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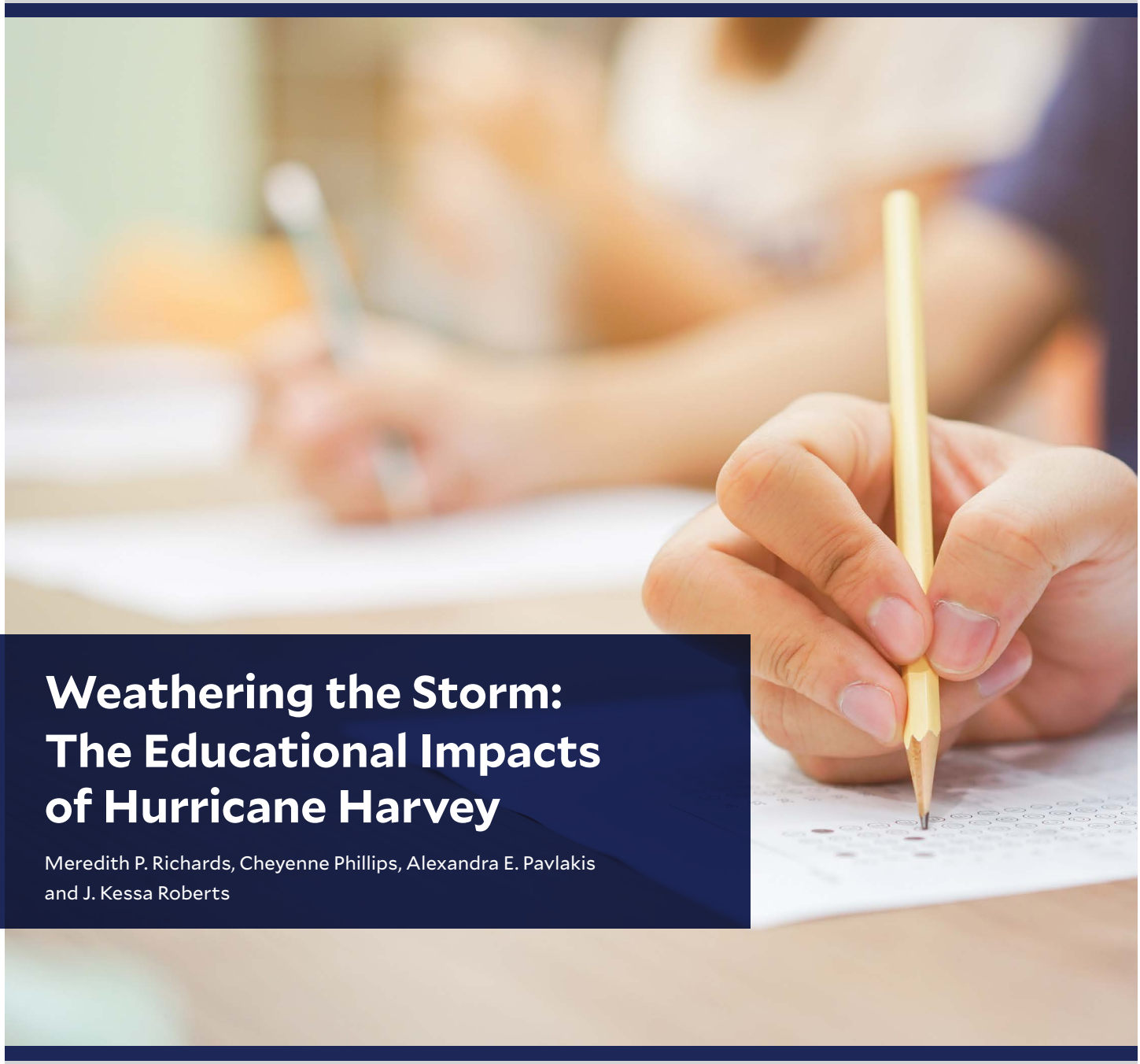

Weathering the Storm: The Educational Impacts of Hurricane Harvey

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Research Brief

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About HERC. Focusing on the most pressing challenges facing the region, the Houston Education Research Consortium (HERC) is a research-practice partnership between the Kinder Institute for Urban Research and 10 Houston-area school districts. HERC research is developed directly alongside district leaders with findings shared with decision-makers — culminating in long-term, equity-minded solutions, opportunities and growth for Houston and beyond.

