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## Pollution, Poverty and People of Color: Asthma and the Inner City

Seven million children now suffer from asthma--and they are disproportionately poor

By Crystal Gammon and Environmental Health News | Wednesday, June 20, 2012 | 4 comments

*Read Part 1, Part 2, Part 3 Part 4, Part 5, Part 6 and Part 7 of the Special Report.*

EAST ST LOUIS, Ill – On a clear spring day, the four-year-olds laughed as they ran out on the playground at the start of morning recess. Within minutes, one boy stopped, a terrified look on his face. Brenda Crisp and her staff immediately realized what was happening: Asthma attack.

“He escalated from zero symptoms to a severe attack in no time at all,” said Crisp, director of the Uni-Pres Kindercottage daycare center. “It came out of the clear blue.”

An ambulance rushed the boy to the hospital, where it took him two days to recover. Two years later, he still suffers unexpected asthma attacks and must take his nebulizer, a device that delivers a dose of corticosteroids and oxygen, wherever he goes.

This wasn't the first — or the last — near-deadly attack Crisp and her staff have witnessed at the daycare center. When it comes to asthma, the children of their community are at high risk.

Nearly all are African American and living in poverty. Incinerators, metal producers, power plants, chemical manufacturers and other industries ring the city. Exhaust from cars and trucks on nearby highways blankets the area, as well.

This socioeconomic profile and long history of environmental hazards have left East St. Louis with what experts suspect is one of the highest asthma rates in the nation.

Seven million American children -- nearly one out of every ten -- have asthma, and the rate has been climbing for the past few decades, reaching epidemic proportions. For black children, it's even worse -- one out of every six -- and the reported rate has risen 50 percent between 2001 and 2010, according to data from the Centers for Disease Control and Prevention.

“We are seeing higher asthma numbers in emergency departments, and we're realizing it's on the rise,” said Anna Hardy, a public health nurse at the East Side Health District in East St. Louis.

What is it about this city – and other poor, African American cities across the



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nation -- that leaves children with a disproportionate burden of respiratory disease? Is it the factories? The traffic exhaust? The substandard housing? For two decades, medical experts have struggled to unravel the mysterious connections between inner-city life and asthma, and while they have reached no conclusions yet, they suspect they know the answer: All of the above.

### **Crippling poverty**

Located across the Mississippi River from St. Louis, Mo., East St. Louis is on the wrong side of the tracks, so to speak.

Of its 27,000 residents, 15 percent are unemployed, almost 44 percent are below the poverty line and the median family income is around \$22,000, according to census reports. Its violent crime and murder rates are consistently among the nation's highest. Eighty-two percent of East St. Louis children depend on food stamps, 28 percent of births are to teen mothers and 22 percent of mothers receive no or inadequate prenatal care, according to the nonprofit group Vision for Children at Risk.

Housing in the city ranges from, at best, small homes that often house multiple families to crowded, low-income apartment complexes. Some people live in burned-out buildings and tents.

There are few grocery stores, so residents buy most of their food at convenience marts. A quart of milk costs around \$6 and a bottle of children's Tylenol is \$15 at one such store, according to nurses at a local clinic run by Community Nursing Services of Southern Illinois University-Edwardsville.

Raw sewage backs up into homes, businesses and schools whenever the volume overwhelms the city's decaying 150-year-old pipes. Garbage collection, which halted completely from 1987 to 1992, now is only available to households that pay out-of-pocket for the service. Most trash is burned in back yards, adding to the polluted air, or dumped in vacant lots.

A survey by the Southern Illinois University nursing group counted 2,200 dumped tires and 27 registered strip clubs within a 10-block radius of the clinic. In fact, for all appearances, strip clubs are the city's dominant industry.

That wasn't always the case. At the turn of the 20th century, East St. Louis was a booming industrial center with abundant employment opportunities. A Monsanto chemical plant, an aluminum refinery and the St. Louis National Stockyards Company, among others, set up shop there.

