Article

A housing mobility program's impacts on teen and young adult parenting

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A B S T R A C T

Objective: To assess the impact of Moving to Opportunity for Fair Housing Demonstration Program (MTO) implemented in 1994 in five U.S. cities (Baltimore, Boston, Chicago, Los Angeles, and New York City) on teen births.
Methods: We analyzed baseline and long-term evaluation data for youth (ages 13–20) and young adults (ages 21–30) (N = 7861) who were children or teens at baseline. We used regression analyses to estimate the impact of housing vouchers on having a teen birth.
Results: Overall, MTO had no significant effect on teen births. However, among young adults whose parent had a child before age 20, the proportion with a teen birth themselves was 21% lower among those offered housing vouchers to low-poverty neighborhoods with no restrictions compared to those not offered housing vouchers (p < 0.05).
Conclusion: MTO appeared to decrease intergenerational teen births among young adults. Further exploration of housing relocation may help untangle risks and protective factors for reducing intergenerational teen births.
Public health implications: Reducing intergenerational teen births is important, especially among those facing economic, environmental, and health risks. Comprehensive programs addressing multiple social determinants of health are vital to reducing teen births.

Introduction

Conditions in the places where people live, learn, work, and play (i.e., social determinants of health) can influence health status and access to programs and services designed to enhance health outcomes. (U.S. Department of Health and Human Services, n.d.) Neighborhood context and educational/employment opportunities can influence adolescents who are still physically and mentally developing, as well as their health decision-making and behaviors (Martens et al., 2014; Swisher & Warner, 2013). Adolescent sexual and reproductive health outcomes can also be shaped by neighborhood context. Higher rates of teen pregnancy and birth are associated with poverty/low socio-economic status and neighborhood violence (Harding, 2009; Penman-Aguilar, Carter, Snead, & Kourtis, 2013; Romero et al., 2016). Despite declines in teen birth rates over the last 26 years (from 61.8 per 1000 females aged 15–19 years in 1991 to 18.8 per 1000 in 2017), racial/ethnic, socioeconomic, and geographic disparities persist (Gold, Kawachi, Kennedy, Lynch, & Connell, 2001; Martin, Hamilton, Osterman, Driscoll, & Drake, 2018). Birth rates among Hispanic and African American teens are twice as high as rates among white teens (28.9 and 27.5 vs. 13.2 births per 1000 females, respectively) (Martin et al., 2018). Studies found teens whose mothers (Meade, Kershaw, & Ickovics, 2008) or sisters (Wall-Wieler, Roos, & Nickel, 2016) were teen parents were more likely to be early parents themselves. This cycle of intergenerational teen childbearing is more prevalent among those living in poverty, compounding the risk for adverse outcomes for teens and their families (Wall-Wieler et al., 2016).

This study examines the Moving to Opportunity for Fair Housing Demonstration Program (MTO) (Sanbonmatsu et al., 2011) to assess its impact on births among young adults (known as Grown Children in the long-term study) (Sanbonmatsu et al., 2011) (ages 21–30) and youth (ages 13–20) who were children or teens at baseline. MTO is a housing mobility experiment that examines the effects of neighborhood context on economic, educational, and health outcomes among low-income renter families. Some families in MTO were randomly selected to receive housing vouchers to move from high-poverty to lower-poverty

areas. Overall, MTO findings were mixed for adults and children for health, employment, and education outcomes (Ludwig et al., 2012, 2013). Ludwig et al. (2012) found moving from higher to lower-poverty neighborhoods improved adult mental and physical health, but did not improve economic self-sufficiency (Ludwig et al., 2012). In addition, Ludwig et al. (2013) had mixed findings on mental and physical health for adults, with no effects on youth physical health and education (Ludwig et al., 2013). Chetty, Hendren, and Katz (2016) explored the long-term impacts of MTO on children who were younger (< 13 years of age) at the time of relocation and found moving to lower-poverty neighborhoods increased income and college attendance, and reduced rates of single parenthood; nonetheless, MTO had no effect on teen birth rates (Chetty et al., 2016).

