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Gentrification And The Health Of Low-Income Children In New York City

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ABSTRACT Although the pace of gentrification has accelerated in cities across the US, little is known about the health consequences of growing up in gentrifying neighborhoods. We used New York State Medicaid claims data to track a cohort of low-income children born in the period 2006–08 for the nine years between January 2009 and December 2017. We compared the 2017 health outcomes of children who started out in low-income neighborhoods that gentrified in the period 2009–15 with those of children who started out in other low-income neighborhoods, controlling for individual child demographic characteristics, baseline neighborhood characteristics, and preexisting trends in neighborhood socioeconomic status. Our findings suggest that the experience of gentrification has no effects on children’s health system use or diagnoses of asthma or obesity, when children are assessed at ages 9–11, but that it is associated with moderate increases in diagnoses of anxiety or depression—which are concentrated among children living in market-rate housing.

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From 2009 to 2015 a single census tract in the historically low-income neighborhood of Bushwick, in Brooklyn, New York, saw an increase in mean income of nearly \$15,000 (a change of 31 percent) and a jump in the percentage of adults with college degrees from 8 percent to 21 percent. Such large increases in socioeconomic status (SES) in historically low-income, urban neighborhoods—or gentrification—have occurred in many cities across the US.¹ Many observers worry that gentrification will destroy neighborhood cultures, increase both rents and the cost of daily living, and price long-term residents out of their communities^{2–8}—all of which could heighten stress and undermine children’s health. Yet gentrification may also bring changes to low-income areas that we expect to enhance health, such as increased safety, healthier food, improved parks, and new businesses and economic opportunities.^{9,10}

There are many theoretical reasons why neighborhoods may shape health and well-being, from social networks to the physical environment and access to services and resources. On average, children living in more disadvantaged neighborhoods fare worse on a wide variety of outcomes, including health. The Moving to Opportunity (MTO) demonstration program offers the most rigorous evidence of a causal link between neighborhood economic context and well-being in the US to date. The program shows that children whose families were randomly given a subsidy to move from high- to low-poverty neighborhoods when the children were young were far more likely to complete college and enjoyed significantly higher earnings as adults than comparable children did.¹¹ But evaluations of the program were more equivocal about the short-run impacts on children’s health, finding only modest mental health benefits for girls, modestly increased risk of posttraumatic stress disorder

in boys, and fewer physician office visits for girls among children whose families received vouchers to move to low-poverty neighborhoods.^{12,13}

The process of gentrification shares some features with the MTO experiment. Like MTO voucher recipients, low-income residents of gentrifying neighborhoods are exposed to more advantaged neighborhoods. Similarly, as with the moves required by the MTO demonstration, gentrification is disruptive: It brings new, often culturally different, residents to a neighborhood; it generates changes in neighborhood conditions that may increase the cost of living; and it may raise rents, forcing some low-income residents to move to new communities. The ambiguous theoretical effects of this mix led us to assess the empirical effects of gentrification on children's health.

New York City, with its large low-income population and diverse range of neighborhoods experiencing these economic and social shifts, has been at the epicenter of debates around gentrification. While gentrification has attracted considerable speculation from the media and policy makers both in New York and elsewhere, the lack of large, longitudinal data sets that track children over time has limited researchers' ability to draw firm conclusions about how gentrification could shape health in the early years of a child's life. Prior studies of gentrification and health have focused on adults or infants only, were unable to distinguish new residents from long-term residents during the gentrification period because of the cross-sectional nature of the data, or examined only the subset of the population that moved when a neighborhood gentrified.^{3,4} Furthermore, existing studies generally have not separately identified renters living in market-rate housing.

We used a large, administrative data set—New York State's Medicaid claims database for the period 2009–17—to shed new light on this question. Using these data, we tracked the health of children born in the period 2006–08 from ages 1–3 through ages 9–11 and compared those who started off in areas that then gentrified in the period 2009–15 with similar children in neighborhoods that did not gentrify in that period.