But most industrial facilities had split off from East St. Louis by the early 1900s, forming their own company towns to avoid the city's regulations and taxes. The Monsanto chemical plant, now Solutia, is in one of those towns, in the village of Sauget, on East St. Louis' southern edge. Sauget also is home to many other chemical plants, a hazardous waste incinerator, a copper smelter and a wastewater treatment plant. The Aluminum Ore Company established the town of Alorton, also along East St. Louis' southern border, and the St. Louis National Stockyards Company, now defunct, incorporated National City in 1907.

Plummeting city revenue combined with job losses, a corrupt city government and increasing racial tensions. Most upper- and middle-class white residents moved out of East St. Louis by the 1960s. The poor, largely African American population that remained was left with a city that couldn't afford to take care of itself.

The city receives no revenue from the neighboring companies. But unlike the tax dollars, the pollutants don't stop at city limits.

### **Whichever way the wind blows**

“East St. Louis gets the pollution, but none of the funds,” said Kathy Andria, president of the American Bottom Conservancy and conservation chair of the Kaskaskia group of the Illinois Sierra Club. “Whichever way the wind blows, the city gets industrial emissions.”

To the city’s north, U.S. Steel-Granite City Works is a major source of carbon monoxide – more than 13,000 tons – as well as 3,500 tons of particulates in 2010. Its coke facility emitted another 1,900 tons of sulfur dioxide and 500 tons of particulates. The Dynegy Midwest Generation plant, a coal-burning power plant, had nearly 10,000 tons of sulfur dioxide emissions in 2010. The ConocoPhillips Wood River refinery also released nearly 5,000 tons of sulfur dioxide, 4,000 tons of nitrogen oxides and 2,000 tons of volatile organic matter, according to data from the U.S. Environmental Protection Agency. To the east, CenterPoint Energy, a natural gas compression facility, contributed 54 tons of nitrogen oxides. South of East St. Louis, the industrial plants in Sauget release hundreds of tons of volatile organic matter, sulfur dioxide and nitrogen oxides each year.

Seven of those facilities each emit at least 10 annual tons of hazardous air pollutants, including the carcinogens benzene and formaldehyde. Dozens of additional polluters are scattered throughout the metro area, too.

Traffic is also a significant pollution source for East St. Louis residents, as the city sits at the intersection of three interstate highways and U.S. Highway 40. Westbound traffic is often funneled into a single lane across the Mississippi River, which means traffic is constantly jammed and engines idle on the highways throughout the day. Also, because it’s a low-income area, local traffic consists of older and more polluting cars and buses.

The region’s levels of ozone and particulate matter, two pollutants caused by both automobiles and industry, exceed national air quality standards.

“We think ozone and particulate matter in this region usually come 50/50 from mobile sources, such as cars and trucks, and from stationary facilities,” said Jim Ross, air pollution control division manager at the Illinois Environmental Protection Agency.

Particulate matter accumulates in the respiratory system and can lodge deep within lungs, triggering asthma attacks and other respiratory and cardiovascular problems. Ozone, volatile organic matter and sulfur and nitrogen oxides can irritate airways and also trigger asthma attacks.

“Particulates, ozone, oxides of nitrogen and sulfur — they all have strong biological mechanisms for making asthma worse,” said Dr. Rob McConnell, an asthma researcher at the University of Southern California.

Air pollution has decreased over the past few decades, but residents still may be dealing with the lasting effects on their health.

“Twenty, 30 years ago, you would step outside and see clouds of smoke, and the air would smell like stale smoke all the time,” Crisp said. “It’s gotten better, but I think those companies were killing our children.”

### **A complex disease**

Experts have been unable to figure out why rates of asthma – a chronic disease in which airways are inflamed and constricted -- have risen so dramatically over the past few decades.

Doctors have long recognized that allergens, such as dust, mold and pet dander, and air pollutants can trigger asthma attacks. Much less clear, however, is what causes people to develop the disease in the first place.

“There’s an emerging consensus that air pollution also causes new onset asthma, but that’s not accepted by everybody,” McConnell said.

Traffic pollution may be the biggest culprit. Over the last two decades dozens of studies have associated increases in asthma rates with pollution near roadways.

“We’ve known for a long time that PM<sub>2.5</sub> [fine particulate matter] exposure is a trigger; now there’s emerging evidence that exposure can be associated with development of asthma, too,” said Dr. Rachel Miller, an asthma researcher at Columbia University Medical

Center.