This research addresses an important gap in the literature by examining the effect of MTO on births among young adults (ages 21–30) who were ages 7–17 years at the time of baseline survey and youth (ages 13–20) who were < 1–11 years at baseline survey. Examining these two age categories is significant for a range of reasons, including time of relocation, source of information, and differing outcome language used for the two categories, all are which are discussed below.

Materials and methods

MTO

The details of MTO have been described previously (Feins, Holin, & Phipps, 1996). In 1994, the U.S. Department of Housing and Urban Development implemented MTO to determine the effects of changing housing and neighborhood conditions on families residing in public housing. Overall, 4604 families were enrolled from five cities (Baltimore, Boston, Chicago, Los Angeles, and New York City) and followed over a 10- to 15-year period. Most families were African American or Hispanic and headed by single mothers receiving Aid to Families with Dependent Children/Temporary Assistance for Needy Families. Families were randomly assigned to one of three conditions: (1) experimental group families received Section 8 vouchers that could only be used to relocate to low-poverty neighborhoods (i.e., areas with less than 10 percent of the population below the poverty line in 1990), from which they could relocate after one year without any restrictions; they received housing mobility counseling; (2) Section 8 group families received vouchers with no restrictions related to relocation neighborhood or when they could subsequently relocate; they did not receive housing mobility counseling; or (3) control group families lived in public housing and did not receive relocation vouchers but remained eligible for any other public assistance to which they were otherwise entitled (Sanbonmatsu et al., 2011). MTO examined a range of outcomes, including mental and physical health; economic self-sufficiency; risky behavior; educational achievement; and mobility, neighborhoods, and social networks.

From 1994 to 1998, families were randomized and an adult head of household was invited to complete the baseline assessment. A long-term evaluation of MTO was completed from 2008 to 2010, with eligibility for the survey interview determined as of December 2007. The sampling frame for the long-term evaluation included a sample adult, and up to 3 youth ages 10–20 years from each household. The sample adult for the long-term survey was often, but not always, the same as the head of household who reported the baseline characteristics.

Outcomes

We examined long-term evaluation data for youth and young adults to assess the effect of MTO on births during the teen years. Budgetary restrictions did not allow for survey interviews to be conducted with a subset of MTO participants known as "young adults," who were ages 7–17 years at the time of the baseline survey and ages 21–30 years at the time of the long-term evaluation. Because the young adults in this analysis were not part of the target survey sampling frame for the long-term evaluation, their outcome data are based on the survey data collected from their household's sample adult. The youth sample was < 1–11 years at baseline survey and 13–20 years at the time of their long-term evaluation (we exclude the youngest youth, ages 10–12 years, because they were unlikely to have initiated sexual activity due to their age), with outcome data collected via self-report. The adult and youth long-term survey samples yielded response rates of approximately 90% across all study groups. The two age categories (young adults and youth at follow-up) allow us to capture those at risk of pregnancy who participated in MTO as a child or teen. This is significant as the two age groups relocated during different time periods of development, which may have played a role in subsequent decision-making. For example, youth who relocated earlier in childhood may have experienced greater benefits given their stage of brain development relative to youth who relocated later, when the social and environmental context might have played a larger role in behaviors, including engaging in risky sexual behaviors and teen/young adult birth or parenting. This study builds upon the work of Chetty et al. (2016), who assessed fertility rates using tax data, and also provides important new information on the relationship between MTO and teen births. However, it is important to note that the overlap in age categories potentially limits examination of the full risk period for youth as discussed above.

Furthermore, the source of birth information varies for the different age categories, with self-reports for the youth sample and proxy report by their household's sample adult for the young adult sample. The proxy report for the young adult having at least one biological child relies on the household sample adult knowing that the young adult had or fathered a child, while a self-reporting male youth would also have to know that he fathered a child. Lastly, it is important to note that the survey questions used technically different language (ever given birth to/fathered a child for the youth vs. has at least one biological child for the young adult), which could potentially lead to differing interpretations. The age categorization used in this paperis consistent and coherent with the general MTO evaluation design and resulting analyses and publications (Ludwig et al., 2013; Sanbonmatsu et al., 2011).