Using the same data, and assessing multiple definitions of *gentrification*, we reported previously that low-income, Medicaid-enrolled children in gentrifying areas in New York City were no more likely to be displaced from their homes than were their peers in persistently low-SES areas, nor were they more likely to move to worse neighborhoods (in terms of poverty, crime, or school quality) when they did move from gentrifying areas.¹⁴ While nearly half of the Medicaid-enrolled children did move in the study period,

mobility rates were no different for children from areas that gentrified than for their peers in persistently low-SES areas (a nonsignificant 0.54-percentage-point increase from a baseline mobility rate of 46 percent). Furthermore, when children from gentrifying areas did move, they moved to areas with similar poverty rates, on average, as did the children from persistently low-SES areas.¹⁴ Even without elevated displacement rates, however, gentrification could still shape health through rising rents and changing conditions.

Study Data And Methods

DATA The New York State Medicaid data set includes all health care claims and encounters for a near-universe of low-income children in New York City. We selected a cohort of children born in 2006–08 who were continuously enrolled in Medicaid in the city in the period January 2009–December 2017 ($N = 71,835$). Following the methods used in the Moving to Opportunity evaluations, we examined the prevalence of four diagnostic categories: overweight or obesity, asthma, and two categories of mental health (specifically, attention deficit hyperactivity disorder or conduct disorder and anxiety or depression). We also measured rates of emergency department (ED) visits and hospitalizations and proportions of children with at least one well-child visit (or routine exam) in 2015–17.

Consistent with earlier research on gentrification, we used census tracts to proxy for neighborhoods. We used American Community Survey estimates to describe the neighborhoods where children lived (estimates from 2005–09 for 2009 conditions and from 2011–15 for 2015 conditions). We defined *gentrifying neighborhoods* as those that fell in the bottom 40 percent of city census tracts in terms of mean income in 2009 and then experienced growth from 2009 to 2015 in the percentage of adults with college degrees that put them in the top quarter of the city's neighborhoods in terms of that growth. We further split the gentrifying neighborhoods into two types, based on the magnitude of the census tract's growth in percentage of adults with college degrees: moderately gentrifying areas saw growth in that percentage that placed them in the eleventh-to-twenty-fifth percentile of growth (corresponding to a mean increase of 7.6 percentage points), and rapidly gentrifying areas saw growth in that percentage that placed them in the top tenth percentile of growth (corresponding to a mean increase of 16.5 percentage points). We labeled neighborhoods in the bottom 40 percent of the income distribution that did not qualify as gentrifying as persistently low-

SES. We defined neighborhoods with 2009 mean incomes in the top 60 percent of the income distribution as higher income, and therefore ineligible for gentrification. In contrast to other work on gentrification, our study distinguishes between residents in subsidized housing (who are shielded from any impact of gentrification on local rents) and those who live in market-rate housing.

ANALYSIS We compared the 2015–17 health outcomes and health system use of children who started out in low-SES neighborhoods that rapidly gentrified from 2009 to 2015 to those of similar children who started out in neighborhoods that looked identical in 2009 (in both conditions and past trends) but didn't gentrify. To estimate the full impact of gentrification in our main analysis, we considered children "treated" by the neighborhoods where they resided in 2009, even if they later moved out. We conducted an attrition analysis of the final cohort to assess whether differential insurance churn (disenrollment from Medicaid) was introducing bias. We found that children from gentrifying areas were no more likely to be lost to follow-up over the study period than children from persistently low-SES areas (attrition rates of 43 percent and 42 percent, respectively).

For binary outcomes, we estimated multivariable logistic regression models with robust standard errors clustered at the census tract level for each of our health outcomes of interest, using a series of dummy variables for gentrification status to compare the children in rapidly gentrifying areas to those in persistently low-SES areas (used as the reference group). We report percentage-point marginal effects exponentiated and converted to probabilities from the logistic regression results. We obtained nearly identical results when we used multivariable linear probability models. For continuous outcomes (hospitalizations and ED visits), we used multivariable linear regression models with standard errors clustered at the census tract level.