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Research Brief

Weathering the Storm: The Educational Impacts of Hurricane Harvey

In August 2017, Hurricane Harvey ravaged the Houston area, causing the homelessness of nearly 24,000 students in the Houston Independent School District (Houston ISD) alone. In the first brief of this two-part series, we examined the characteristics of students who became homeless due to Harvey. In this second brief, we turn to the educational outcomes of these students.

We find that students who became temporarily homeless for a year or less due to Harvey tended to fare as well as or better on educational outcomes than even their never-homeless peers. This was true for both chronic absenteeism and measures of achievement. However, our findings highlight two key areas of concern. First, students who became homeless and remained homeless the next academic year had higher chronic absenteeism and lower achievement than students experiencing more temporary homelessness. Second, our results highlight the ongoing challenges facing students who are experiencing homelessness due to conventional reasons. We conclude with implications of these findings for educational stakeholders in preparation for both generational and "everyday" homelessness crises.

Key Findings

Attendance

- Chronic absenteeism rates for students who became temporarily homeless due to Hurricane Harvey increased by 27% after the storm.
- Students who became homeless due to Harvey and remained homeless into the following year had particularly steep increases in chronic absenteeism.
- Students who became homeless due to conventional reasons had higher rates of chronic absenteeism than all other students.

Achievement

- Students who became temporarily homeless due to Hurricane Harvey had similar or higher State of Texas Assessments of Academic Readiness (STAAR) achievement than their peers who did not experience homelessness.
- Students who became homeless due to Harvey and remained homeless in the following year had lower STAAR achievement.
- Students who became homeless due to conventional reasons had substantially lower levels of achievement than all other students.

Background

In August 2017, Hurricane Harvey ravaged Houston and surrounding areas, causing approximately $125 billion in damage overall (Mooney & Dennis, 2018). Hundreds of thousands of homes were damaged or destroyed, causing considerable increases in homelessness. Additionally, nearly all Houston ISD schools sustained damage of some kind, resulting in school closures, campus relocations, and even the delaying of the start of classes for some students (Waldron, 2017).

There has been substantial research attention on the effects of student homelessness (Buckner, 2013; Gould & Williams, 2010; Miller, 2011), including in Houston ISD (Pavlakis et al., 2020; Richards & Pavlakis, 2022). However, we know little about a subset of these students—those who lost their housing due to natural disasters such as hurricanes. Such research is particularly critical given that such natural disasters will only continue to intensify as climate change worsens; furthermore, natural disasters hold the potential to exacerbate existing inequalities by race and class (Bullard, 2000; Mohai et al., 2009).

In our first brief, we found that student homelessness in Houston ISD quadrupled due to Harvey. Moreover, most of these students lived, at least temporarily, in unsheltered contexts, such as sleeping in a car or on the street. Unlike other high-profile storms such as Hurricane Katrina, students who became homeless due to Harvey tended to be broadly representative of the district in terms of their demographic characteristics—and were significantly less likely to be Black, economically disadvantaged, or qualified for special education compared to students who became homeless due to conventional reasons, such as job loss and medical debt. A key exception to this pattern was the relatively small share of students (n=981) who became homeless due to Harvey for a year or more, who were particularly likely to be Black and economically disadvantaged.

In this brief, the second in a two-part series, we explore the educational impact of Hurricane Harvey on students who became homeless in Houston ISD. Using data from before and after Harvey, we document the impact of the storm on students' educational outcomes. We examine the educational outcomes of students who became temporarily homeless due to Harvey, as well as students who remained homeless into the next school year. We compare these students not only to their peers who did not experience homelessness, but also to other students who experienced homelessness in prior years due to conventional, economic reasons.