Analyses included fertility measures among young adults (i.e., biological child born since random assignment; had first child before age 20; parent under age 20 at birth of first child). For youth, we examined if they had ever given birth to or fathered a child, and whether their mother or father was younger than age 20 at birth of first child. All outcomes were analyzed by sex.

Statistical analysis

Sample characteristics. To verify the assignment of the youth and young adult samples into treatment and control groups was indeed random, we pe rformed two-tailed *t*-tests comparing the experimental, Section 8, or combined experimental/Section 8 group with control group means in a model where the baseline characteristic was regressed against the treatment group indicator (weighted and clustered by family).

Intention-to-treat (ITT) effects:. The random assignment of families to different treatment conditions allows us to identify the causal effects of being offered an MTO housing voucher by comparing the average outcomes of young adults and youth assigned to each treatment group (experimental or Section 8) with those assigned to the control group, also known as the ITT effect. The ITT estimates measure the effect of the offer of services through MTO for the entire treatment group, including families who used the voucher and those who did not. These estimates are calculated as the difference in average outcomes for treatment vs. control families by regressing an outcome against indicators for treatment group assignment and (pre-random assignment) baseline covariates that include (but are not limited to) indicators for MTO demonstration site and participant socio-demographic characteristics (i.e., age, race/ethnicity) to improve precision of estimates (see Supplemental Table A for full list). To examine whether treatment

effects vary by subgroup (sex and whether the youth's or young adult's parent had a child as a teen), we modified our regression models to include interactions between the treatment indicators and the dichotomous subgroup categories.

We applied sampling weights to adjust for changes over time in the probability of treatment assignment due to higher-than-expected compliance rates and survey sampling differences affecting the selection of Section 8 group adults and youth from large families. We also clustered the data to adjust the standard errors for the presence of multiple youth from the same family. Significance levels are reported using two-tailed hypothesis tests.

Overall, 46% of the families of young adults and youth assigned to the experimental group and 62% of those assigned to Section 8 group relocated with an MTO voucher; the ITT estimate will underestimate the effects of actually relocating using an MTO voucher because take-up of the voucher was not 100%. However, the ITT nonetheless represents an unbiased estimate for the effects of *offering* families the chance to move with an MTO voucher. Because the ITT estimator compares the average outcome of the control group with the average outcome of *all* families assigned to a treatment group (either the experimental or Section 8 group), regardless of whether or not the family assigned to the treatment group relocates through MTO, the ITT estimate is not susceptible to concerns about "selection bias" that plague non-experimental estimation approaches (Ludwig et al., 2008).

Treatment on the treated (TOT) effects. We also estimate the TOT effects to estimate the effect of relocating via MTO. We can estimate the TOT effect by using information about the proportion of families assigned to the experimental or Section 8 only groups that actually moved using an MTO voucher. Specifically, the TOT estimate will be approximately equal to the ITT effect divided by the share of the experimental or Section 8 only groups that relocates using an MTO voucher (Angrist, Imbens, & Rubin, 1996). Given the MTO voucher use rates reported above, the estimated TOT effects for the experimental and Section 8 groups will be about 2.2 and 1.6 times the estimated ITT effects for these groups, respectively. Our analytic methods are similar to those in earlier MTO studies, which included more detailed discussions (Kling, Liebman, & Katz, 2007; Sanbonmatsu et al., 2011).

Results

Sample characteristics

As shown in Table 1, the overall sample (7,861) includes 3217 young adults and 4644 youth. Most characteristics were similar between the two samples and are presented jointly, but those that differ (e.g., age) are presented in different rows. On average, the sample of young adults was aged 13 years at baseline and 24 years as of December 31, 2007 (when eligibility for the long-term survey interview was determined), while the youth sample averaged 5 years at baseline and 17 years as of December 31, 2007. The proportion of females was similar between groups (about 50%).

At baseline, of those ages 6–17 years, approximately 7% had been suspended or expelled from school in the two years prior to baseline and about 10% were gifted or did advanced coursework. Among the youngest in the youth sample who were ages 0–5 years at baseline, 10% had been hospitalized before their first birthday and 8% weighed less than 6 pounds at birth.

