, resulting in a mix of the number of states analyzed with some studies examining policy effects in a single state; though the included studies conducted multivariate analyses that controlled for sociodemographic state-level characteristics, there may remain important differences between states that are difficult to control for. Additionally, as a scoping review, inclusion decisions did not require a formal appraisal of methodological quality, as previously discussed. Publication bias, or the potential for publication decisions to be based on statistical significance, direction, or magnitude of findings, may also be an important consideration in the overall presentation of existing literature related to policy impacts on adolescent sexual health (Page et al., 2021). Studies presenting statistically significant positive results have been found to be more likely to be published than studies presenting null or negative findings, which may influence the available pool of existing published studies (Page et al., 2021). Finally, though this scoping review included a systematic and comprehensive search of the literature, there remains the potential that relevant articles were inadvertently omitted.

Conclusion

The purpose of this review was to systematically examine the state of available evidence on the impact of state policies in the USA on both teen pregnancy/birth and STIs, as well as the impact of policy on racial disparities in these selected health outcomes. Studies in this review consistently found that greater state-level expenditures on family planning or policies that increased minors' access to contraceptive services were associated with lower rates of teen pregnancy and birth. Beyond that, the review found mixed evidence on the impact of policies related to abortion restrictions, sex education policies, and public assistance. Only three included studies examined the effect of policy on STIs, two of which presented mixed findings on the impact of sex education policies. Furthermore, a limited number of studies addressed the potential impact of various state-level policies on rates of disparities by race and ethnicity. Collectively, this study offers a summary of existing evidence on the association between state-level policy and adolescent sexual health outcomes, highlighting essential areas for future research in policy and adolescent sexual health.

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Availability of Data and Materials The data that support this study will be shared upon reasonable request to the corresponding author.

Code Availability Not applicable.

Declarations

Ethics Approval Review article, not applicable.

Consent to Participate Review article, not applicable.

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