Research Question

- What were the educational outcomes of students who became homeless due to Hurricane Harvey?

Data and Methods

This brief uses Public Education Information Management System (PEIMS) data and other Houston ISD administrative data from the 2015-16 to 2018-19 school years provided to the Houston Education Research Consortium (HERC), part of Rice University's Kinder Institute for Urban Research. In total, we employ data on 358,273 students over the four academic years.

We compare four key groups of students:

- students who became homeless temporarily due to Hurricane Harvey (in 2017-18),
- students who became homeless due to Hurricane Harvey in 2017-18 and remained homeless into the 2018-19 school year,
- students who became homeless over the study period for conventional reasons not associated with Hurricane Harvey, and
- students who never experienced homelessness.

For this brief, we compare these groups on two key educational outcomes: 1) student chronic absenteeism, defined as missing 10% or more of their school days within the academic year; and 2) achievement on the STAAR exams in math and reading. All estimates presented in the results are regression-adjusted using mixed-effects models incorporating student-level covariates and grade and school fixed effects. See the Methodological Appendix for a more detailed discussion of our data and methods.

Key Findings

Attendance

Chronic absenteeism rates for students who became temporarily homeless due to Hurricane Harvey increased by 27% after the storm.
As Figure 1 demonstrates, the roughly 23,000 students who became temporarily homeless due to Hurricane Harvey (green line) were less likely to be chronically absent than other students before the hurricane (dashed line)—including those who never experienced homelessness (blue line). While somewhat surprising, this is consistent with findings in Brief 1 that students who became temporarily homeless due to Harvey are broadly representative of Houston ISD students.

In the year after Hurricane Harvey (2017-18), however, students who became temporarily homeless experienced a 27% increase in chronic absenteeism, three times the increase of students who did not experience homelessness (+9%). However, the chronic absenteeism of students who were temporarily homeless stabilized in 2018-19, when these students were no longer homeless. And nearly two years after Harvey, students who became temporarily homeless still had lower chronic absenteeism than all other student groups.

Students who became homeless due to Harvey and remained homeless into the following year had particularly steep increases in chronic absenteeism.
The nearly 1,000 students who became homeless due to Harvey and remained homeless into the following year (yellow line) had substantially higher chronic absenteeism before the storm than other students who experienced more temporary stints of homelessness. These gaps also continued to widen. By 2018-19, students who experienced longer-term homelessness due to Harvey were 55% more likely to be chronically absent than their peers who did not experience homelessness.

