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GIVING NEW MEANING TO 'CRIMINAL ENVIRONMENT'

Compelling crime story: The lead in the air did it

By Robert Mitchum

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Police and policymakers were treated to a happy surprise in the 1990s. Crime rates, which had recently surged and appeared destined to soar, suddenly began to fall -- more than 30 percent throughout the decade.

Some experts credited an improving economy, others law enforcement. Still others looked to social changes, such as the legalization of abortion and the decline in the use of crack cocaine.

Now two independent studies link the drop in crime to an unexpected source: the coordinated removal of lead from gasoline about 20 years earlier.

Criminologists are skeptical. But the research by economists Rick Nevin and Jessica Wolpaw Reyes is compelling.

Data from Chicago, for example, intriguingly trace the exposure to car exhaust from the Dan Ryan Expressway among residents of the Robert Taylor Homes. The study posits that one significant explanation for why the now-demolished housing project was such a hotbed of violence can be plucked out of the lead-infused air.

The research builds on what we already know about the devastating effects of lead exposure on young brains. And it warns against complacency in our efforts to remove lead from the environment, given the strong neurological effects observed even at low exposures.

"Because lead has been studied for so long, people have a false sense of security that lead is no longer a problem," said Tomas Guilarte, a professor of molecular neurotoxicology at Johns Hopkins University. "But it's still a huge problem, not only in this country but worldwide."

That warning has been underscored by a recent string of toy recalls because of concerns about lead paint.

While the crime studies focus on lead in a novel way, they raise thorny questions:

Does lead exposure cause criminal behavior, or is it merely associated with other contributing factors? Lead often is a marker of poor housing, which correlates with factors such as race, urban location and poverty.

And if lead exposure causes criminality, what is the biological mechanism?

Nevin and Reyes do not delve deeply into biological questions. They just lay out data, compiled from all 50 states and nine foreign countries.

The data show a 20-year lag between the onset of efforts to reduce lead exposure and a fall in crime rates. The suggestion is clear: The less lead exposure that children receive as infants and toddlers, when they are most vulnerable to the toxin, the less likely those children are to commit crimes at 20, when criminal behavior peaks.

Lead exposure was not the only factor affecting crime rates. But it made the largest impact, the researchers said, superseding such commonly quoted factors as the unemployment rate, incarceration rate, number of police on the streets, single-parent upbringing and the legalization of abortion.

Those other factors leave criminologists wary about blaming lead.

"It seems to me very dangerous to try to track so much with one cause," said Jim Wagner, president of the Chicago Crime Commission. "If this has led to a reduction, why are we having an increase in the more recent figures?"

But Nevin suggested that his data are strong enough to reconsider previous studies looking at other factors associated with crime.

"Evidence has mounted to the point where we must ask the reverse question: Do we have any studies that show socioeconomic status, race or family structure have independent effects on the declining crime rate after controlling for lead?" he asked.

Beyond dispute is the damage lead can do. As long as 50 years ago, lead's effects on behavior were being recognized, said Dr. Herbert Needleman, a professor of psychiatry and pediatrics at the University of Pittsburgh Medical Center.

"Mothers knew that their kids had changed" after suffering lead poisoning, Needleman said. "Parents complained that ... [children] became hard to manage, easily frustrated and violent."

Many studies have shown that lead exposure early in life can lead to decreases in IQ; increased impulsiveness; higher incidence of attention deficit hyperactivity disorder, or ADHD; and aggressive behavior. Needleman found that juvenile delinquents have higher levels of lead in their bones than their peers. Long-term studies have linked elevated levels of lead in the blood to higher rates of delinquency.

"There are so many different examples of its influence, it's hard to say which one is the reason that behavior is disturbed," Needleman said. "You could write a book about different lead effects, and you would run out of space before you run out of targets."

The link between these neurological and behavioral changes and actual criminal behavior remains indirect, however. Some studies have shown relationships between impulsivity disorders such as ADHD and delinquency, and others have found that lower IQs predispose people to incarceration.

"If a child has a lower IQ resulting from exposure to lead or other environmental agents, then the ability of the child to make correct decisions could potentially be altered," Guilarte said.

Chicago children are particularly vulnerable, according to annual lead screenings of Illinois schoolchildren. Data collected from 1997-2003 showed that in several areas of the city, more than a quarter of children have blood-lead levels above 10 micrograms per deciliter -- the Centers for Disease Control and Prevention minimum for having a dangerously elevated level of lead in the blood.

Though efforts to remove lead-based paint and the ban on leaded gasoline have produced dramatic gains, even small exposures to the toxin can deliver strong neurological effects. The latest research underlines the importance of reducing the risks, whether the exposure comes from old houses or imported toys.

"It opens up this whole set of questions about the role of environmental policy as social policy," Reyes said.

Robert Mitchum, a neurobiology graduate student at the University of Chicago, recently finished a reporting internship at the Tribune.

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