Baseline characteristics of the sample adult in MTO households reflects that the sample parent was overwhelmingly female (98%), with one-third (32%) of Hispanic ethnicity (any race), and almost two-thirds (65%) African American, regardless of ethnicity. Half the households' sample adults had a GED (18%) or high school diploma (34%) and less than a quarter were employed. Nearly 30% of sample adults had given birth before the age of 18. Also, over 40% of respondents reported at baseline that a household member was a victim of a crime in the past 6

months, and half reported that the streets were very unsafe at night (Table 2).

Birth outcomes for young adults

Table 3 displays birth outcomes among the MTO young adult sample. The first column presents means for the control group and subsequent columns present the ITT and TOT effects for the experimental, Section 8, and the combined experimental/Section 8 groups. Among those in the control group, 58.9% had a least one biological child and 23.8% had their first child before age 20 years; these were not significantly different from the experimental or Section 8 groups.

We found statistically significant treatment effects, particularly for the experimental group, on teen births among young adults (either mother or father) whose parent had their own first child as a teen. For males, this measure reflects their own age at the birth of their first biological child; the mother of the child was not necessarily under age 20. The control group teen birth rate in this subsample was 30.4%, and the experimental ITT effect of -6.5 percentage points (SE = 0.027) represents a 21% decrease in teen births (the corresponding TOT, -14.0 percentage points, [SE = 0.059], represents a 46% decrease). Although Section 8 group effect is not statistically significant, the teen birth rate was also lower by 4.0 percentage points, and the combined experimental/Section 8 effect of -5.5 percentage points (SE = 0.027) represents an 18% decrease in the proportion who had a birth while still a teen.

Pregnancy and birth outcomes for youth

Table 4 displays pregnancy and birth outcomes among the MTO youth sample. In the control group, 24.9% of youth reported ever having been pregnant or gotten someone pregnant, and 15.0% had ever given birth to or fathered a child. No consistent statistically significant effects were found for teen births among youth, even when stratified by sex or parent's age at birth of first child, with the exception of one statistically significant effect among youth in the combined experimental/Section 8 group whose parents were at or older than age 20 at birth of their first child.

Conclusion

We did not find an overall effect for MTO on teen births, which is consistent with Chetty et al. (2016) who found no effect on the teen birth rate for females less than age 13 or ages 13–18 years as of the baseline survey (Chetty et al., 2016). However, we found MTO decreased intergenerational teen births among our young adult sample as reported by the sample adult. Among the young adult sample whose parent had a child before age 20, those in the experimental group were significantly less likely than those in the control group to have had a child before age 20, suggesting that using a voucher to relocate from a higher to lower-poverty neighborhood had potentially interrupted the intergenerational teen birth effect found in prior studies (Meade et al., 2008; Wall-Wieler et al., 2016).

This finding differs from other studies indicating children whose parents were teen parents are more likely to become teen parents themselves (Meade et al., 2008; Wall-Wieler et al., 2016). There are many individual and environmental factors that may have influenced the results of this study. Kirby (2002) highlights factors influencing the initiation of sex, contraceptive use, and pregnancy, including but not limited to community context, family/partner relationships, school connectedness, and mental health (Kirby, 2002). These factors may remain significant for youth who had teen parents. Moreover, the role of parent-child communication about decision-making and behavior is also critical to sexual health outcomes for teens (Cosgrove, LeCroy, Fordney, & Voelkel, 2018; Sutton, Lasswell, Lanier, & Miller, 2014). The role of risk and protective factors in the prevention of intergenerational

Table 1

Baseline Characteristics of Youth (ages < 1–11 years at baseline, 13–20 years prior to long term follow-up period) and Young Adults (ages 7–17 years at baseline, 21–30 years prior to long term follow-up period) of the Moving to Opportunity (MTO) long-term evaluation 2008–2010.

