Socioeconomic Disadvantage as a Social Determinant of Teen Childbearing in the U.S.

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ABSTRACT

Objective. We reviewed the literature focused on socioeconomic influences on teen childbearing and suggested directions for future research and practice related to this important indicator of teen sexual health.

Methods. We conducted an electronic search of Medline, ERIC, PsychLit, and Sociological Abstracts databases for articles published from January 1995 to November 2011. Selected articles from peer-reviewed journals included original quantitative analyses addressing socioeconomic influences on first birth among teen women in the U.S. Articles were abstracted for key information, ranked for quality according to the U.S. Preventive Services Task Force guidelines, assessed for bias, and synthesized.

Results. We selected articles with a range of observational study designs. Risk for bias varied across studies. All 12 studies that considered socioeconomic factors as influences on teen childbearing (vs. moderators or mediators of other effects) reported at least one statistically significant association relating low socioeconomic status, underemployment, low income, low education levels, neighborhood disadvantage, neighborhood physical disorder, or neighborhood-level income inequality to teen birth. Few reports included any associations contradicting this pattern.

Conclusions. This review suggests that unfavorable socioeconomic conditions experienced at the community and family levels contribute to the high teen birth rate in the U.S. Future research into social determinants of sexual health should include multiple levels of measurement whenever possible. Root causes of teen childbearing should be evaluated in various populations and contexts. Interventions that address socioeconomic influences at multiple levels could positively affect large numbers of teens and help eliminate disparities in teen childbearing.

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The birth rate among teenagers aged 15–19 years in the United States has decreased dramatically during the past several years to a record low of 34.3 births per 1,000 population in 2010. Nevertheless, the absolute number of teen births remains high, with approximately 370,000 teen females aged 15–19 years having given birth in 2010.[1] Giving birth in the teen years can limit one's social and financial well-being.[2,3] Teen childbearing is also associated with adverse outcomes among infants born to teens, including preterm birth, low birthweight, and infant death.[4,5] The consequences of childbirth for a teen mother and her infant may vary according to individual circumstances (e.g., age subgroup and whether the pregnancy was intended). However, it is clear that the overall costs of teen motherhood for young women and their infants are substantial.

Primarily because of potential effects on mothers themselves, teen motherhood can be considered an indicator of suboptimal sexual health. The World Health Organization defines sexual health as "a state of physical, mental, and social well-being in relation to sexuality."[6] The number of lives impacted as well as the racial/ethnic and geographic disparities that exist[7,8] make this sexual health issue a priority for public health researchers and practitioners in the U.S.

Social determinants of health are "complex, integrated, and overlapping social structures and economic systems [that] are linked to lack of opportunity and to a lack of resources to protect, improve, and maintain health."[9] They operate at levels beyond the individual and family, and they often represent the root causes of health outcomes observed at the individual and community levels. Various theories of how community-level socioeconomic factors contribute to teen childbearing have been proposed. For example, Wilson theorized that, in urban settings, social determinants such as pervasive lack of opportunity set into motion a chain of events that support early motherhood,[10,11] and a large body of work has been conducted to validate and expand upon his theories.[12–15]

Moore et al. published an extensive review of the literature on determinants of teen pregnancy and childbearing in 1995, finding that living in a disadvantaged neighborhood and family receipt of welfare benefits were both positively associated with teen birth. On a state level, however, higher Aid to Families with Dependent Children benefit levels were not as predictive of teen birth rates as were poor employment opportunities. Although the effect of maternal education on teen birth was inconsistent, it appeared to have a greater impact on teen birth than paternal educational achievement.[16]

In this study, we summarized a number of peer-reviewed journal articles that were published after Moore et al.'s 1995 review. Like Moore et al.[16] and others,[17] we conceptualized influences on teen motherhood as operating at multiple levels. However, our review was somewhat narrower in scope than theirs: we focused only on socioeconomic factors (vs. all determinants) and only on teen birth (vs. pregnancy as well). Our review considered individual-, family-, school-, and community-level socioeconomic influences on teen childbearing, and we summarized recent findings, identified gaps in the literature, and suggested directions for future research and practice related to social determinants of teen motherhood.

METHODS

For purposes of this analysis, we considered socioeconomic factors to include educational attainment of the teen or her parent(s); family members' income, wealth, and occupation(s) (including some proxies for these); and community-level financial or material resources.

We conducted an electronic search of Medline, ERIC, PsychLit, and Sociological Abstracts databases for articles published from January 1995 to November 2011. The Medline search used the MeSH terms "socioeconomic factors" and "pregnancy in adolescence" linked by "and." We constructed similar search strings for the other three databases.

We reviewed titles and abstracts of the resulting citations for relevance to the topic of socioeconomic determinants of teen birth; we reviewed full-text articles when abstracts were unavailable. We then reviewed potentially relevant peer-reviewed articles in their entirety to determine whether they examined socioeconomic factors as determinants of teen birth. We also included articles considering socioeconomic factors as potential moderators or mediators of other effects (e.g., the intergenerational effect on teen birth of having a teen mother). However, we excluded those studies that conceptualized socioeconomic factors solely as confounders necessitating analytic control (e.g., studies whose authors followed the common practice of including education and/or income as control variables in multivariable models without explicitly focusing on their potential role as determinants of teen birth). Although access to sex education and family planning at the community level may at times reflect a community's overall financial or material resources, we chose not to consider articles for which access to these or other health-related services was the only socioeconomic measure discussed. One concern was that access to these services can be driven by need; thus, higher teen birth rates might, in some cases, lead to

better access, leaving doubt as to what was the cause and what was the effect. Selected articles also contained (*1*) original quantitative analysis, (*2*) a focus on first birth among females aged 19 years or younger in the U.S., and (*3*) if data were aggregated, aggregation at the county level or lower.

We then abstracted and evaluated selected articles for study design, unit of analysis, objectives, data sources, study population, socioeconomic measures, teen childbearing measures, findings, and strengths and limitations. We ranked study designs for quality of evidence using the designations set forth by the U.S. Preventive Services Task Force (USPSTF), which range from I for "evidence obtained from at least one properly randomized controlled trial" to III for "opinions of respected authorities, based on clinical experience, descriptive studies and case reports, or reports of expert committees." We applied sublevels of the middle category (II) as follows: II-1 for well-designed, nonrandomized controlled trials; II-2 for well-designed cohort or case-control studies; and II-3 for evidence comparable with that from multiple time series or dramatic results in uncontrolled experiments.[18] Additionally, we systematically assessed the risk of bias to study findings (e.g., due to nonresponse or lack of proper controls) for each article.[19] In summarizing articles, we followed the authors' conventions in describing race/ethnicity.