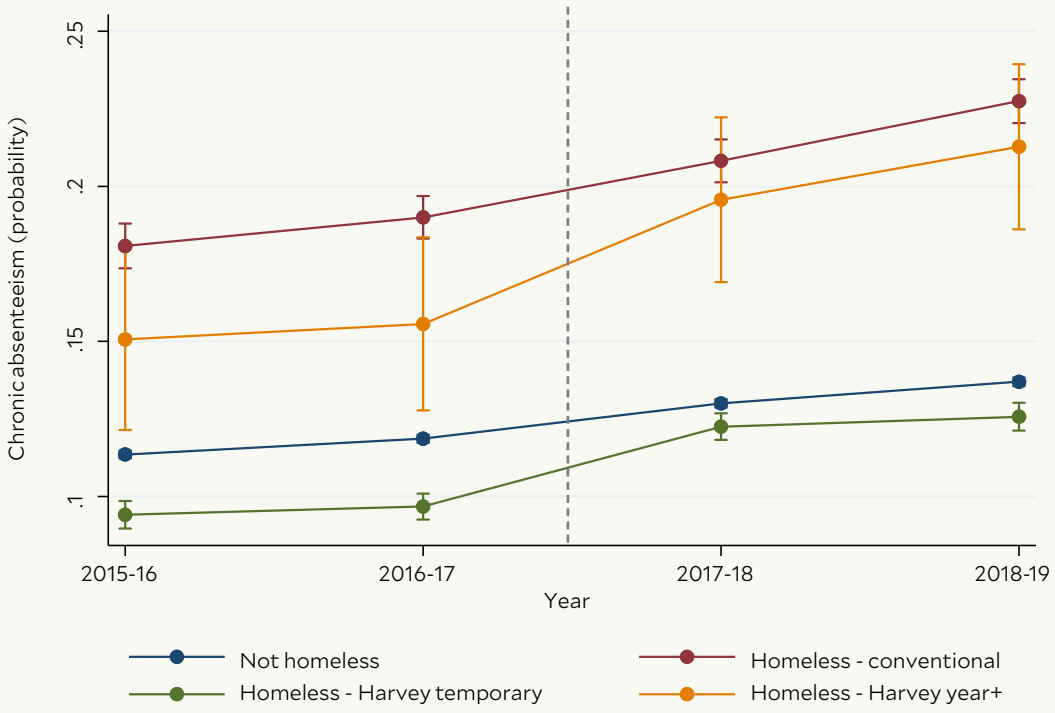
Students who became homeless due to conventional reasons had higher rates of chronic absenteeism than all other students.
Students who became homeless for conventional reasons unrelated to Harvey (red line) had rates of chronic absenteeism that were consistently higher than all other groups. These students also experienced larger-than-expected increases in chronic absenteeism in the two years after the storm. By 2018-19, students experiencing homelessness for conventional reasons were 74% more likely to be chronically absent than students who became homeless temporarily due to Harvey.

Achievement

Students who became temporarily homeless due to Hurricane Harvey had similar or higher STAAR achievement than their peers who did not experience homelessness.
Figures 2 and 3 demonstrate that students who became temporarily homeless due to Hurricane Harvey (green lines) had similar baseline achievement as students who never experienced homelessness (blue lines). Their STAAR reading trajectories continued to mirror those who did not experience homelessness after Harvey. On STAAR math, however, they began to outperform students who did not experience homelessness—a gap that widened the subsequent year. By 2018-19, students who had been temporarily homeless due to Harvey scored 0.05 standard deviations higher on STAAR math than students who did not experience homelessness. If we consider 0.20 standard deviations a typical year of learning growth, as proposed by Shakeel and Peterson (2022), this represents a quarter year of learning.

FIGURE 1

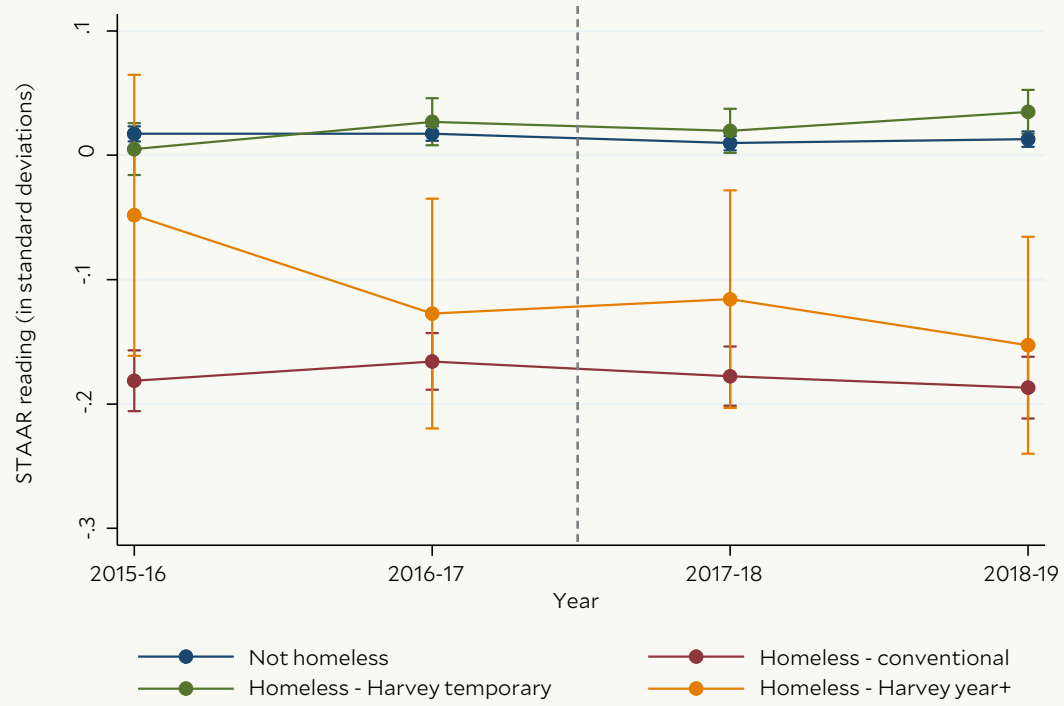
Relationship between homelessness and chronic absenteeism (%) by pathway to homelessness