	Experimental	Section 8	Experimental/Section 8 combined	Control	Total
Sample size (overall)	3313	1990	5303	2558	7861
Young Adults	1463	672	2135	1082	3217
Youth	1850	1318	3168	1476	4644
Youth/Young Adult Characteristics					
Age at baseline					
Young Adults	12.7	12.6	12.7	12.6	12.6
Youth	4.9**	5.0	5.0	5.1	5.0
Age as of December 31, 2007					
Young Adults	24.6*	24.3	24.5	24.4	24.4
Youth	16.5	16.7	16.6	16.6	16.6
Gender (%)					
Female	50.4	49.4	50.0	49.2	49.7
Male	49.6	50.6	50.0	50.8	50.3
Characteristics of those ages 6–17 years at Baseline (%)					
Suspended or expelled from school in past two years	7.6	7.3	7.5	6.8	7.3
Gifted student or did advanced coursework	9.1	10.1	9.5	10.1	9.7
Learning problem	9.9	12.2	10.9	10.9	10.9
Characteristics of those ages < 1–5 years at Baseline (%)					
In hospital before first birthday	9.7	10.0	9.8	11.1	10.3
Weighed less than 6 pounds at birth	7.4	8.1	7.7	8.5	8.0
Characteristics of the sample adult (%)					
Female adult	98.4	97.6	98.1	97.7	98.0
Race/ethnicity					
Hispanic (any race)	31.5	31.5	31.5	31.5	31.5
African-American (any ethnicity)	64.6	64.6	64.6	65.3	64.8
Education level					
Certificate of General Educational Development (GED)	15.6*	19.3	17.2**	20.5	18.2
High school diploma	35.0	32.0	33.7	33.2	33.5
Employed at baseline	26.0	22.0	24.0	23.0	24.0
Had first child before the age of 18	27.3	30.3	28.6	28.2	28.5

Notes: * = $p < 0.05$, ** = $p < 0.10$ on two-tailed *t*-test comparing the experimental, Section 8, or combined experimental/Section 8 group with control group means from a model regressing the baseline characteristic against the treatment group indicator (weighted and clustered by family). The sample includes (a) youth ages 13–20 as of December 2007 (ages < 1–11 at baseline) interviewed as part of the MTO long-term survey and (b) young adults under age 18 at baseline (range 7–17) but over age 20 (range 21–30) as of December 2007 (and therefore ineligible for the MTO long-term youth survey) from households where the adult completed a long-term survey interview. Data are from baseline head of household reports, where the sample adult was often but not always the same person (a sample adult was selected from each household and priority was given to females who were more likely to be the children's caretakers).

Table 2

Baseline Neighborhood and Household Characteristics of Youth (ages < 1–11 years at baseline, 13–20 years prior to long term follow-up period) and Young Adults (ages 7–17 years at baseline, 21–30 years prior to long term follow-up period) of the Moving to Opportunity (MTO) long-term evaluation 2008–2010.

	Experimental	Section 8	Experimental/Section 8 combined	Control	Total
Neighborhood Characteristics and Mobility Experiences (%)					
Household member was crime victim in past 6 months	45.3	42.3	44.0	42.2	43.4
Streets very unsafe at night	50.5	51.0	50.7	50.2	50.5
Very dissatisfied with neighborhood	48.2	49.2	48.6	46.1	47.9
Primary or secondary reason for wanting to move was …					
To get away from drugs and gangs	78.5	73.7	76.4	77.5	76.8
Better schools for the children	51.3	57.4*	53.9	50.7	52.9
Household Characteristics (%)					
Receiving Aid to Families with Dependent Children (AFDC) benefits	79.1	77.7	78.5	78.4	78.5
No teens in household	53.0*	53.5	53.2*	57.7	54.6
Randomization Site (%)					
Baltimore	13.7	15.1	14.3	13.5	14.1
Boston	17.4	18.2	17.7	19.2	18.2
Chicago	22.4	23.8	23.0	21.5	22.5
Los Angeles	24.3	20.3	22.6	22.7	22.6
New York City	22.1	22.6	22.3	23.1	22.6

Notes: * = $p < 0.05$, ** = $p < 0.10$ on two-tailed *t*-test comparing the experimental, Section 8, or combined experimental/Section 8 group with control group means from a model regressing the baseline characteristic against the treatment group indicator (weighted and clustered by family). The sample includes (a) youth ages 13–20 as of December 2007 (ages < 1–11 at baseline) interviewed as part of the MTO long-term survey and (b) young adults under age 18 at baseline (range 7–17) but over age 20 (range 21–30) as of December 2007 (and therefore ineligible for the MTO long-term youth survey) from households where the adult completed a long-term survey interview. Data are from baseline head of household reports, where the sample adult was often but not always the same person (a sample adult was selected from each household and priority was given to females who were more likely to be the children's caretakers).

teen pregnancy and births among youth in MTO is beyond the scope of this paper, yet is worthy of further exploration.