In Southern California communities, exposure to air pollution and traffic emissions stunts children's lung growth, according to USC research. Traffic pollution near a child's home and school also was related to the child's risk of developing asthma, and regular freeway commutes of just a few minutes increased a child's asthma risk. Children in families and communities with low socioeconomic status had a higher risk of developing the disease.

In Dominican and African American families from poor areas of New York City, living in a neighborhood with dense traffic and industrial facilities increased a child's risk of developing asthma, according to Miller and other Columbia University researchers. These children had higher levels of an immune marker associated with asthma the closer they lived to a highway.

Also, in a poor area near Lima, Peru, researchers found that living near a major road doubled both asthma and allergy risks. People near the roadway were exposed to significantly higher levels of black carbon, a component of diesel vehicle exhaust.

"We know that traffic-related pollution can be very allergenic. It could...make an individual more susceptible to developing an allergic sensitization to a specific allergen," said Dr. William Checkley, a Johns Hopkins pulmonologist who led the Peru study.

Nevertheless, some experts believe outdoor air quality plays only a minor role in asthma disparities. Instead, they focus on cockroaches, mold and other problems related to poverty or substandard housing.

For those living below the poverty line, 12 percent of U.S. children have the disease, compared with eight percent with family incomes more than twice the poverty level.

"Asthma rates and lead poisoning rates often track pretty closely," said Dr. William Kincaid, chairman of the St. Louis Regional Asthma Consortium and a professor at Saint Louis University. "Everyone breathes the same outdoor air. But if you're in an older home, you're more likely to have lead paint, and you're also more likely to have mold, mildew, a leaky roof and all those other issues that predispose you to asthma."

Miller said that labeling pollutants as "indoor" versus "outdoor" oversimplifies the issue.

"Most of the outdoor pollutants people encounter readily penetrate indoors," she said. "In particular, black carbon, the soot that can come from diesel engines, penetrates from outdoors to indoors, and from indoors to outdoors."

In addition, scientists suspect that the stress of living in low-income areas with high rates of crime and other stressors may make children more vulnerable to the effects of pollutants, perhaps by altering their hormones and immune systems.

There also is evidence that some pollutants and allergens may interact synergistically to cause asthma or trigger an attack. For example, diesel exposure and allergen exposure can each trigger allergic reactions. However, people exposed to both diesel exhaust and another allergen simultaneously often have a reaction that is more severe than the sum of their diesel-only and allergen-only reactions, McConnell said.

"I think the evidence for outdoor, near-roadway pollution is as strong as the evidence that indoor allergens cause asthma — maybe stronger — but I don't see it as one or the other," McConnell said.

"Asthma is a complex disease, and there are probably multiple causes," he said.

### **A triple whammy for East St. Louis**

East St. Louis is prime territory for both indoor and outdoor pollution, as well as poverty.

“Their housing stock generally is older and not so well-maintained,” which exposes residents to a variety of indoor air pollutants, said Amy Funk, an air quality specialist with the Metro East Citizens Air Project at the University of Illinois. “The housing stock also sits directly on a major interstate, so obviously you’re going to have an impact from mobile pollution sources, too.”

St. Louis ranks seventh on the Asthma and Allergy Foundation of America’s list of asthma capitals. About 14 percent of children have asthma in the St. Louis metro area, compared with 9.4 percent nationwide, according to the St. Louis Regional Asthma Consortium.

Data on East St. Louis itself is nearly impossible to track down, but its asthma rate is likely higher. Ninety-eight percent of the city is black, and black children have double the asthma rate of whites.

One person who’s not waiting for more asthma data is Crisp of Kindercottage. Five generations of her family have lived in East St. Louis, and nine family members — including Crisp herself — have suffered from asthma.

After caring for dozens of asthmatic children over the last 42 years, including her own son and daughter, Crisp knows how to make immediate differences in their lives. Kindercottage partners with local physicians and pharmacy representatives so children have access to check-ups and asthma medications.

Crisp also teaches children to remind their parents not to smoke around them, and to ask drivers to avoid revving car engines in their driveways.

“We start asthma education early so children can take charge of their own care,” Crisp said. “It’s about empowering kids to know they can control their asthma.”

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