Our covariates included mean neighborhood characteristics in 2009 (income, rent, and percentage of adults with college degrees—all measured using five-year American Community Survey estimates for the period 2005–09), change in that percentage from 2000 to 2009 (baseline gentrification trends), baseline borough of residence and distances from midtown Manhattan and from the nearest subway station (which research shows are correlated with both gentrification and residents' well-being), and a set of individual child characteristics (race, age, sex, low-birthweight status, baseline health, and whether the child resided in public or other subsidized housing in 2009 and was thus shielded

from rising rents).

LIMITATIONS Our study had several limitations. First, New York City's large population and diversity of residents and neighborhoods make it an instructive case for gentrification research. In fact, a recent report on the prevalence of gentrification nationwide listed New York as the city with the largest number of gentrifying census tracts—14 percent of all such tracts in the US.¹⁵ But any relationship between gentrification and children's well-being may unfold differently in other places if gentrification takes different forms.

Second, a lack of consensus around the definition of *gentrification* persists in both academic research and the media, which can make findings from any single study difficult to compare to those of other studies. We conducted sensitivity analyses using several definitions of *gentrification* to assess the robustness of our findings, but determining the appropriateness or accuracy of any single definition remains a challenge.

Third, observational data such as the ones we used cannot capture the kinds of dramatic changes in neighborhood economic environment that could be generated by the MTO study in an experimental context. "Treatment" families in MTO used their vouchers to move to areas with poverty rates of less than 10 percent, while even the children in the rapidly gentrifying areas in our study were, on average, exposed to poverty rates of more than 20 percent.

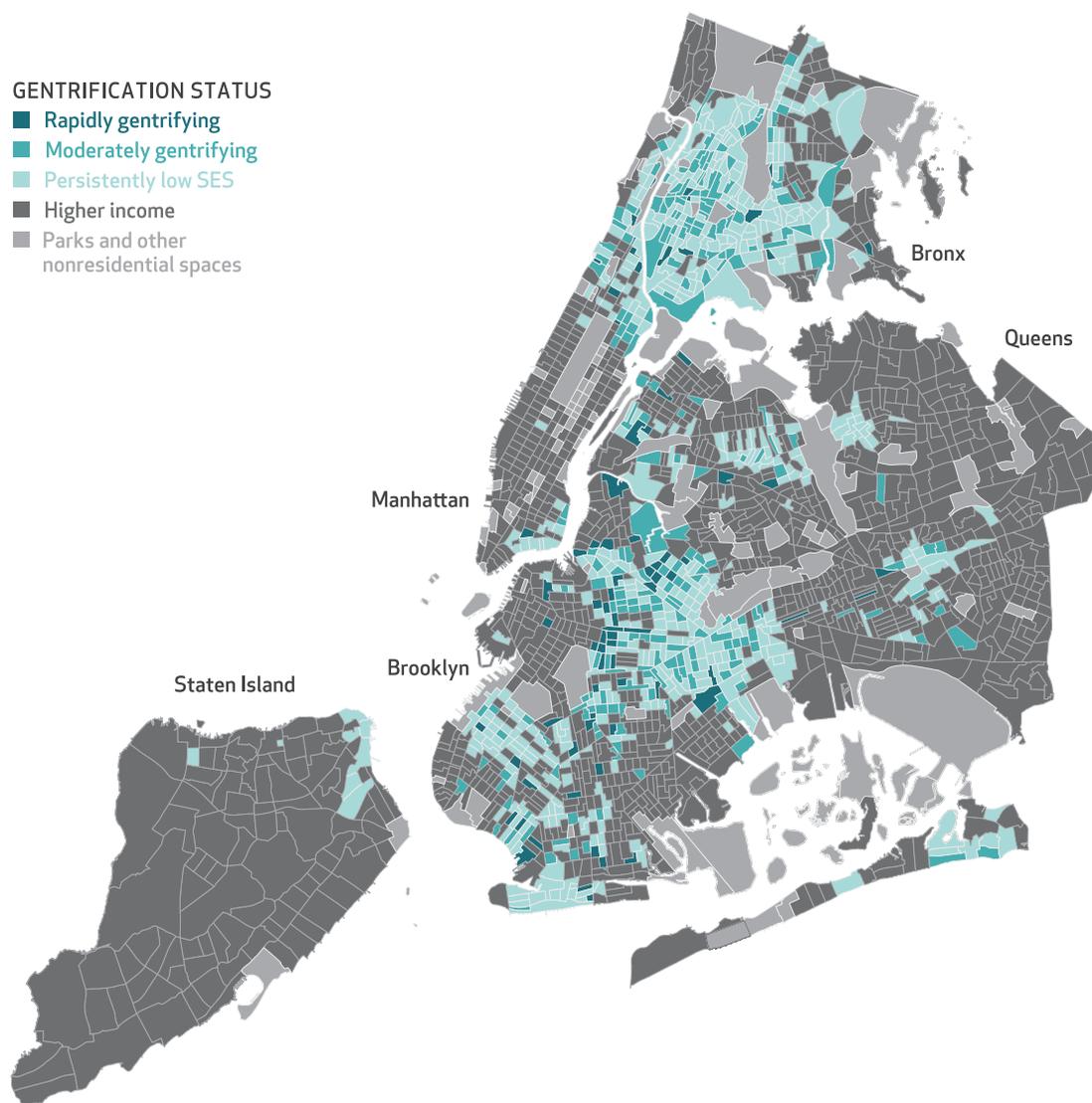
Fourth, we relied on administrative Medicaid claims data for this study, which may have underestimated or overestimated the true prevalence of disease or rates of health system use. We note that both the gentrifying and low-SES tracts are located in many areas across the city and are often adjacent (exhibit 1), which decreases the chance that idiosyncratic coding errors in gentrifying neighborhoods were driving our claims-based results.