Overall, reducing intergenerational teen pregnancy and births is multifaceted. For example, in a 6-year study by Meade et al. (2008), the key factors associated with daughters of teen mothers becoming teen mothers themselves were school performance, family structure, dating

Table 3

Birth Outcomes for Young Adults (7–17 years at baseline, 21–30 years prior to long term follow-up period) of the Moving to Opportunity (MTO) long-term evaluation 2008–2010.

Outcome	Control mean	Experimental vs. control		Section 8 vs. control		Experimental/Section 8 vs. control		N
		ITT (SE)	TOT (SE)	ITT (SE)	TOT (SE)	ITT (SE)	TOT (SE)	
Has at least one biological child (overall) (%)	58.9	0.008 (0.021)	0.018 (0.049)	0.048** (0.029)	0.087** (0.052)	0.022 (0.020)	0.046 (0.042)	3114
Males (%)	51.0	0.063* (0.030)	0.150* (0.070)	0.103* (0.038)	0.193* (0.072)	0.077* (0.028)	0.164* (0.060)	1575
Females (%)	66.6	−0.047 (0.030)	−0.105 (0.067)	−0.005 (0.040)	−0.009 (0.068)	−0.032 (0.029)	−0.603 (0.057)	1539
Had first child before age 20 (overall) (%)	23.8	−0.014 (0.019)	−0.033 (0.043)	0.005 (0.025)	0.009 (0.046)	−0.008 (0.018)	−0.015 (0.036)	3114
Males (%)	16.5	−0.001 (0.024)	−0.003 (0.056)	0.022 (0.030)	0.041 (0.056)	0.007 (0.022)	0.016 (0.047)	1575
Females (%)	31.0	−0.028 (0.028)	−0.061 (0.063)	−0.012 (0.038)	−0.021 (0.065)	−0.022 (0.027)	−0.044 (0.053)	1539
Parent < 20 at birth of first child (%)	30.4	−0.065* (0.027)	−0.140* (0.059)	−0.040 (0.036)	−0.069 (0.063)	−0.055* (0.027)	−0.107* (0.052)	1558
Parent ≥ 20 at birth of first child (%)	17.2	0.035 (0.025)	0.085 (0.061)	0.057** (0.031)	0.106** (0.057)	0.045** (0.023)	0.096** (0.050)	1556

Notes: * = p < 0.05, ** = p < 0.10 on two-tailed *t*-test. Robust standard errors shown in parentheses. Intention-to-treat (ITT) effects (or the estimated impact of being offered an MTO housing voucher) were estimated using weighted ordinary least squares (OLS) regression model controlling for the baseline covariate and clustered by family ID. Experimental vs. control and Section 8 vs. control estimates come from a single model that included an indicator for each treatment. Experimental/Section 8 vs. control estimates come from a separate model with a combined treatment indicator. Treatment-on-the-treated (TOT) effects (or the estimated impact of moving via an MTO voucher) were calculated by inflating the ITT effects by the experimental, Section 8 group or combined experimental/Section 8 compliance (or MTO voucher use) rate. Subgroup analyses were run as an interaction with the treatment group indicator.

history, and environmental factors (Meade et al., 2008). Campa and Ekenrode (2006) conducted a 19-year cohort study with daughters of teen moms and found intergenerational teen childbearing was related to the daughter's age at sexual debut and home environmental factors, including the lack of a father figure, and less to the pre-birth socio-economic status of the mother (Campa & Ekenrode, 2006). Thus, various combinations of such factors could have potentially played a role in reducing intergenerational teen births among the young adult sample in this study.