Note: Gray dashed line indicates the year Hurricane Harvey hit.

FIGURE 2

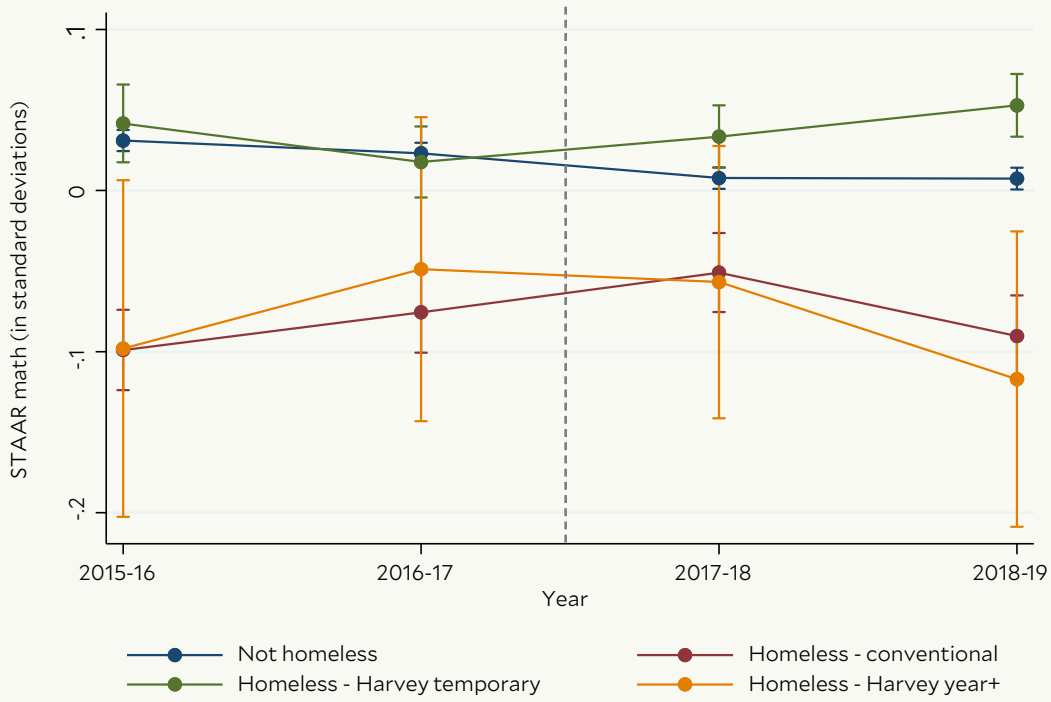
Relationship between homelessness and standardized STAAR reading achievement by pathway to homelessness



Note: Gray dashed line indicates the year Hurricane Harvey hit.

FIGURE 3

Relationship between homelessness and standardized STAAR math achievement by pathway to homelessness



Note: Gray dashed line indicates the year Hurricane Harvey hit.