RESULTS

Of 1,033 articles retrieved by the electronic searches, 57 were considered potentially relevant to the topic of this review based on review of titles and abstracts or full text, and 16 were selected for this review based on the aforementioned criteria. However, two of the selected articles did not contain sufficient information about the studies to allow for a complete abstraction or assessment; therefore, they were not included.[20,21] Our final set of 14 articles (Figure) included 12 that evaluated socioeconomic factors as determinants of teen birth and two that considered them as moderators or mediators of other effects on teen birth. Four of the articles described cohort studies, representing Evidence Level II-2 in the USPSTF grading system and 10 represented Evidence Level II-3 (three longitudinal analyses of survey data and seven cross-sectional studies). Risk for bias varied across studies, with Level II-2 studies all exhibiting a moderate risk of bias and Level II-3 studies ranging from low to high risk of bias. It should be noted that Level II-3 studies, by virtue of their design, have higher levels of potential bias, as compared with studies that are ranked higher in the USPSTF system, and this difference is not reflected by our bias assessments.

Of the 14 studies included in the review, two studies restricted their analyses to black respondents.[12,13] A third study was conducted in Appalachia in counties with predominantly non-Hispanic white (NHW) populations.[22] Two studies included multiple racial/ethnic groups with the stated purpose of making comparisons; they compared Latina respondents with non-Latina white respondents[23] and black teens with white teens.[14] Five studies included black, NHW, and Hispanic people.[24–28] The remaining four studies[29–32] were unclear about the racial/ethnic composition of their samples.

Teen childbearing measures varied somewhat across studies. Five studies looked at birth rates among teens.[22,24,27,29,30] Two studies examined timing of teen birth, measured at the individual level.[12,14] Six studies had occurrence of teen birth as their outcome.[13,23,25,28,31,32] Additionally, one study analyzed the chain of events leading to teen birth among individual women, including the risk of becoming sexually active, the hazard of pregnancy, and the probability of a birth resulting from the first pregnancy.[26]

Socioeconomic factors as determinants of teen childbearing

Analyses of family-level socioeconomic influences. Three studies analyzed only family-level socioeconomic influences on teen pregnancy.[23,26,32] Using data from the Maternal and Infant Health Assessment (an annual survey of women giving birth in California with linked birth certificate data), Dehlendorf et al. compared characteristics of women whose first birth occurred when they were teens with women who first gave birth as adults. In this study, which was restricted to 2,119 primiparous Latina and non-Latina white women, the authors found that lower education levels among respondents' parents were associated with teen births for both racial/ethnic groups. For Latinas, this association held regardless of country of birth.[23]

Using data from a cohort study of young people assessed from seventh grade onward that included 248 females, Gest et al.[32] found that female students with a profile characterized by lower family-level socioeconomic status (SES) (based on a revised version of Duncan's Socioeconomic Index[33]) in combination with individual characteristics such as greater aggression were more likely to become teen mothers, as compared with those with the alternative characteristics (e.g., higher family-level SES and less aggression). The associations between this profile and teen motherhood did not differ by race/ethnicity. When student characteristics were analyzed as separate variables (rather than as part of a profile), lower family-level SES was

Figure. Selected articles (*n*=14) addressing socioeconomic factors influencing first birth among U.S. teens published from January 1995 to November 2011 in peer-reviewed journals

Author and year	*Study design*	*Unit of analysis*	*Objective(s)*	*Data sources/ study population*[a]	*Socioeconomic measure(s)*	*Teen childbearing measure(s)*	*Findings*	*Level of evidence*[b]
Bickel et al. 1997[c]	Cross-sectional analysis of county-level data	County	To explore contextual factors as determinants of teen pregnancy/ birth	• 55 counties in West Virginia during 1987–1988 • Residents were predominantly NHW	County-level measures: • Average wage • Unemployment rate • Average household income • Public school revenue • Student-teacher ratio • High school completion rate • Modern vs. traditional Appalachian community (included community-level education and occupational status)	Births per 1,000 teen females aged 15–19 years	SE factors as determinants: • Unemployment rate ($p<0.05$) and modern (vs. traditional) community characterization ($p<0.001$) were positively associated with teen childbearing. • Average wage was inversely associated ($p<0.001$) with teen childbearing.	II-3
Blake and Bentov 2001[d]	Cross-sectional	ZIP Code	To analyze sociodemographic variables associated with childbirth among unmarried teens	• Birth certificates from 81 ZIP Codes in Dallas County, Texas, 1995–1996 • 1990 U.S. Census data • Dallas county residents were 65% white, 22% black, and 16% Hispanic	Indicators of low SES: • Low median household income • High percentage of households receiving public assistance • High percentage of population ≥25 years of age who completed <9 years of education • High percentage of population ≥25 years of age who completed 9–12 years of education but did not graduate from high school	ZIP Code-level unmarried teen birth rate = total number of births to unmarried females <20 years of age divided by total number of 12- to 19-year-old residents × 1,000	SE factors as determinants: At the ZIP Code level, all four indicators of low SES were significantly correlated with births among unmarried teens. (Spearman r for higher household income = −0.67; r for households receiving public assistance = 0.71; r for <9 years of education = 0.74; and r for 9–12 years of education without graduating = 0.49) (all $p<0.01$).	II-3

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Figure (continued). Selected articles (*n*=14) addressing socioeconomic factors influencing first birth among U.S. teens published from January 1995 to November 2011 in peer-reviewed journals

Author and year	*Study design*	*Unit of analysis*	*Objective(s)*	*Data sources/ study population*[a]	*Socioeconomic measure(s)*	*Teen childbearing measure(s)*	*Findings*	*Level of evidence*[b]
Campa and Eckenrode 2006[e]	Cohort study	Individual	To test whether the effect on teen childbearing of having an adolescent mother is mediated through the mother's prebirth SES or other factors	• 19-year cohort study of Generation 2 (G2) infants delivered by Generation 1 (G1) pregnant women enrolled in the Elmira Nurse Family Partnership Project • *n*=293 (including 152 females) • >75% of participants were white.	G1 mother's prebirth SES was measured with an adaptation of the Hollingshead four-factor index of social status[f]	Giving birth at ≤19 years of age	SE factors as mediators or modifiers of non-SE effects: The intergenerational effect of having an adolescent mother on teen childbearing is not explained by the G1 mother's SES or education level during pregnancy.	II-2
Dehlendorf et al. 2010[g]	Cross-sectional analysis of survey data	Individual	To evaluate SE factors and acculturation as determinants of teen childbirth among Latinas living in the U.S.	• 2003–2005 Maternal and Infant Health Assessment • *n*=2,119 primiparous Latina and non-Latina white females	Highest level of education attained by either parent when teen was 13 years of age	Teen birth to 15- to 19-year-olds	SE factors as determinants: Lower levels of parental education were significantly associated with teen births among non-Latina white ($p<0.001$) and Latina ($p=0.002$) females. For Latina females, this association held regardless of country of birth.	II-3

