



## Advocacy

### True grit: Pediatrician proves Michigan community's water was poisoning children

by Madeline Sturgeon, Editorial Intern

Although the residents of Flint, Mich., had been complaining for months about the color, smell and taste of the community's water, state and local officials maintained the water supply was safe.

Mona Hanna-Attisha, M.D., M.P.H. FAAP, however, was not convinced.

A dinner party conversation with a water-quality expert stoked the Flint pediatrician's curiosity and compelled her to seek evidence that would prove the water supply was toxic.

"As the stewards of these children, it is our responsibility to protect them," said Dr. Hanna-Attisha, a mother of two. "When there is a clear violation of public health that is going to impact these kids today and forever, we couldn't not do anything."

With help from colleagues and the AAP Michigan Chapter, Dr. Hanna-Attisha uncovered the data to support her suspicions. A pediatrician at Hurley Children's Hospital, Dr. Hanna-Attisha had access to a large body of routine blood test records. She started investigating, and what she found was disturbing: The percentage of Flint children with elevated blood lead levels had doubled since the city had changed its water source.

Her efforts were rewarded on Oct. 15 when the Michigan Legislature unanimously passed a bill allocating \$9.3 million to address the crisis.

#### How did this happen?

Prior to April 2014, Flint bought Lake Huron water from Detroit. To cut costs, Flint officials joined the Karegnondi Water Authority to build their own Lake Huron intake system. Until it could be completed in 2016, Flint would pull water from the Flint River.

In mid-September, a Virginia Tech researcher and lead expert, Marc Edwards, concluded that Flint water was 19 times more corrosive than Detroit water. The city had allowed the water to flow through an old system without corrosion control, leaching lead from the pipes as it traveled to Flint spigots.

Despite Edwards' findings and complaints from residents, state and local officials insisted testing showed lead in homes to be at acceptable levels.

Dr. Hanna-Attisha's research demonstrated otherwise.



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Mona Hanna-Attisha, M.D., M.P.H, FAAP

She compared routine blood lead test results for 1,746 kids in Flint before and after April 2014. The percentage of kids in Flint with elevated blood lead levels of 5 micrograms per deciliter or more had doubled since the switch. In certain ZIP codes, it had tripled.

While no level of lead in the body is safe, the Centers for Disease Control and Prevention (CDC) uses a level of 5 micrograms per deciliter to identify children living in environments that expose them to lead hazards. Toxicity builds slowly and silently, and the effects are permanent. (See sidebar.)

"When we saw the results, we weren't surprised because it made sense based on the water chemistry and infrastructure," Dr. Hanna-Attisha said. "But we were still angry and saddened because this could have entirely been prevented."

Dr. Hanna-Attisha released her data on Sept. 24, but officials refused to accept the findings. They called her work "unfortunate" and said it fueled public discontentment in a time of "near hysteria."

Despite a "constant nauseous feeling" and minimal sleep, Dr. Hanna-Attisha stood her ground. Her team had checked and double-checked the data, run p-values over and over again. They knew they were right.

Dr. Hanna-Attisha asked Eden Wells, M.D., the state's chief medical executive, to take a closer look. The two doctors, who had worked together on immunization promotion earlier in the year, compared Dr. Hanna-Attisha's results with the testing performed by state epidemiologists. They noticed the state's sample included children who would not normally drink Flint water.

After reanalyzing their data, state epidemiologists confirmed Dr. Hanna-Attisha's findings: The water supply was contaminated with lead. Finally, the children of Flint had been heard.

"Kids cannot speak up and say, 'Hey, pass stricter immunization regulations, or I want to be rear-facing (in a car seat) until the age of 2 or I want to wear my helmet,'" said Dr. Hanna-Attisha. "We have to be their voices."

### **Pediatricians as advocates**

Teresa Holtrop, M.D., FAAP, a member of the Michigan Chapter, recalled how Dr. Hanna-Attisha and her colleague, Lawrence Reynolds, M.D., FAAP, presented Flint's lead issue to the chapter before the state had acknowledged the crisis.

The two pediatricians talked about the extent of the problem, potential resources and an action plan. The



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chapter helped them draft press releases and consolidate advocacy efforts.

"It was a real concrete example for everyone how advocacy is so important," said Dr. Holtrop. "It was an example to us as to how one person or two people can bring something forward and then make it really, actually change how policy is created."