Students who became homeless due to Harvey and remained homeless in the following year had lower STAAR achievement.

Students who became homeless due to Harvey and remained homeless (yellow lines) had lower achievement prior to the storm than students who did not experience homelessness as well as students who became temporarily homeless due to Harvey. The gap in STAAR math achievement appeared to narrow slightly in the year after Harvey, but both math and reading achievement remained significantly below that of their peers with stable housing. Caution should be used in interpreting estimates for this subgroup, however, as the smaller size of this sample (n<100) means those estimates have more error and are more influenced by individual students.

Students who became homeless due to conventional reasons had substantially lower levels of achievement than all other students.

Students who experienced homelessness for conventional reasons (red lines) consistently scored lower than their peers—particularly those who temporarily experienced homelessness due to Harvey. Their performance was similar to students who became and remained homeless after Harvey. The gap in STAAR math achievement appeared to narrow somewhat in the year after Harvey but widened again in 2018-19. In 2018-19, students experiencing homelessness due to conventional reasons scored approximately 0.19 standard deviations lower in reading and 0.14 standard deviations lower in math than students who became temporarily homeless due to Harvey.

Conclusion

In 2017, nearly 24,000 students became homeless due to Hurricane Harvey in Houston ISD alone. Unfortunately, given the worsening global climate crisis, such storms are likely to continue to increase in both frequency and intensity—highlighting the importance of better understanding the impact of natural disasters on students' housing experiences and educational outcomes.

In this brief, we examine the educational outcomes of students who became homeless due to Harvey. We find that students who became temporarily homeless for a year or less had educational outcomes that were equivalent to or better than even their never-homeless peers. This was true for both chronic absenteeism and STAAR reading and math achievement.

This finding is perhaps surprising to those familiar with prior crises such as Hurricane Katrina, which disproportionately devastated low-income and Black communities in New Orleans and the Gulf Coast. Research suggests that communities of color and people living in poverty tend to be more vulnerable to natural disasters (Cutter, 2006; FEMA, n.d.; Taneja et al., 2021). However, as the first brief in the series revealed, the damage from Hurricane Harvey in Houston ISD was widespread—hitting both more- and less-advantaged communities owing to historical patterns of residential segregation and the unique configuration of Houston's bayous. Accordingly, students who became temporarily homeless due to Harvey generally mirrored the characteristics of the district.

Our analyses also highlight a key exception to this trend: Students who became homeless due to Harvey and remained homeless a year later had significantly worse educational outcomes than those who experienced more temporary stints of homelessness. However, baseline data suggest these students were at elevated risk even before Harvey. It is possible that students who lost housing and remained homeless were already in more precarious financial and living conditions that were then exacerbated by Harvey.

Finally, is important to emphasize that students who experienced homelessness for conventional reasons had substantially more adverse educational outcomes—in terms of both chronic absenteeism and academic achievement—than not only their peers who did not experience homelessness, but also students who became temporarily homeless from Harvey. This is consistent with prior research highlighting the challenges faced by these students (e.g., Miller, 2011).

Implications and Recommendations

Strengthen school and community partnerships from Harvey.

Our results suggest that, overall, students who became homeless due to Harvey fared as well as their peers with stable housing in terms of academic outcomes. While our quantitative analyses provide little insight into the reasons for this, our prior qualitative work in Houston ISD has highlighted high levels of protective school- and community-level factors post-Harvey (Phillips et al., 2023). For example, Houston ISD personnel reported that they received large injections of resources from all over the country. Community providers and Houston ISD personnel deepened their collaborations and took pride in the mantra of *Houston Strong*—the idea that the entire community came out, volunteering time and money to get the city back on track. This societal and community-level response may have buffered students whose housing was impacted by Harvey. Such partnerships should be nurtured to ensure more robust responses for the next disaster—as well as to the "everyday" crises of homelessness.

Set criteria for accountability waivers before disasters strike.