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Figure (continued). Selected articles (*n*=14) addressing socioeconomic factors influencing first birth among U.S. teens published from January 1995 to November 2011 in peer-reviewed journals

Author and year	*Study design*	*Unit of analysis*	*Objective(s)*	*Data sources/ study population*[a]	*Socioeconomic measure(s)*	*Teen childbearing measure(s)*	*Findings*	*Level of evidence*[b]
Driscoll et al. 2005[h]	Cohort study	Individual	To examine how community-level opportunity and teens' perceptions of opportunities interact as determinants of first teen birth	• 5,650 nonpregnant teen females enrolled in the NELS:88 • *n*=4,211 white, 656 black, and 783 Hispanic teens • NELS:88 data were linked to Census data at the ZIP Code level.	• Community opportunity composite based on percentage of adults on public assistance, adults with a bachelor's degree, employed adults, residence in a nonpoor neighborhood, residence in a low-minority neighborhood, children born to never-married women, and 16- to 19-year-olds in school or employed. • High-opportunity community (teens in the top quartile) vs. low-opportunity community (all other teens) • Family SES: highest parental education, highest parental occupation, parents' employment status, and family income	First birth occurring at <20 years of age	SE factors as mediators or modifiers of non-SE effects: • For teens from high-opportunity communities, educational expectations did not predict teen birth. • For teens from low-SES families living in low-opportunity communities, high educational expectations were inversely associated with teen birth ($p<0.05$).	II-2
Gest et al. 1999[i]	Cohort study	Individual	To clarify risk for early parenthood conferred by configurations of individual characteristics	• 475 young people (including 248 females) assessed annually from seventh grade through end of high school and at ages 20 and 24 years • 30% minority (primarily African American)	• Cluster analysis identified four profiles based on participants' physical maturation and age; teacher ratings of academic competence, popularity, and aggression; and family SES. • For the measure of SES, participants' reports of parents' employment were coded according to a revised version of Duncan's Socioeconomic Index.[j]	Motherhood at <20 years of age	SE factors as determinants: • Participants with the profile characterized by more aggression, less popularity, lower achievement, lower age for grade, and lower SES were more likely to become teen mothers, as compared with those with the alternative characteristics (i.e., less aggression, greater popularity, higher achievement, higher age for grade, and higher SES) (20% vs. 6%, $p<0.05$). • Lower SES was predictive of teen motherhood even when participants had multiple assets (e.g., popularity). • Associations between profiles and teen motherhood did not differ by race/ethnicity.	II-2

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Figure (continued). Selected articles (*n*=14) addressing socioeconomic factors influencing first birth among U.S. teens published from January 1995 to November 2011 in peer-reviewed journals

Author and year	*Study design*	*Unit of analysis*	*Objective(s)*	*Data sources/ study population*[a]	*Socioeconomic measure(s)*	*Teen childbearing measure(s)*	*Findings*	*Level of evidence*[b]
Gold et al. 2001[k]	Cross-sectional	County	To examine whether income and income inequality are independently associated with teen birth rates at the county level	• 1990 Census data and 1991 National Center for Health Statistics birth data from 414 U.S. counties with populations >100,000 • Mean percentage of black teenage girls aged 15–19 years was 14.4%.	Primary measures: • Per capita income (PCI) • Income inequality index (measured with the 90:10 ratio—the ratio of cumulative income of the highest income decile to that of the lowest income decile) Alternate measures: • Median household income • Percentage at <200% FPL • Robin Hood index—percentage of aggregate income that must be redistributed to achieve equality • Gini coefficient	County-level birth rates among teens aged 15–17 and 18–19 years	SE factors as determinants: • For the age range 15–17 years, lower PCI and greater income inequality were associated with higher birth rates, regardless of the county's racial/ethnic composition ($p<0.01$ for all racial/ethnic compositions examined). • For the age range 18–19 years, low PCI was uniformly associated with high birth rates ($p<0.01$), and high income inequality was associated with high birth rates only in counties with the lowest proportions of black teens ($p<0.05$). • Similar results were observed when alternate measurements (e.g., median household income) were used.	II-3
Hogan et al. 2000[l]	Cross-sectional analysis of survey data (retrospective event history data used to construct fertility behaviors of 15- to 19-year-olds during three distinct time periods)	Individual	To characterize changes in reproductive and sexual behavior among females aged 15–19 years in the U.S. during 1985–1995 and examine associations with family-related factors	• 1995 National Survey of Family Growth • *n*=4,653 • NHB: 13.9%–15.6%; non-black Hispanic: 12.7%–12.8%; NHW: 71.6%–73.5%	Household SES: highest education level of the parent or parental surrogate	Relevant outcome variables included risk of becoming sexually active at age 12–19 years, hazard of pregnancy among those who were sexually active, and probability of a live birth resulting from first pregnancy (live birth vs. other).	SE factors as determinants: Parental education was inversely associated with initiating sexual intercourse (28% lower odds), becoming pregnant (21% lower odds), and giving birth (63% lower odds) (all $p<0.001$).	II-3

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Figure (continued). Selected articles (*n*=14) addressing socioeconomic factors influencing first birth among U.S. teens published from January 1995 to November 2011 in peer-reviewed journals