Once state epidemiologists had confirmed Dr. Hanna-Attisha's findings, local officials declared a public health emergency.

On Oct. 2, Flint Mayor Dayne Walling and state officials vowed to remedy the crisis. They announced a plan that included free water testing, filters for residents and complete anticorrosion treatment of the city's water system. Two weeks later, the Michigan Legislature approved \$9.3 million to return Flint to the Detroit water system, hire more public health workers, test children in schools and provide water filters.

Detroit water returned to Flint's pipes on Oct. 16 and now contains corrosion control agents that help prevent lead from leaching into the system.

Still, many people wonder how this public health failure happened in the first place.

"It w



Dr. Reynolds as shocking that there was such a disconnect between water quality as assessed by... our Department of Environmental Quality, and the reality of the health issues," said Dr. Reynolds.

Dan Wyant, director of Michigan's Department of Environmental Quality, said staff members applied the wrong standards of the Lead and Copper Rule when testing drinking water, which caused them to miss elevated lead levels.

"As Fellows, we are responsible for not just the health of the children who come into our office, but the health of our community," Dr. Reynolds said. "We cannot always assume that the guidelines and regulations that are followed by agencies take into consideration the particular needs and health risks for children."

## Next steps

Although officials have enacted changes that ensure safer water for Flint residents, lead exposure cannot be



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reversed. Increased lead poisoning only adds to the long list of disparities in Flint, which include high rates of poverty and violence.

Concerns still remain over Flint's aging water infrastructure, which has now lost the protective seal that used to prevent lead from getting into the water.

"Now we have an entire cohort of children... that have been exposed to lead," said Dr. Hanna-Attisha. "And this is a population that is already battling every single toxic stress indicator that you can think of."

In addition to reassessing children's blood lead levels in one year, Dr. Hanna-Attisha plans to look at cord blood lead levels. She plans to advocate at the national level to increase funding for the Childhood Lead Poisoning Prevention programs and strengthen the Safe Drinking Water Act.

She also plans to promote wraparound services that will buffer the impact for affected families, including public nutrition education, a home-visiting program, infant social support and mental health services.

For Dr. Hanna-Attisha, being a pediatrician is synonymous with being an advocate. As a professor at the Michigan State University College of Human Medicine, she urges her medical students to embrace the powerful credibility they possess as physicians.

"Nobody listened to the mom, to the activist, to the water expert," she said. "But when the pediatrician spoke, that's when the game changed."

## Preventing lead exposure is key

About half a million U.S. children between 1 and 5 years old have blood lead levels above 5 micrograms per deciliter, the point at which the Centers for Disease Control and Prevention (CDC) recommends intervention to remove lead sources and monitor the child.

Most lead poisoning is invisible, a slow buildup in the body, according to the CDC. Over time, lead poisoning can slow physical growth, damage hearing and speech, lead to behavior problems, make it difficult to pay attention and learn, damage organs, and disrupt regular bodily functions, including digestive and possibly reproductive processes. New research also suggests that damage from lead exposure to an unborn child may affect his or her grandchildren decades later.

"Kids with lead poisoning are asymptomatic," said Mona Hanna-Attisha, M.D., M.P.H, FAAP, who brought the water crisis in Flint, Mich., to the forefront. "We're not going to see the impact until in five years when the kid needs special education, or in 10 years when they have ADHD or in 15 years when they're in the criminal justice system."

Blood tests to measure lead levels are covered by Medicaid and most private health insurance. Chelation therapy should be considered when a child has a blood lead level greater than or equal to 45 micrograms per deciliter, according to the CDC.

By shifting focus to primary prevention of lead exposure, dangerous lead sources in children's environments can be reduced or eliminated before they are exposed, Dr. Hanna-Attisha said.



THE OFFICIAL NEWSMAGAZINE OF THE AMERICAN ACADEMY OF PEDIATRICS

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"When you detect (lead) in a kid ... that means primary prevention has failed," she said. "And that's what we need to be doing for lead: primary prevention. It should never reach a child."

## Resources

- [Information about protecting children from lead exposure](#)
- [A fact sheet for parents from the CDC](#)
- [HealthyChildren.org information for parents on blood lead levels](#)
- [HealthyChildren.org information for parents on lead screening](#)