Study Results

Exhibit 1 shows the distribution of census tracts by gentrification status, with gentrifying areas appearing in four of New York City's five boroughs and being particularly concentrated in Brooklyn. Exhibit 2 presents the baseline characteristics of all four types of neighborhoods, including higher-income and moderately gentrifying areas for context. We focused our comparisons in the study on children in rapidly gentrifying areas relative to those in persistently low-SES areas. Rapidly gentrifying areas had baseline characteristics similar to those of the areas that remained low SES, but they saw much larger changes in the percentage of adults with a college

EXHIBIT 1

Gentrification status in New York City from 2009 to 2015, by census tract



SOURCE Authors' analysis of five-year estimates for 2009 and 2015 from the American Community Survey. **NOTES** The gentrification statuses are explained in the text. SES is socioeconomic status.

degree (about a 90 percent increase from baseline), mean income, and mean rent, as well as much larger reductions in poverty. As a robustness test, we replicated our analyses with alternative measures that defined *gentrification* in terms of large growth in mean income or mean rent.

Exhibit 3 shows that children who started out in areas that rapidly gentrified in the period 2009–15 did not differ meaningfully or significantly from children in similar areas that remained low SES in terms of their 2015–17 rates of hospitalizations or ED visits or proportion with one or more well-child visits, or in terms of diagnoses for overweight or obesity, attention

deficit hyperactivity disorder or conduct disorder, or asthma at the end of the period (by ages 9–11).

However, the difference between the two groups of children with respect to anxiety or depression diagnoses was significant: We saw a 1.56-percentage-point increase (8.69 percent versus 7.13 percent; $p < 0.01$) in the prevalence of anxiety or depression among those who started out in areas that rapidly gentrified relative to those in areas that remained low SES, representing 22 percent higher prevalence.