Author and year	*Study design*	*Unit of analysis*	*Objective(s)*	*Data sources/ study population*[a]	*Socioeconomic measure(s)*	*Teen childbearing measure(s)*	*Findings*	*Level of evidence*[b]
Kirby et al. 2001[m]	Cross-sectional	ZIP Code	To examine the effects of SE and other factors on birth rates among young teens	• California birth certificates and 1990 U.S. Census data for 1,192 California ZIP Codes with ≥200 females aged 15–17 years from 1991 to 1996 • Mean percentages of NHB, Hispanic, and NHW were 8.0%, 28.6%, and 53.2%, respectively.	Overall: • Median household income • Percentage of households receiving public assistance • Percentage of households with income >$150,000 • Percentage of households owned with >1 person per room • Percentage of households rented with >1 person per room Overall and by racial/ethnic group: • Percentage of population living below FPL • Percentage of adults aged ≥25 years with a college degree • Percentage of adults aged ≥25 years with a high school diploma • Percentages of females and males employed and unemployed • Percentage of females in armed forces	ZIP Code-level young teenage birth rate = mean of annual birth rates for 15- to 17-year-old females from 1991 to 1996 (overall and by racial/ ethnic group)	SE factors as determinants: • Percentage of the population living below FPL (+), percentage of adults with a college degree (−), and percentage of males employed (+) were predictive of teen birth rate. • Percentage of black population living below FPL (+), percentage of black adults with a college degree (−), and percentage of black females unemployed (+) were predictive of black teen birth rate. • Percentage of Hispanic population living below FPL (+), percentage of Hispanic adults with a college degree (−), and percentage of Hispanic males employed (+) were predictive of Hispanic teen birth rate. • Percentage of NHW population living below FPL (+), percentage of NHW adults with a college degree (−), percentage of NHW males employed (−), percentage of NHW males unemployed (+), and percentage of NHW females unemployed (+) were predictive of NHW teen birth rate. • All associations were significant at alpha = 0.05.	II-3

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Figure (continued). Selected articles (*n*=14) addressing socioeconomic factors influencing first birth among U.S. teens published from January 1995 to November 2011 in peer-reviewed journals

Author and year	*Study design*	*Unit of analysis*	*Objective(s)*	*Data sources/ study population*[a]	*Socioeconomic measure(s)*	*Teen childbearing measure(s)*	*Findings*	*Level of evidence*[b]
Manlove 1998[n]	Cohort study	Individual	To examine the effect of high school dropout on risk of school-age pregnancy leading to birth	• 8,223 teen females enrolled in NELS:88 • *n*=5,788 white, 834 black, and 1,021 Hispanic teens	• School dropout • Family SES: composite based on income, occupation, and education • Private vs. public school • Percentage of students receiving subsidized lunches at participants' school (indicator of school's resources)	First pregnancy occurring when teen was school-aged that resulted in birth	SE factors as determinants: • In proportional hazards models, school dropout was predictive of teen birth among white and Hispanic teens (hazard ratio [HR] = 1.5 and $p<0.05$ for both). School dropout was not associated with teen birth among black teens. • Among Hispanic teens, higher family SES was inversely associated with teen birth (HR=0.68, $p<0.05$). However, among black teens, higher family SES was positively associated with teen birth (HR=1.5, $p<0.05$). Nevertheless, among black teens, attending a private school was inversely associated with teen birth (HR=0.30, $p<0.05$).	II-2

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Figure (continued). Selected articles (*n*=14) addressing socioeconomic factors influencing first birth among U.S. teens published from January 1995 to November 2011 in peer-reviewed journals

Author and year	*Study design*	*Unit of analysis*	*Objective(s)*	*Data sources/ study population*[a]	*Socioeconomic measure(s)*	*Teen childbearing measure(s)*	*Findings*	*Level of evidence*[b]
Massey and Shibuya 1995[o]	Longitudinal survey	Individual	To analyze the SE effects of concentrated male joblessness on the odds of (*1*) employment and incarceration among men and (*2*) marriage and teen childbearing among women	• Data come from a special version of the Panel Study of Income Dynamics with appended census-tract data. • Analysis of teen childbearing included all African American females turning 15 years of age from 1969 to 1985 who provided information on teen childbearing (*n*=779 females).	The primary independent variable was percentage of adult men in the teen's census tract who were jobless. The following were among the control variables in the analysis: • Respondent is in school (or not) • Hours respondent worked during past year • Family receives welfare • Education level of household head • Family owns home • Family income when respondent was 10–14 years of age	First teenage birth (odds of this event at year *t*+1, given conditions at year *t*)	SE factors as determinants: • In logistic regression models adjusted for relevant individual- and family-level characteristics, childhood income-to-needs ratio was inversely associated with teen birth (beta = –0.65, $p<0.01$). • There was a marginally significant inverse association ($p=0.08$) between census tract percentage of jobless men and teen birth (beta = −0.01).	II-3

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Figure (continued). Selected articles (*n*=14) addressing socioeconomic factors influencing first birth among U.S. teens published from January 1995 to November 2011 in peer-reviewed journals

Author and year	*Study design*	*Unit of analysis*	*Objective(s)*	*Data sources/ study population*[a]	*Socioeconomic measure(s)*	*Teen childbearing measure(s)*	*Findings*	*Level of evidence*[b]
South 2000[p]	Longitudinal survey	Individual	To evaluate whether racial/ ethnic differences in premarital teen childbearing rates are due to neighborhood-level SE factors and to assess mediators of the effect of neighborhood disadvantage on premarital teen birth	• Data come from the three waves of the National Survey of Children (NSC) and the 1980 Census. • *n*=112 black children and 450 white children	Neighborhood disadvantage and neighborhood affluence scales were created based on neighborhood-level indicators of SES in 1980 Census data and scaled as z scores. Family-level SES control variables (from NSC data): • Family income • Parents' education • Home ownership	Timing of first premarital birth <20 years of age	SE factors as determinants: • Black women in this study resided in neighborhoods with higher levels of disadvantage (z score of 6.3) and lower levels of affluence (z score of –1.5) vs. white women (z scores of –1.4 and 0.1, respectively). • Neighborhood disadvantage (+) and neighborhood affluence (−) were predictive ($p<0.05$) of teenage premarital birth in models adjusted for race/ ethnicity and variables reflecting family-level SES.	II-3

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Figure (continued). Selected articles (*n*=14) addressing socioeconomic factors influencing first birth among U.S. teens published from January 1995 to November 2011 in peer-reviewed journals

