Scientist takes first step to measure chromium contamination

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Judy Zelikoff is filling an unwanted role. Three decades after hexavalent chromium spread under a Garfield, N.J., neighborhood, this accomplished scientist and her team of researchers at New York University may finally be able to tell residents whether their bodies have absorbed dangerous quantities of the cancer-causing metal.

It is the first attempt to assess the health of residents after state officials turned down requests for such a study, saying they don't have the money or manpower. But Zelikoff said it was her own humble upbringing in Paterson that led her to this working-class community that has become accustomed to being let down.

"I have a warm spot in my heart for towns that are underserved," she said. "I went into science so I can help people like this."

Over the next few months, up to 250 residents in the city's southwest corner will be asked to cut their toenails and submit them to Zelikoff's team for analysis at her laboratory in Tuxedo, N.Y. It may seem like an odd experiment, but the most accurate, non-invasive way to measure chromium intake is through the protein found in toenails. The study will show how prevalent exposure to the toxic substance is among people living on top of the Superfund site.

But first Zelikoff and her team have to navigate their way through a community distrustful of authority after almost three decades of inaction to a public health crisis. They have to ingratiate themselves in a

neighborhood full of new immigrants, many of whom do not speak English. And they have to make sure that their study is solid and offers answers to residents who fear they are more susceptible to cancer because of the chromium that flows under the homes and has infiltrated some of their basements.

"I can see how frustrated people can get when they don't know if something like this is affecting their health," Zelikoff said. "They want answers. We hope to give them some."

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In December 1983, almost three tons of hexavalent chromium poured into the ground after a valve on a holding tank broke at the E.C. Electroplating plant on Clark Street. Despite having recovered only 30 percent of the chromium and evidence that it migrated under the surrounding neighborhood, the state Department of Environmental Protection allowed E.C. to suspend all recovery efforts less than two years later.

The spill was largely forgotten until chromium seeped into the basement of a firehouse on Willard Street a decade later. In the ensuing years it would be found in the basements of several other properties, including the Golden Tower senior center, whenever there was flooding in the neighborhood. When floodwater evaporated, it left a yellow or green dust filled with chromium crystals that are considered extremely dangerous because they can be inhaled. Hexavalent chromium has been known to cause lung, nasal, and sinus cancer.

The U.S. Environmental Protection Agency took over the case in 2008 and found high levels of chromium contamination in 13 homes and businesses. In one apartment building, hexavalent chromium levels were found at 2,500 times the level considered safe by the federal

government.

The neighborhood, bordered by Van Winkle Avenue to the north, Monroe Street to the south, Sherman Place to the east and the Passaic River to the west, became North Jersey's latest Superfund site in 2011. While drinking water is not affected, groundwater is so contaminated that federal officials told homeowners to avoid their basements.

Despite calls from state and federal legislators for a comprehensive health study that included medical exams of residents, the state Department of Health and Senior Services refused, saying that there was no funding for a study. Health officials suggested that those concerned about their health could go to their personal doctor and pay for their own health assessment.

Zelikoff first heard of the Garfield problem after reading an article about it in The Record in August.

"The initial reaction was: 'Oh my gosh, I never knew about this,' " said Zelikoff, who lives in Ramsey. "I thought these people could use some help."

Within days, her team toured the site with EPA investigators and met with city officials, who embraced whatever help they could get. She suggested a study to determine whether residents had been affected by the contamination.

"We didn't have the capacity to address this," said Darleen Reveille, a public health nurse at the Garfield Department of Health. "I'm certainly not an expert in toxicology or heavy metals. We needed someone to come in and help us."

The daughter of a plumber, Zelikoff grew up on 11th Avenue in

Paterson's Eastside neighborhood. Drawn to the sciences at an early age, this self-described "weird child" often exhumed her dead goldfish, turtles and other pets to record each stage of decomposition.

"I was the only one in the biology lab who actually liked the dissections," she said of her days at Eastside High School in the late 1960s. "All of the other girls would be 'Eeeeeeeewwwww!' And I would be picking at organs."

When she was 17, Zelikoff's father Harry died from lung cancer. He was a smoker, but he was also exposed to a lot of pipes covered in asbestos long before it was discovered to cause cancer "A big part of (his death) is genetic and a big part of it is environmental," she said during a recent interview.

Zelikoff graduated from Upsala College in 1973 with a degree in biology, got a master's in microbiology at Fairleigh Dickinson University and received a Ph.D. in experimental pathology from UMDNJ in 1982.

Soon she was at the NYU School of Medicine's Institute of Environmental Medicine running through the ranks from post-doctoral fellow to research scientist to tenured professor.

Founded in 1947, the institute is one of the nation's oldest and most renowned centers for research into the health effects of pollution. It was a perfect place for Zelikoff, who specialized in inhaled pollutants with an emphasis on metals like chromium.

As with most metals broken down into powder, chromium can be absorbed into the bloodstream through breathing. Toenails are a perfect incubator for heavy metals because they are full of fibrous proteins that absorb substances like chromium. And unlike hair and fingernails, which also can house high concentrations of chromium, toenails grow at a

much slower rate, allowing scientists to measure long-term exposure.