We next considered whether the effects of gentrification differed among three groups whose members had different experiences: people who

EXHIBIT 2

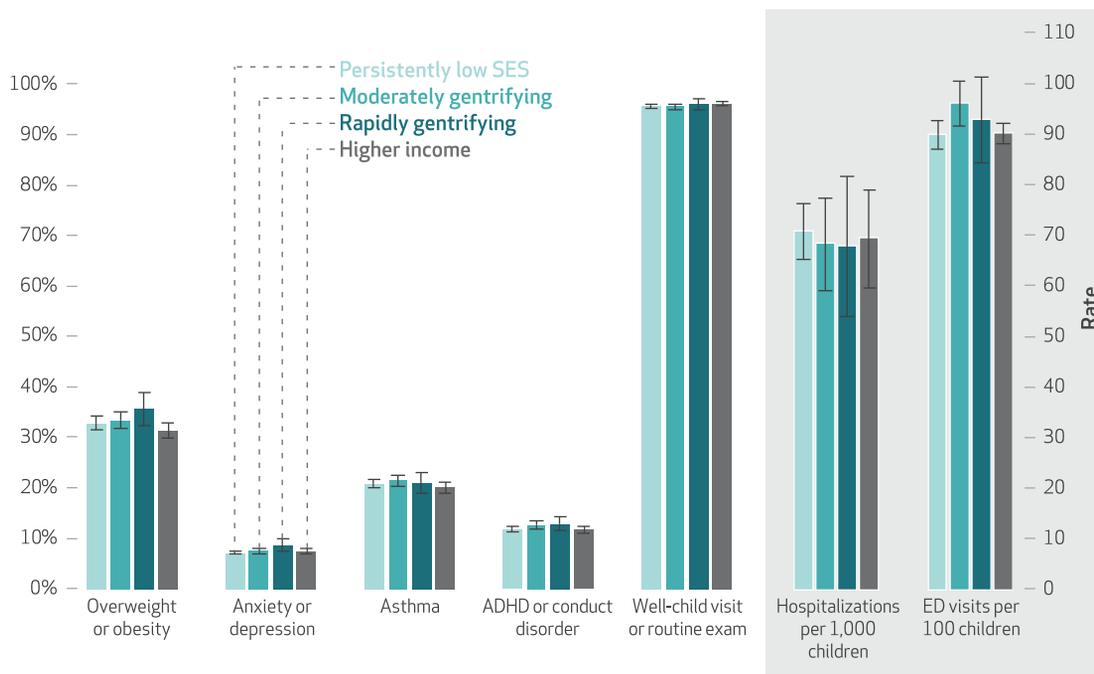
New York City neighborhood characteristics in 2009 and changes from 2009 to 2015, by gentrification status

| | Gentrification status | | | |
|--|------------------------------|----------------------------------|--------------------------------|---------------------------|
| | Rapidly gentrifying (n = 82) | Moderately gentrifying (n = 236) | Persistently low SES (n = 524) | Higher income (n = 1,264) |
| BASELINE CHARACTERISTICS (2009) | | | | |
| Mean annual income | \$49,287 | \$44,232 | \$48,573 | \$100,573 |
| Adults with college degree (%) | 17.9 | 12.0 | 19.5 | 38.5 |
| Mean monthly rent | \$1,042 | \$961 | \$1,000 | \$1,361 |
| Poverty rate (%) | 25.0 | 31.9 | 28.1 | 10.5 |
| CHANGE FROM 2009 TO 2015 | | | | |
| Mean annual income | \$15,135 | \$4,743 | \$1,875 | -\$54 |
| Adults with college degree (percentage points) | 16.5 | 7.6 | -0.5 | 3.1 |
| Mean monthly rent | \$226 | \$105 | \$89 | \$133 |
| Poverty rate (percentage points) | -2.6 | -0.6 | 2.4 | 2.1 |

SOURCE Authors' analysis of New York State Medicaid claims data for 2009–17 and American Community Survey data for 2009 and 2015. **NOTES** We used census tracts to proxy for neighborhoods. The gentrification statuses are explained in the text. SES is socioeconomic status.