Author and year	*Study design*	*Unit of analysis*	*Objective(s)*	*Data sources/ study population*[a]	*Socioeconomic measure(s)*	*Teen childbearing measure(s)*	*Findings*	*Level of evidence*[b]
Sucoff and Upchurch 1998[q]	Longitudinal survey	Individual	To compare neighborhood racial composition and poverty as influences on teen childbearing among metropolitan black females	• Data come from a special version of the Panel Study of Income Dynamics with appended census-tract data. • *n*=940 black metropolitan females	Neighborhood type was based on percentage of people living below FPL, mean income, and percentage of black residents. Family-level characteristics: • Mother finished high school • Household head works full-time • Mother works full-time • Upper quartile of income-to-needs ratio (ratio of income to food needs)	Time to premarital first birth at <20 years of age	SE factors as determinants: • Teens living in the poorest, most segregated, predominantly black neighborhoods had the highest rates of premarital first births (risk ratio [RR] = 1.7, $p<0.01$), as compared with the reference group of teens living in racially mixed working-class neighborhoods. • Living in a segregated working-class black neighborhood was associated with a higher teen birth rate than living in a racially mixed working-class neighborhood (RR=1.4, $p<0.05$). • After adjusting for SE and other family-level characteristics, both types of segregated black neighborhoods (poor and working class) had similarly elevated rates of premarital birth among black teens, compared with racially mixed working-class neighborhoods (RR=1.5 and $p<0.05$ for both comparisons).	II-3
Wei 2005[r]	Cross-sectional	Neighbor-hood	To validate a measure of neighborhood disorder and compare it with Census-based neighborhood poverty as a predictor of various outcomes, including teen births	• Pittsburgh, Pennsylvania, neighborhoods, 1998–2000 • Block observation logs for 82 neighborhoods (of 89 sampled) consisting of 6,107 street blocks • 2000 U.S. Census data • Birth certificates during 1999–2000	From block observation: • Neighborhood physical disorder index = sum of five items based on the presence (1) or absence (0) of graffiti, beer or alcohol containers, cigarette butts, litter or glass, and abandoned vehicles From Census: • Percentage of families living below FPL	Neighborhood-level teen birth rate (among 13- to 19-year-olds) per 1,000 population—numerator was based on birth certificates; denominator was based on Census data.	SE factors as determinants: In a regression model adjusted for poverty and neighborhood racial/ethnic composition, neighborhood physical disorder was significantly associated with higher teen birth rates.	II-3

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Figure (continued). Selected articles (*n*=14) addressing socioeconomic factors influencing first birth among U.S. teens published from January 1995 to November 2011 in peer-reviewed journals

[a]In summarizing articles, we followed authors' conventions in describing race/ethnicity; i.e., we did not want to assume that the use of white in one article was equivalent to NHW in another.

[b]The U.S. Preventive Services Task Force rankings applicable to these studies included II–2 and II–3. We applied these rankings as follows: II–2 for well-designed cohort or case-control studies and II–3 for evidence comparable with that of multiple time series or dramatic results in uncontrolled experiments.

[c]Bickel R, Weaver S, Williams T, Lange L. Opportunity, community, and teen pregnancy in an Appalachian state. J Educ Res 1997;90:175-81.

[d]Blake BJ, Bentov L. Geographical mapping of unmarried teen births and selected sociodemographic variables. Public Health Nurs 2001;18:33-9.

[e]Campa MI, Eckenrode JJ. Pathways to intergenerational adolescent childbearing in a high-risk sample. J Marriage Family 2006;68:558-72.

[f]Adams J, Weakliem DL. August B. Hollingshead's "four-factor index of social status": from unpublished paper to citation classic. Yale J Sociol 2011;8:11-20.

[g]Dehlendorf C, Marchi K, Vittinghoff E, Braveman P. Sociocultural determinants of teenage childbearing among Latinas in California. Matern Child Health J 2010;14:194-201.

[h]Driscoll AK, Sugland BW, Manlove J, Papillo AR. Community opportunity, perceptions of opportunity, and the odds of an adolescent birth. Youth Soc 2005;37:33-61.

[i]Gest SD, Mahoney JL, Cairns RB. A developmental approach to prevention research: configural antecedents of early parenthood. Am J Community Psychol 1999;27:543-65.

[j]Stevens G, Cho JH. Socioeconomic indexes and the new 1980 census occupational classification scheme. Soc Sci Res 1985;14:142-68.

[k]Gold R, Kawachi I, Kennedy BP, Lynch JW, Connell FA. Ecological analysis of teen birth rates: association with community income and income inequality. Matern Child Health J 2001;5:161-7.

[l]Hogan DP, Sun R, Cornwell GT. Sexual and fertility behaviors of American females aged 15–19 years: 1985, 1990, and 1995. Am J Public Health 2000;90:1421-5.

[m]Kirby D, Coyle K, Gould JB. Manifestations of poverty and birthrates among young teenagers in California zip code areas. Fam Plann Perspect 2001;33:63-9.

[n]Manlove J. The influence of high school dropout and school disengagement on the risk of school-age pregnancy. J Res Adolesc 1998;8:187-220.

[o]Massey DS, Shibuya K. Unraveling the tangle of pathology: the effect of spatially concentrated joblessness on the well-being of African Americans. Soc Sci Res 1995;24:352-66.

[p]South SJ, Baumer EP. Deciphering community and race effects on adolescent premarital childbearing. Social Forces 2000;78:1379-407.

[q]Sucoff CA, Upchurch DM. Neighborhood context and the risk of childbearing among metropolitan-area black adolescents. Am Soc Rev 1998;63:571-85.

[r]Wei E, Hipwell A, Pardini D, Beyers JM, Loeber R. Block observations of neighbourhood physical disorder are associated with neighbourhood crime, firearm injuries and deaths, and teen births. J Epidemiol Community Health 2005;59:904-8.

NHW = non-Hispanic white

SE = socioeconomic

SES = socioeconomic status

NELS:88 = National Education Longitudinal Study of 1988

FPL = federal poverty level

NHB = non-Hispanic black

predictive of teen motherhood even among participants with personal assets that were protective against teen birth, such as popularity.

In a cross-sectional analysis of data from the National Survey of Family Growth, Hogan et al. used retrospective event history data from 4,653 women to construct fertility behaviors of teen women, finding that parental education was inversely associated with initiating sexual intercourse, becoming pregnant, and giving birth.[26]

Analyses of community-level socioeconomic influences. Of the eight studies that focused on community-level influences, five included only community-level measures of socioeconomic influences on teen pregnancy;[22,24,27,29,30] the remaining three included both community- and family-level measures.[12–14]

In a cross-sectional analysis of Census data and National Center for Health Statistics birth data from 414 populous U.S. counties, Gold and colleagues sought to determine whether county-level per capita income (PCI) and income inequality were associated with teen birth rates, independently of counties' racial/ethnic composition. They found that, for birth rates among teens aged 15–17 years, lower PCI and greater income inequality were associated with higher rates regardless of the county's racial/ethnic composition. For birth rates among teens aged 18–19 years, lower PCI was uniformly associated with higher rates, and higher income inequality was associated with higher birth rates only in counties with the lowest proportions of black teens.[29]

Bickel et al. conducted a cross-sectional analysis to explore contextual factors as determinants of county-level teen birth rates in 55 Appalachian counties in West Virginia. They constructed a composite measure of whether counties were traditional or "modern" (i.e., departing from traditional Appalachian community characteristics) that included seven county-level factors, such as percentage urban and percentage of high school graduates who began college, with higher values indicating more modern settings. County-level average wage was inversely associated, and unemployment rate was positively associated, with county-level teen birth rates. Modern communities had higher teen birth rates.[22]