The participants will be given a packet with toenail clippers, a cotton swab and nail polish remover. They will have to clip all 10 toenails and will be given times and places to return their collection. NYU hopes to get at least 50 participants and may expand up to 250.

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Along with teaching and research, Zelikoff spent years working in community outreach, a skill she has begun to put to use in Garfield. One of the first community leaders contacted by Zelikoff was Monsignor William Reilly, pastor of Most Holy Name Roman Catholic Church. Although the church is located just a few blocks outside the neighborhood, many of its parishioners live in the affected area.

Reilly is key since a large portion of residents are recent immigrants from Central and South America whose sometimes politically unstable homelands and current immigration status make them wary of any kind of contact with government. Reilly not only speaks fluent Spanish but has helped scores of parishioners navigate immigration law.

"I think that this (study) can only benefit them," Reilly said. "When they came to me, I was on board."

While some towns with a Superfund site have organized citizens groups that push and prod regulators into action, community involvement in Garfield has been meager. The neighborhood has long been a working-class enclave, but in recent decades it has seen an influx of new immigrants. The population is more transient these days with many homeowners having moved out. They now rent their multifamily homes to newcomers, many of whom don't plan to put down roots in Garfield.

The language barrier also hinders involvement. Public updates from the EPA are sent out in English, Spanish, Polish and Macedonian, but attendance at public meetings from a community of 3,700 is sparse. EPA officials were pleased when 75 people attended a meeting in September.

"Interest has picked up, but day to day we don't have the community involvement that we have elsewhere," said Pat Seppi, the EPA's liaison to the community. "It's a very transient community. A lot of people are in and out. There's no environmental group in the community. All of that makes it more difficult to get people involved."

Those who do attend often express anger that the nothing was done about the site for almost 30 years.

Zelikoff is used to a heated room. She was among a group of scientists that studied the health effects of the toxic dust cloud from the collapsed World Trade Center on 9/11. Federal officials including former New Jersey Gov. Christie Whitman, then head of the U.S. Environmental Protection Agency, had initially downplayed the possible health risks from the cloud, angering residents along with the first responders who worked at the site.

"You often deal with tough crowds in this job," Zelikoff said. "I'm used to it. I grew up in Paterson. I tell my grad students that's how I learned to be tough."

News of the study has already generated interest, especially from former residents.

Bernadette Roskowsky hasn't lived in the neighborhood for 15 years, but wants to be tested.

Roskowsky, who lived at several locations in the neighborhood for the

first 40 years of her life, said her father died of complications from esophageal cancer, a disease associated with hexavalent chromium exposure. She said her father lived his later years at the Golden Tower senior center just a few blocks from the E.C. plant. Hexavalent chromium was first discovered in the high-rise's basement in 2003 and found during subsequent floods. Since no chromium was found in the tower's apartments, federal officials have said it was never a threat to residents. That doesn't reassure Roskowsky.

"I grew up on all those streets," Roskowsky said. "It really is scary."

Annie Le grew up in a garden apartment complex on Maple Street less than a half mile from the plant and also hopes to be tested.

"I want to make sure everyone in my family is OK," said Le, who moved to another part of Garfield two years ago. "Even if (NYU researchers) say no, I would want them to point me in the right direction. I'd like to get some answers. This is not an everyday chemical."

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Bad news often seems to follow every bit of progress in Garfield.

Soon after the E.C. plant was demolished last year, the EPA discovered chromium in a non-drinking well in the city of Passaic, suggesting that the plume, which had already spread beyond the neighborhood's boundaries, may have migrated under the Passaic River. Officials believe it is deep enough that it doesn't pose an immediate threat to city residents. The investigation to map the entire plume is still ongoing.

Zelikoff hopes her study may offer some good news, although it has its limitations.

The toenail analysis will only show total chromium absorption and not specifically hexavalent chromium - the substance that spilled from the plant in 1983 and the most toxic form of the metal. Also, the nail clippings can only show chromium exposure for up to 18 months, so Zelikoff's team wants people who have recently lived in the neighborhood, which may preclude former residents like Roskowsky.

And participants need to meet certain criteria, such as living in a non-smoking household and living at least two years above the plume.

If a resident's toenail analysis shows there could be a concern, researchers will collect blood samples to determine recent exposure. If the blood comes back negative, nothing further will be done.

If the blood analysis shows an elevated level of chromium, NYU is making arrangements to get consultations with a physician who specializes in metal contamination.

NYU is paying about $25,000 for the study, but Zelikoff will put in a grant request to the National Institute of Environmental Health Sciences for Superfund research.

The project is part public service mission, part research project. It could advance the science like knowing more about the effects chromium has on cell growth or genetic manipulation. But Zelikoff's primary concern is the people living with chromium.

"We would like to ease a lot of the fear," she said. "We would like to ensure that things are getting better. But we'll have to see where the science takes us."