EXHIBIT 3

Percent of children diagnosed with selected diseases and receiving well-child visits or routine exams and rates of hospitalization and emergency department (ED) visits among children ages 9–11 in 2015–17, by the gentrification status of the New York City neighborhoods they were born into



SOURCE Authors' analysis of New York State Medicaid claims data for 2009–17 and American Community Survey data for 2009 and 2015. **NOTES** The gentrification statuses are explained in the text. We used census tracts to proxy for neighborhoods. Rates and proportions were regression adjusted to account for baseline differences in neighborhood income trends, baseline neighborhood characteristics, geographic location, child demographic and other characteristics, and child health history. See the “Study Data And Methods” section for a full list of the control variables. The proportion of children from rapidly gentrifying census tracts who were diagnosed with overweight or obesity is significantly different from those in persistently low-SES areas ($p < 0.001$).

moved out of the neighborhood, those who remained in market-rate housing, and those who remained in subsidized housing. Exhibit 4 shows that the effect of gentrification on anxiety remained significant only for the movers and the stayers in market-rate housing. The estimated effect size for those two groups was more than twice the size of that for the stayers in subsidized housing (though the difference in coefficients was not significant).

Among movers, children who moved from areas that rapidly gentrified also had slightly higher ED use rates, compared to their peers who moved from persistently low-SES areas. We observed a significant decrease in asthma prevalence among those staying in subsidized housing in rapidly gentrifying areas, relative to their peers in low-SES areas, but this finding was not robust to specification checks: It was concentrated among a small group of children and was not consistent across alternative definitions of *gentrification* (data not shown). In addition, it is challenging to identify a plausible mechanism by which we would see a large asthma effect among only subsidized stayers and not also among market-rate stayers.

We also stratified the analyses by sex and race (see online appendix exhibit A1).¹⁶ The effect of gentrification on the prevalence of anxiety was significant for both girls and boys as well as for white and black children. The effect remained positive for Hispanic and Asian children, though it was somewhat smaller and nonsignificant. The coefficients did not differ statistically from one another across strata by either sex or race.

Our result for anxiety or depression diagnoses was robust across various definitions of *gentrification*, including those that considered changes in mean income and mean rent as indicators of gentrification (see appendix exhibit A2).¹⁶ However, the rest of our outcomes were sensitive to the definition of *gentrification*: All other outcomes either were not associated with gentrification or emerged as significantly related to gentrification in only one of the definitions.

Discussion

Despite substantial speculation, very little is known about the health effects of gentrification on children. Most of what is known about the effects of neighborhood economic environments on health has come from the Moving to Opportunity demonstration. The process of gentrification, however, reverses the MTO process: It involves neighborhoods changing around children, rather than children moving to new, lower-poverty neighborhoods. While MTO found that moving to lower-poverty neighborhoods had few short- or medium-run effects on children’s health, our study is the first to show that this reverse process similarly has few short- or medium-run effects, with the exception of an increase in anxiety and depression diagnosis rates. Our findings suggest that the effects of neighborhood change on children’s health are likely more modest than either optimists or pessimists assume.

Our very large sample size—over 71,000 children and eighty-two rapidly gentrifying census

EXHIBIT 4

Adjusted marginal effects of gentrification on the prevalence of disease and rates of health system use in 2015–17, by New York City children’s moving status and housing subsidization status

| | Movers (n = 33,886) | Stayers | |
|--|------------------------|-----------------------------|---------------------------|
| | | Market rate (n = 32,114) | Subsidized (n = 5,835) |
| Prevalence, percentage-point difference (SD) | | | |
| Overweight or obesity | 2.68 (1.86) | 3.76* (2.22) | –1.57 (4.06) |
| Anxiety or depression | 2.01** (0.90) | 1.37* (0.81) | 0.62 (2.44) |
| ADHD or conduct disorder | 1.81 (1.20) | 0.72 (0.93) | 0.01 (3.49) |
| Well-child visit or routine exam | –0.11 (0.89) | 0.51 (0.65) | 0.55 (1.66) |
| Utilization rates (SD) | | | |
| Hospitalizations per 1,000 children | 4.83 (12.28) | –11.52 (7.14) | –41.63 (36.53) |
| ED visits per 100 children | 10.07* (5.78) | –0.79 (5.55) | –12.91 (16.39) |