Kirby and colleagues conducted a cross-sectional analysis of birth certificate and Census data for 1,192 California ZIP Codes, using a variety of ZIP Code-level measures to examine the effects of socioeconomic and other factors on birth rates among teens aged 15–17 years. They found that higher percentages of the population living below the federal poverty level, lower percentages of adults with a college degree, and higher percentages of employed males were positively associated with higher teen birth rates at the ZIP Code level. Associations with teen birth rates varied somewhat by racial/ethnic group. For example, whereas higher percentages of employed Hispanic males were positively associated with Hispanic teen birth rates, lower percentages of NHW employed males were associated with higher NHW teen birth rates.[27]

In an unadjusted cross-sectional analysis of birth certificate and Census data from 81 Dallas County, Texas, ZIP Codes, Blake and Bentov found that, at the ZIP Code level, low median income, high percentage of households receiving public assistance, high percentage of people aged ≥25 years with <9 years of education, and high percentage of people aged ≥25 years with 9–12 years of education who did not graduate from high school were each associated with elevated birth rates among unmarried teens.[24]

Wei et al. conducted a cross-sectional analysis of the association of neighborhood physical disorder (an indicator of community resources) and teen birth rates in 82 Pittsburgh, Pennsylvania, neighborhoods. Neighborhood physical disorder was assessed at the street-block level (n=6,107 blocks) using a standardized data collection tool that relied on systematic observation of the presence of graffiti, beer or alcohol containers, cigarette butts, litter or glass, and abandoned vehicles. In a multivariable model adjusted for neighborhood racial/ethnic composition and poverty, physical disorder was associated with higher teen birth rates.[30]

In a study of community-level influences that included family-level measures, Sucoff and Upchurch used data from a special version of the Panel Study of Income Dynamics (PSID) that appended census-tract data to individual records to compare neighborhood racial composition and poverty as influences on timing of childbearing among black teens living in metropolitan areas. Their analysis, which was limited to 940 black females, found that (*1*) teens living in the poorest, most segregated, predominantly black neighborhoods and (*2*) teens living in segregated, predominantly black working-class neighborhoods experienced shorter times to teen birth, as compared with the reference group of teens living in racially mixed working-class neighborhoods. The analysis was adjusted for several family-level characteristics known to be associated with teen childbearing and provided evidence that, for metropolitan black teens, segregation may exert a stronger influence on timing of teen birth than poverty.[12]

Massey and Shibuya used PSID data with appended Census data to analyze the socioeconomic effects of concentrated male joblessness on the odds of teen childbearing and marriage among 779 African Ameri-

can women. After adjusting for relevant individual- and family-level variables, they found that growing up in a family with a low income-to-needs-ratio was associated with higher odds of teen birth. There was also a marginally significant (p=0.08) inverse association between census-tract percentage of jobless men and odds of teen birth. The authors interpreted this finding as evidence that concentrated male joblessness does not contribute to high birth rates among African American teens. Other findings led them to conclude that male joblessness does, however, lead to higher birth rates among unmarried women.[13]

South and Baumer analyzed data from the National Survey of Children, a three-wave nationally representative longitudinal survey that oversampled black children, to evaluate whether racial differences in rates of premarital teen childbearing are due to neighborhood-level socioeconomic factors. They found that, among 112 black children and 450 white children who were followed to adulthood, black women resided in neighborhoods with qualitatively higher levels of disadvantage and lower levels of affluence (two distinct scales based on Census data). Both scales were predictive of shorter time to teenage premarital birth in models adjusted for race/ethnicity and family-level SES. Much of the influence of neighborhood-level socioeconomic factors appeared to be mediated by teen attitudes toward childbearing and by peer influences.[14]

Analyses of socioeconomic influences operating at multiple levels. Manlove evaluated school dropout (an individual-level socioeconomic measure), school resources (a school-level measure based on percentage of students receiving subsidized lunches), and SES (a family-level measure based on income, occupation, and education) as predictors of teen birth. Using data from 8,223 teen women enrolled in the National Education Longitudinal Study of 1988 (NELS:88), a nationally representative cohort study of students who were in eighth grade in 1988, the author found that, among white and Hispanic teens (but not black teens), school dropout was predictive of teen birth. Among Hispanic teens, higher family SES was inversely associated with teen birth. Among black teens, higher family SES was positively associated with teen birth; however, attendance at a private school, which could reflect higher family SES as well as school-level influences, was inversely associated with teen birth. Among white teens, but not black or Hispanic teens, attending a more highly resourced school (whether it was public or private) was inversely associated with teen birth.[28]

Socioeconomic factors as moderators or mediators of other effects on teen childbearing

Two studies looked at socioeconomic factors not as determinants of teen childbearing, but rather as influences that could mediate or moderate the effect of other important variables.[25,31]

Intergenerational effect of teen motherhood. Being the daughter of a mother who gave birth as a teen is generally considered to be a risk factor for teen birth.[16] Campa and Eckenrode analyzed data from a 19-year cohort study of Generation 2 (G2) infants (including 152 females) delivered by Generation 1 (G1) pregnant women. They found that, for daughters of unmarried G1 adolescent mothers, the intergenerational effect of having an adolescent mother on teen childbearing was neither explained by the G1 mother's family-level prebirth SES (measured with an adapted version of the Hollingshead Index[34]) nor by the G1 mother's education level during pregnancy. Rather, it appeared to be mediated by the G2 daughter's early sexual debut, which was, in turn, associated with characteristics of the home environment (e.g., lack of a father figure residing in the home).[31]

Teens' educational expectations. In a study that included both family- and community-level measures of socioeconomic influences, Driscoll et al. used data from 5,650 female NELS:88 participants in combination with linked Census data to create a measure of community opportunity (a composite based on percentages of adults on public assistance, adults employed, adults possessing a college degree, and other factors). For teens from advantaged, high-opportunity communities, having high educational expectations was not associated with teen birth. However, for those with low family-level SES who resided in low-opportunity communities, high educational expectations were protective against teen birth.[25]

