

School Suspensions, Test Scores, and Lead Poisoning

RACHEL M. COHEN

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Economists find new evidence that kids with higher exposure to lead are more likely to misbehave in school and do worse academically.



AP Photo/Kalamazoo Gazette-MLive Media Group, Mark Bugnaski

This 110-year-old home in Kalamazoo, Michigan, was the subject of a \$115,000 settlement with the city after homeowner Brandi Crawford-Johnson discovered the house's lead-based paint was responsible for her child's elevated lead levels in 2013.



Over the past several years, education advocates and civil rights groups have been **sounding the alarm** on the harms of exclusionary school discipline policies. Critics say these punishments—suspensions, expulsions, and school-based arrests—are increasingly doled out for minor infractions, and disproportionately given to students of color.

A National Bureau of Economic Research (NBER) **working paper** published in May adds a new wrinkle to the debate on disparities in school discipline: Economists found causal evidence linking young children with higher exposures to lead in their bloodstream with an increased probability of getting suspended from school and placed in juvenile detention.

Anna Aizer, a Brown University economist, and Janet Currie, a Princeton University economist were the first researchers to look at the relationship between lead exposure and school discipline. While others have explored links between lead exposure, criminal activity, and cognitive development, this study breaks new ground by tracking individual children over time.

One reason why researchers hadn't studied lead and school discipline before is due to insufficient data. Most children exposed to lead tend to come from disadvantaged backgrounds, but even if a researcher had identified a relationship between lead levels and future disciplinary infractions—they could not determine if lead was driving the relationship, or if the underlying poverty was the cause.

Getting precise measurements of lead has also been a challenge for researchers. Blood tests are relatively cheap and easy to administer, but depending on when the blood is drawn, the results may or may not accurately capture a child's exposure because lead remains in an individual's bloodstream for a little over a month before their organs absorb the metal. In other words, researchers worry that they potentially underestimate children's exposure to lead when they analyze blood tests.

Only 11 states and the District of Columbia even mandate blood-lead tests for children, which exacerbates the problem of mismeasuring lead. Researchers estimate that maybe a quarter of all U.S. children nationally ever get screened. A **Reuters investigation** published last year documented how millions of kids fall through the cracks, even among those who are required to undergo state-mandated screening.

Yet Rhode Island, where Aizer and Currie did their study, presented some unique research opportunities. Unlike most states, the number of children in Rhode Island who get screened for lead is high, close to 80 percent. Not only that, but Rhode Island children are also screened three times on average during their first six

years of life. This means that the chances of getting an accurate measure of lead exposure are significantly higher than usual since kids are tested multiple times.

Aizer and Currie studied Rhode Island children born between 1990 and 2004. They accessed state health department data on each child's preschool blood lead levels from 1994 to 2010, and then linked that information to school suspension data for the 2007-2008 and 2013-2014 school years. The researchers also compared this information to data from the state's juvenile detention facility and all Rhode Island correctional institutions.

“What we find is that there's a pretty robust relationship between early childhood lead levels as measured by the blood tests and future disciplinary infractions,” says Aizer. Not only were children with elevated blood-lead levels more likely to be suspended, but Aizer and Currie found that suspended children were also ten times more likely to end up in juvenile detention.

The two most common sources of lead poisoning are old paint and soil. A robust movement to reduce lead in the environment didn't really take off until 1971, when the U.S. surgeon general **issued a policy statement** on childhood lead poisoning, and the EPA's first administrator **declared** that “an extensive body of information exists which indicates that the addition of alkyl lead to gasoline ... results in lead particles that pose a threat to public health.”

The federal government finally banned lead-based paint in 1978, but older housing units may still contain the metal. Washington also phased out leaded gasoline between 1979 and 1986. While the amount of lead in soil has significantly decreased over time—because it's been washed out, blown, or tracked away—the soil near roadways, especially in urban areas, may still contain lead that had seeped into the ground from automobile exhaust.

One strategy Aizer and Currie used to track the relationship between blood-lead levels and future misbehavior was to look at where kids with high lead exposure live. “We tried to address the question of confounding variables by looking at the same kids who live near the same roads at different periods of time [with the] same racial composition, the same income,” says Aizer. “The difference is they are living or born near roads fifteen years later, as the amount of lead in the soil near roads declined because of repaving or rain runoff or new turf.” The economists found that the dramatic declines in lead levels were linked to significant declines in disciplinary infractions.

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Aizer and Currie's findings related to race and gender were complex. They found that white girls with high lead levels were not likely to be suspended, but that was not true for African-American girls, or, generally, for boys. They also found that the relationship between lead and suspensions was much stronger for kids who received free lunches. While Aizer and Currie have not settled on definitive explanations for why lead had different effects on different children, they have developed some possible theories.

“There is some evidence that cognitive stimulation reduces or mitigates the negative impact of lead,” says Aizer, who explains that if a child who receives free lunches—a proxy for low-income households—gets less stimulation, they might react differently to the lead exposure compared to a wealthier student exposed to lead. Another explanation could be that schools respond differently to the misbehavior of different groups of students. Currie and Aizer say that there is evidence for both interpretations.

Their research comes on the heels of **another working paper** Aizer, Currie, and two other colleagues co-published last year. Using a slightly different research strategy but still involving Rhode Island children, they found that reducing children's lead levels had significant positive effects on third grade reading test scores, especially for black and Hispanic students. “A one-unit decrease in average blood-lead levels reduces the probability of being substantially below proficient in reading by 3.1 percentage points,” the economists concluded.

While average childhood lead levels have fallen by more than 90 percent over the last 40 years, progress has been uneven, especially in poor urban areas with old housing stock.

Some states, like Rhode Island, have taken effective steps to reduce exposure to lead. In 1997, for example, Rhode Island officials implemented policies that required landlords to ensure that their rental properties were lead-free. One policy required all Rhode Island landlords to obtain “lead-safe certificates” if they intend to rent their properties. Another required landlords who own buildings where a child had elevated lead levels to mitigate the lead hazard or face legal action by the state attorney general.

In 2010, the U.S. spent more than \$80 billion on corrections expenditures at the federal, state, and local levels, **according to the Brookings Institution**. They found that total correctional expenditures had more than quadrupled over the past 20 years. And in 2014, after surveying 46 states on their costs of juvenile detention, the Justice Policy Institute **reported** that average per-person costs for the most expensive juvenile confinement options reached \$407 a day, or nearly \$150,000 per year.

“Governments need to think about this,” says Aizer. “Crime is just an incredibly expensive outcome for a state, and lead mitigation is so much cheaper relative to that.”