In addition, other longitudinal relocation programs for families living in poverty report mixed results. Early findings from the Gautreaux housing program in Chicago (designed to reduce racial segregation and address socio-economic factors) (Venkatesh, Celimli, Miller, Murphy, & Turner, 2004), found youth who moved to the suburbs were more likely to complete high school and attend college than those who moved to other parts of the city (Rosenbaum et al., 2008; Rubinowitz & Rosenbaum, 2000). Less promising differences between the two groups were reported in later studies (Deluca, Duncan, Keels, & Mendenhall, 2010). The ongoing Chicago Housing Authority Plan for Transformation, launched in 1999, was designed to remove distressed public housing units and support self-sufficiency. Families could live in new/renovated public housing in the same area, or move to a different community using a voucher (Chicago Housing Chicago Housing Authority, 2011). Although many families relocated to other high poverty areas lacking social and economic opportunities (Venkatesh et al., 2004), those who moved reported better mental health and fewer behavioral problems for children, despite higher levels of economic hardship (Popkin & Price, 2010). These findings further demonstrate the complexity of housing relocation programs and the influence of multiple, interrelated factors that can facilitate or hinder success, which is also significant for the current study.

In general, programs that relocated residents to more diverse, lower-poverty areas offering improved socioeconomic opportunities, often demonstrated more promise than those that did not (Chicago Housing Chicago Housing Authority, 2011). Regarding MTO, Edsall (2014) noted in a New York Times opinion piece that addressing poverty is complex and requires more than relocating residents. Moreover, reducing multigenerational poverty is beyond the scope of housing policy and involves other interdependent determinants, suggesting one-dimensional approaches are not likely to yield effective outcomes (Edsall, 2014). Hence, housing mobility efforts should not only provide safe and affordable housing to residents, but also provide the necessary

Table 4

Pregnancy and Birth Outcomes for Youth (ages < 1–11 years at baseline, 13–20 years prior to long term follow-up period) of the Moving to Opportunity (MTO) long-term evaluation 2008–2010.

Outcome		Experimental vs control		Section 8 vs control		Experimental/Section 8 vs control		
	Control mean	ITT (SE)	TOT (SE)	ITT (SE)	TOT (SE)	ITT (SE)	TOT (SE)	N
Ever been or gotten someone pregnant (overall) (%)	24.9	−0.009 (0.016)	−0.019 (0.033)	−0.021 (0.017)	−0.032 (0.026)	−0.014 (0.014)	−0.025 (0.026)	4576
Males (%)	22.4	−0.024 (0.021)	−0.052 (0.045)	−0.031 (0.025)	−0.045 (0.036)	−0.027 (0.020)	−0.048 (0.035)	2243
Females (%)	27.5	0.006 (0.023)	0.012 (0.048)	−0.011 (0.025)	−0.017 (0.040)	−0.001 (0.021)	−0.002 (0.038)	2333
Ever given birth to/fathered a child (overall) (%)	15.0	0.007 (0.013)	0.014 (0.027)	0.002 (0.015)	0.003 (0.022)	0.005 (0.012)	0.008 (0.021)	4565
Males (%)	11.5	0.003 (0.017)	0.006 (0.036)	−0.012 (0.020)	−0.017 (0.028)	−0.003 (0.016)	−0.006 (0.028)	2240
Females (%)	18.6	0.011 (0.020)	0.023 (0.041)	0.015 (0.023)	0.024 (0.035)	0.013 (0.019)	0.023 (0.033)	2325
Parent < 20 at birth of first child (%)	18.4	−0.010 (0.019)	−0.020 (0.037)	−0.020 (0.021)	−0.029 (0.030)	−0.015 (0.017)	−0.025 (0.029)	2401
Parent ≥ 20 at birth of first child (%)	10.9	0.028 (0.018)	0.061 (0.039)	0.030 (0.021)	0.047 (0.032)	0.029** (0.017)	0.054** (0.031)	2164