Summary

All 12 studies that considered socioeconomic factors as influences on teen childbearing (rather than as moderators or mediators of other effects) reported at least one statistically significant association relating low SES, underemployment, low income, low education levels, neighborhood disadvantage, neighborhood physical disorder, or neighborhood-level income inequality to teen birth. Few reported associations contradicted this pattern. One exception—the finding of Kirby et al. that higher employment rates were associated with higher teen birth rates[27]—has been noted previously in the literature. Higher employment rates can serve

as proxies for reduced parental monitoring, a factor that may contribute to teen birth rates.[16] Additionally, none of the findings of Manlove were uniform across racial/ethnic groups,[28] and the author found that, among black teens, higher family SES was positively associated with teen birth. Massey and Shibuya found that higher census-tract percentages of jobless men were associated with lower odds of teen birth, but only after adjusting for several important individual- and family-level socioeconomic influences.[13] Finally, one of the two studies that considered socioeconomic factors as moderators or mediators of other effects found family- and community-level socioeconomic factors to be important moderators of the protective effect of teens' educational expectations.[25]

DISCUSSION

The findings of this review suggest that unfavorable socioeconomic conditions experienced at the community and family levels affect teens' sexual health behaviors and, in turn, contribute to the high number of teen births in the U.S. One theory is that, unlike their more advantaged counterparts, disadvantaged young women may not perceive early childbearing as an obstacle to a bright future; indeed, they may perceive it as one of few viable paths to adulthood.[35,36] It is worth noting that the findings of some studies have challenged this theory, including one study in our review.[14] While our review focuses specifically on socioeconomic conditions, a focus on sexual health acknowledges the complex interconnections among developmental, relational, and community influences,[37,38] and it is clear that socioeconomic factors represent but one set of influences on teen birth rates. Nevertheless, they may be particularly powerful, as compared with other influences.[39]

Despite growing consensus that individual-, peer-, family-, community-, school-, and policy-level factors jointly influence health outcomes,[16,40] only five of the 14 studies in our review measured socioeconomic factors at multiple levels. We recommend that future research into social determinants of sexual health include multiple levels of measurement whenever possible.[40] For example, community-level variables can be incorporated by linking individual-level datasets with U.S. Census data, as was done in four studies in our review.[12–14,25]

Studies in this review tended to include African American, NHW, and/or Latina teens, and a few focused on a specific racial/ethnic group. As noted previously, a large body of work has been conducted to test the hypotheses of Wilson[10,11] regarding early childbearing among the urban poor, many of whom are African American. The study by Sucoff and Upchurch,[12] which examined the role of racial segregation on the risk of childbearing among urban African American teens, is an outstanding example of such an analysis, as are the studies by South and Baumer[14] and Massey and Shibuya.[13] Similar efforts need to be undertaken to examine the root causes of teen childbearing in other contexts (e.g., in rural and suburban areas) and for other racial/ethnic groups. For example, Wingo et al. recently commented on the dearth of knowledge regarding determinants of higher teen birth rates among American Indian/Alaska Natives,[41] and Dehlendorf et al. noted that it is not yet understood why teen birth rates are declining relatively slowly among Latinas.[23]

Limitations

This review was subject to several limitations. For one, it excluded qualitative studies. Qualitative research can yield valuable insights on how socioeconomic disadvantage contributes to teen sexual health. Additionally, although we focused on determinants of becoming a teen mother, there is much to be learned from the literature on determinants of (*1*) teen pregnancy (regardless of whether a teen birth occurred) and (*2*) repeat pregnancy and birth among teen mothers. The latter topic is salient given recent statistics on repeat teen births: of the 370,000 teen births in 2010, 20.6% were second or subsequent births for the teen mother.[1] A review focused on social determinants of repeat pregnancy and birth would make a valuable contribution to the literature.

CONCLUSIONS

Interventions that address socioeconomic influences at multiple levels (e.g., individual, family, and community) could positively affect large numbers of teens and contribute to the elimination of disparities in teen childbearing. Growing research on structural and multilevel interventions for human immunodeficiency virus prevention, while inconclusive, shows promise and should provide important lessons for researchers studying teen pregnancy and birth.[42] The field of public health cannot take on this challenge single-handedly. Effective collaborations with other sectors (e.g., education and housing) are vital to ensure that the underlying social determinants of sexual health are addressed. Collaborative efforts, including those based on positive youth development approaches, which seek to provide young people with opportunities and positive experiences,[43] can build capacity in communities to evaluate

and address the root causes of high teen birth rates. Finally, access to evidence-based sex education and family planning services (including contraception) should be considered in the development of interventions to address socioeconomic influences regarding teen childbearing.[44] Broadened access to family planning through Medicaid family planning waivers and other federal or state subsidies has benefited teens (and older women) and reduced unintended pregnancy and birth rates,[45–47] and shows how increasing access to services can have a positive effect on teen birth rates.

The findings and conclusions in this article are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention

REFERENCES

1. Hamilton BE, Martin JA, Ventura SJ. Births: preliminary data for 2010. Natl Vital Stat Rep 2011 Nov 17;60:1-25.
2. Kearney MS. Teen pregnancy prevention. In: Levine PB, Zimmerman DJ, editors. Targeting investments in children: fighting poverty when resources are limited. Chicago: University of Chicago Press; 2010. p. 221-47.
3. Korenman S, Fales S. The socioeconomic effects of teenage childbearing: a review of the recent literature. Report to the Bureau of Maternal, Infant, and Reproductive Health, New York City Department of Health and Mental Hygiene. New York: Baruch College, City University of New York, School of Public Affairs; 2011.
4. Mathews TJ, MacDorman MF. Infant mortality statistics from the 2006 period linked birth/infant death data set. Natl Vital Stat Rep 2010 Apr 30;58:1-32.
5. Martin JA, Hamilton BE, Sutton PD, Ventura SJ, Mathews TJ, Osterman MJK. Births: final data for 2008. Natl Vital Stat Rep 2010 Dec 8;59:1-72.
6. World Health Organization. Health topics: sexual health [cited 2012 Nov 18]. Available from: URL: http://www.who.int/topics/sexual_health/en
7. Mathews TJ, Sutton PD, Hamilton BE, Ventura SJ. State disparities in teenage birth rates in the United States. NCHS Data Brief No. 46. Hyattsville (MD): National Center for Health Statistics (US); 2010.
8. Ventura SJ, Mathews TJ, Hamilton BE, Sutton PD, Abma JC. CDC health disparities and inequalities report—United States, 2011: adolescent pregnancy and childbirth—United States, 1991–2008. MMWR Morb Mortal Wkly Rep 2011;60(Suppl):105-8.
9. Centers for Disease Control and Prevention (US). Establishing a holistic framework to reduce inequities in HIV, viral hepatitis, STDs, and tuberculosis in the United States: an NCHHSTP white paper on social determinants of health, 2010. Atlanta: CDC, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention (US); 2010.
10. Wilson WJ. When work disappears: the world of the new urban poor. New York: Knopf; 1996.
11. Wilson WJ. The truly disadvantaged: the inner city, the underclass, and public policy. Chicago: University of Chicago Press; 1987.
12. Sucoff CA, Upchurch DM. Neighborhood context and the risk of childbearing among metropolitan-area black adolescents. Am Soc Rev 1998;63:571-85.
13. Massey DS, Shibuya K. Unraveling the tangle of pathology: the effect of spatially concentrated joblessness on the well-being of African Americans. Soc Sci Res 1995;24:352-66.
14. South SJ, Baumer EP. Deciphering community and race effects on adolescent premarital childbearing. Social Forces 2000;78:1379-407.
15. South SJ, Crowder KD. Neighborhood effects on family formation: concentrated poverty and beyond. Am Soc Rev 1999;64:113-32.
16. Moore KA, Miller BC, Glei D, Morrison DR. Adolescent sex, contraception, and childbearing: a review of recent research. Washington: Child Trends, Inc.; 1995.
17. Leventhal T, Brooks-Gunn J. The neighborhoods they live in: the effects of neighborhood residence on child and adolescent outcomes. Psychol Bull 2000;126:309-37.
18. Harris RP, Helfand M, Woolf SH, Lohr KN, Mulrow CD, Teutsch SM, et al. Current methods of the US Preventive Services Task Force: a review of the process. Am J Prev Med 2001;20(3 Suppl):21-35.
19. MANILA Consulting Group, Inc. Family planning methodology—outreach. Report prepared for the Division of Reproductive Health, Centers for Disease Control and Prevention (US). McLean (VA): MANILA Consulting Group, Inc.; 2011.
20. Dormire SL, Yarandi H. Predictors of risk for adolescent childbearing. Appl Nurs Res 2001;14:81-6.
21. Liao HH, Wang H, Laymon P. Predicting teen live birth rates using selected census-derived indicators, Lancaster County, South Carolina, 1990. J Public Health Manag Pract 1999;5:21-2.
22. Bickel R, Weaver S, Williams T, Lange L. Opportunity, community, and teen pregnancy in an Appalachian state. J Educ Res 1997;90:175-81.
23. Dehlendorf C, Marchi K, Vittinghoff E, Braveman P. Sociocultural determinants of teenage childbearing among Latinas in California. Matern Child Health J 2010;14:194-201.
24. Blake BJ, Bentov L. Geographical mapping of unmarried teen births and selected sociodemographic variables. Public Health Nurs 2001;18:33-9.
25. Driscoll AK, Sugland BW, Manlove J, Papillo AR. Community opportunity, perceptions of opportunity, and the odds of an adolescent birth. Youth Soc 2005;37:33-61.
26. Hogan DP, Sun R, Cornwell GT. Sexual and fertility behaviors of American females aged 15–19 years: 1985, 1990, and 1995. Am J Public Health 2000;90:1421-5.
27. Kirby D, Coyle K, Gould JB. Manifestations of poverty and birthrates among young teenagers in California zip code areas. Fam Plann Perspect 2001;33:63-9.
28. Manlove J. The influence of high school dropout and school disengagement on the risk of school-age pregnancy. J Res Adolesc 1998;8:187-220.
29. Gold R, Kawachi I, Kennedy BP, Lynch JW, Connell FA. Ecological analysis of teen birth rates: association with community income and income inequality. Matern Child Health J 2001;5:161-7.
30. Wei E, Hipwell A, Pardini D, Beyers JM, Loeber R. Block observations of neighbourhood physical disorder are associated with neighbourhood crime, firearm injuries and deaths, and teen births. J Epidemiol Community Health 2005;59:904-8.
31. Campa MI, Eckenrode JJ. Pathways to intergenerational adolescent childbearing in a high-risk sample. J Marriage Family 2006;68:558-72.
32. Gest SD, Mahoney JL, Cairns RB. A developmental approach to prevention research: configural antecedents of early parenthood. Am J Community Psychol 1999;27:543-65.
33. Stevens G, Cho JH. Socioeconomic indexes and the new 1980 census occupational classification scheme. Soc Sci Res 1985;14:142-68.
34. Adams J, Weakliem DL, August B. Hollingshead's "four-factor index of social status": from unpublished paper to citation classic. Yale J Sociol 2011;8:11-20.
35. Burton LM. Teenage childbearing as an alternative life-course strategy in multigeneration black families. Human Nature 1990;1:123-43.
36. Furstenberg FF Jr. As the pendulum swings—teenage childbearing and social concern. Family Relations 1991;40:127-38.
37. Douglas JM Jr. Advancing a public health approach to improve sexual health in the United States: a framework for national efforts. Paper presented at the International Perspectives on Sexual Health National HIV Prevention Conference; 2011 Aug 16; Atlanta.
38. Centers for Disease Control and Prevention (US). A public health approach for advancing sexual health in the United States: rationale and options for implementation. Meeting report of an external consultation. Atlanta: CDC; 2010.
39. Frieden TR. A framework for public health action: the health impact pyramid. Am J Public Health 2010;100:590-5.
40. Braveman PA, Cubbin C, Egerter S, Chideya S, Marchi KS, Metzler M, et al. Socioeconomic status in health research: one size does not fit all. JAMA 2005;294:2879-88.
41. Wingo PA, Lesesne CA, Smith RA, de Ravello L, Espey DK, Arambula Solomon TG, et al. Geographic variation in trends and characteristics of teen childbearing among American Indians and Alaska natives, 1990–2007. Matern Child Health J 2011;16:1779-90.

42. Adimora AA, Auerbach JD. Structural interventions for HIV prevention in the United States. J Acquir Immune Defic Syndr 2010;55 Suppl 2:S132-5.
43. Gavin LE, Catalano RF, David-Ferdon C, Gloppen KM, Markham CM. A review of positive youth development programs that promote adolescent sexual and reproductive health. J Adolesc Health 2010;46(3 Suppl):S75-91.
44. Sexual experience and contraceptive use among female teens—United States, 1995, 2002, and 2006–2010. MMWR Morb Mortal Wkly Rep 2012;61(17):297-301.
45. Foster DG, Biggs MA, Rostovtseva D, de Bocanegra HT, Darney PD, Brindis CD. Estimating the fertility effect of expansions of publicly funded family planning services in California. Womens Health Issues 2011;21:418-24.
46. Kearney MS, Levine PB. Subsidized contraception, fertility, and sexual behavior. Rev Econ Stat 2009;91:137.
47. Lindrooth RC, McCullough JS. The effect of Medicaid family planning expansions on unplanned births. Womens Health Issues 2007;17:66-74.