SOURCE Authors’ analysis of New York State Medicaid claims data for 2009–17 and American Community Survey data for 2009 and 2015. **NOTES** We used census tracts to proxy for neighborhoods. “Movers” are children who moved out of their neighborhood (the gentrification statuses are explained in the text). “Stayers” are children who did not move, divided into those in market-rate housing and those in subsidized housing. The reference groups are movers and stayers in neighborhoods with persistently low socioeconomic status. Rates and proportions were regression adjusted as explained in the notes to exhibit 3. See the “Study Data And Methods” section for a full list of the control variables. SD is standard deviation. ADHD is attention deficit hyperactivity disorder. ED is emergency department. *p < 0.10 **p < 0.05

The relationship between neighborhood economic change and health may be more nuanced than is often assumed.

tracts—allowed us to identify null effects with considerable precision. We found that the effects of gentrification on children by early adolescence were modest, both among the entire cohort of children born in areas that later gentrified as well as among the subset who continued living in the neighborhoods as they gentrified. While we did not test an exhaustive list of all possible health outcomes potentially affected by neighborhood economic change, our selected set of outcomes, which included metrics of acute and routine care and both mental and physical health, was representative of many salient aspects of children's overall health and aligned with the theoretical pathways and outcomes tested in the MTO demonstration.¹²

The largest effect we observed was the higher rate of anxiety or depression diagnoses: Children starting out in areas that gentrified had a 22 percent higher prevalence rate than did children who started off in low-SES areas that did not gentrify. The effect appears to be particularly driven by children who moved from rapidly gentrifying areas as well as by those who stayed but lived in market-rate rental housing. A plausible mechanism for this effect is economic pressures, which could lead to relocation for some families and to financial insecurity for families that remain in the gentrifying areas in market-rate housing, as we did not see an effect among the stayers in subsidized housing. While it will be important to continue to monitor this risk as the children enter adolescence, baseline rates of

anxiety and depression diagnosis in our study's younger population were quite low, so the difference in prevalence between the two groups was only 1.5 percentage points (8.69 percent versus 7.13 percent). While this result echoed the MTO demonstration's finding of increased mental health risk among boys, it contrasted with the MTO finding of mental health benefits of higher-income neighborhoods for girls. Further research on sex differences in mental health outcomes is warranted.

Our general finding that gentrification had few impacts on health was consistent across definitions of *gentrification*. While the effect of gentrification on diagnosis rates of anxiety and depression was robust to multiple definitions, all other outcomes were significantly related to gentrification for no or only one definition. While neighborhood change is undoubtedly an important phenomenon to track with respect to children's well-being, there is a lack of consensus among advocates and researchers about what gentrification truly means, and future research on it and children's health should be sensitive to the range of potential definitions—and how variation in the measurement of gentrification could influence results.

Conclusion

Our core results provide little evidence that gentrification dramatically altered the health status or health system use of children by ages 9–11. While the Moving to Opportunity demonstration likewise found few short-term impacts on children's health, researchers uncovered significant longer-run income benefits.^{11,12} Thus, it is possible that health effects will emerge over the longer term. Moreover, our findings of elevated anxiety and depression merit continued investigation as this cohort continues to age into later adolescence, when these conditions are more prevalent. Neighborhood environments undoubtedly play a role in children's health, but the largely null findings in both our analysis and the MTO research suggest that the relationship between neighborhood economic change and health may be more nuanced than is often assumed. ■

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- 16 To access the appendix, click on the Details tab of the article online.