We find little evidence that Harvey had any substantial negative effect on STAAR test scores of students who became homeless due to the storm. Notably, the Texas Education Agency (TEA) waived state accountability for Houston ISD campuses and other affected districts that year under the so-called Hurricane Harvey Provision in House Bill 22 (TEA, 2018). However, the provision was not finalized until June 2018, heightening uncertainty regarding whether and how campuses and districts would be rated. Proactive efforts by TEA should establish clear, predetermined criteria for post-crisis accountability policies to reduce uncertainty and anxiety for leaders, teachers, and students.

Make crisis supports available to all students experiencing homelessness.

Moving forward, school leaders should also consider how crisis supports and policy changes might benefit all students experiencing homelessness, irrespective of the role the disaster played in their housing instability. Lessons learned during Harvey, such as the value of a community-wide *Houston Strong* ethos, should also be applied to the routine, everyday policies, practices, and norms aiming to address the impact of homelessness for everyone affected.

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Methodological Appendix

This brief uses Houston ISD administrative data from the 2015-16 to 2018-19 school years that were provided to the Houston Education Research Consortium. In total, we analyzed data on 358,273 students over the four academic years of the study.

This time span allows us two years of data before and after Hurricane Harvey to estimate the characteristics and numbers of students experiencing homelessness before and after the storm. We elect not to follow students in 2019-20 onwards, as analyses would confound the effects of the hurricane with the effects of the global COVID-19 pandemic.

Analytical Models

To assess the impact of homelessness on educational outcomes of students who became homeless, Figures 1 through 3 report the estimated marginal effects obtained from multilevel mixed-effects regression models plotted in Stata. These models account for a handful of time-varying and non-time-varying student characteristics as well as grade and school fixed effects. All models are estimated with robust standard errors. We discuss each random variable in turn below.

Key Independent Variable

Homelessness. We use data on student homelessness obtained from Houston ISD attendance data. Unlike the PEIMS data, which provide a "snapshot" of students in fall, this allows us to capture students who were homeless at any time during the school year. Student homelessness is captured by the district in accordance with McKinney-Vento's definition of homelessness as any student who lacks "a fixed, regular, and adequate nighttime residence." As noted, we employ four mutually exclusive homelessness categories:

- students who became homeless temporarily due to Hurricane Harvey (in 2017-18),
- students who became homeless due to Hurricane Harvey in 2017-18 and remained homeless into the 2018-19 school year,
- students who became homeless over the study period for conventional reasons not associated with Hurricane Harvey, and
- students who never experienced homelessness.

Key Outcomes

Chronic absenteeism. Per TEA guidelines, based on Every Student Succeeds Act (ESSA) guidance, we consider a student "chronically absent" if they miss 10% or more of their enrolled school days per year.

STAAR achievement. Achievement is measured as student performance on the STAAR tests in reading and mathematics for third through eighth grade. We standardize these measures by grade and year for the purposes of analysis and interpretation. For example, a reported STAAR math score of a third grader in 2017 of 0.5 would mean that student scored 0.5 standard deviations above other third graders on the STAAR math exam in 2017.

Key Covariates

Gender. We use students' binary gender codes from PEIMS, which classify students as male or female.

Economic disadvantage. We categorize students as economically disadvantaged using PEIMS codes, including students who are eligible for free- and reduced-price lunch or are eligible for federal benefits, etc.

Special education. We use students' special education codes from PEIMS to indicate whether the student is participating in a special education program or a general education program using special education support services, supplementary aids, etc.

Emergent bilingual. We classify students as emergent bilingual using the Limited English Proficient (LEP) indicator codes from PEIMS. We consider students emergent bilinguals if they were classified as currently LEP or in the first or second year after reclassifying.

School fixed effects. We incorporate dummy codes to account for all non-time-varying sources of variation between schools.

Grade fixed effects. We incorporate dummy codes to account for all non-time-varying sources of variation between students of different grade levels.

Mission

The Kinder Institute for Urban Research builds better cities and improves lives through data, research, engagement and action.

About

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