Notes: * = p < 0.05, ** = p < 0.10 on two-tailed *t*-test. Robust standard errors shown in parentheses. Intention-to-treat (ITT) effects (or the estimated impact of being offered an MTO housing voucher) were estimated using weighted ordinary least squares (OLS) regression model controlling for the baseline covariate and clustered by family ID. Experimental vs. control and Section 8 vs. control estimates come from a single model that included an indicator for each treatment. Experimental/Section 8 vs. control estimates come from a separate model with a combined treatment indicator. Treatment-on-the-treated (TOT) effects (or the estimated impact of moving via an MTO voucher) were calculated by inflating the ITT effects by the experimental, Section 8 group or combined experimental/Section 8 compliance (or MTO voucher use) rate. Subgroup analyses were run as an interaction with the treatment group indicator.

resources and opportunities to support and sustain success. This may include factors that also demonstrate an important role in reducing teen births (e.g., access to education and employment opportunities, reproductive and contraceptive health care). As housing mobility programs advance (Juracek et al., 2018), and proposed federal legislation (i.e., Housing Choice Voucher Mobility Demonstration Act) increases support for such efforts, more comprehensive approaches are being initiated that take into consideration the wide-range of issues that foster success (i.e. comprehensive counseling, job training, education services, financial literacy). (Housing Choice Voucher Mobility Act, 2019; Juracek et al., 2018).

Limitations

Several important limitations are noteworthy. While MTO explored education, employment, and health outcomes of adults and youth, data on sexual activity and contraception use were only collected from youth at follow-up. We were unable to detect treatment effects on these other measures for the youth sample and therefore do not present the detailed results here. The inclusion of such data (i.e., sexual debut, number of sexual partners, contraceptive use) for the young adult sample may also have informed the interpretation of our findings by potentially providing a more thorough understanding of the specific risk and protective factors that influence decision-making and ultimately behaviors (i.e., type and effectiveness of contraception). Also, data for young adults were based on proxy report and did not capture pregnancies that did not result in a live birth (i.e., miscarriage or abortion), which may have resulted in underreporting of pregnancy history. Furthermore, approximately one-third of the youth sample (ages 13–20 years at the beginning of the long-term evaluation period) reported they had not initiated sexual activity and thus were not at risk for pregnancy as of the follow-up. It should be noted that MTO experimental group families were only required to remain in low-poverty areas for one year and then could relocate again, including back to their original neighborhoods, which may have further influenced results. Also, MTO did not have the same impact for each site for several reasons including, but not limited to housing markets, social services, and demographics. The potential for social desirability bias in self-reports is also noteworthy, which is optimistically even by treatment status as not to cofound the impact.

One final limitation relates to the precision of our estimates. The relative standard errors for the effect sizes are large, indicating a lack of precision in the estimates. Additionally, while we present only self or proxy reported data on births, we did obtain birth certificate data from two of the MTO randomization sites (Massachusetts and New York City). However, we could not secure data from all sites as planned due to a variety of administrative challenges. Overall, the intergenerational impact found using the survey data is mirrored in the Massachusetts sample with available birth records data, but no statistically discernable patterns were detected in the New York City sample.

Public health implications

The key finding suggesting a reduction in intergenerational teen birth is promising, especially for populations facing adverse economic and health risks, and is worthy of future exploration in these and related data. Thus, this issue remains relevant today, as literature continues to demonstrate that adolescents living in poverty experience adverse reproductive health outcomes related to neighborhood characteristics (Decker et al., 2018). Exposure to educational and economic opportunities plays an important role in health outcomes (Mirowsky & Ross, 2017). Research further suggests comprehensive programs that address multiple social determinants are paramount to reducing inequities and improving health outcomes (Satcher, 2010). Moving from individual-level interventions to broader efforts addressing socioeconomic factors may have a greater, sustainable impact (Frieden,

2010). For teen childbearing, Breheny and Stephens (2008) suggest interventions should focus more on untangling the social context of disadvantage rather than exclusively focusing on individual and family level factors. Therefore, addressing social determinants that perpetuate teen pregnancy and birth, including strategies to improve educational and environmental factors, are essential to these efforts, as well as a thorough investigation of higher-level strategies and policies that play a significant role in outcomes (i.e., health care, housing). (Breheny & Stephens, 2008; Decker et al., 2018).

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssmph.2019.100451.

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