Anne Johnson: Welcome to Environmental Health Chat, a podcast about how the environment affects our health, from the National Institute of Environmental Health Sciences. I'm your host, Anne Johnson.

I'm going to start with a clip from a video explaining a study that recently began in New Mexico. Listen for a moment. [Sound of man speaking in Navajo] You probably noticed two things about this clip. First, if you didn't understand much of it, it's because the narrator is speaking Navajo. But you may have caught one word: uranium. That's the word at the center of the research we're talking about today. Here's the back story. Between the mid-1940s and the mid-1980s, miners extracted nearly four million tons of uranium ore from tribal lands of the Navajo Nation. Lots of Navajo people worked in the mines. Some suffered lung diseases and other health problems from their exposure to the radioactive particles that are released when uranium breaks down. But the health effects didn't stop when the mines closed. Big piles of dirt containing uranium, its decay products and other metals were left behind at the abandoned mines. People started noticing unusually high rates of certain health problems, like kidney disease, in the communities living in the area.

In the early 2000s, the Navajo community and a group of scientists started working together to figure out whether the abandoned uranium mines posed a health risk for the people living nearby. I spoke with two people closely involved in this effort. Teddy Nez is a member of the grassroots community of the Navajo Nation. Dr. Johnnye Lewis directs the Community Environmental Health program at the University of New Mexico College of Pharmacy.

I asked Teddy to start by telling me about the landscape outside his home, what the mines and subsequent cleanup effort have left behind.

Nez: It's wide open…there's holes in the abandoned uranium mines. They moved the contaminated dirt into a hill, which is about the height of a football field—about 300 feet high and then maybe about half a mile long.

Johnson: He said even though some of these sites have been cleaned up, many still worry him.

Nez: Our concern is health. We break it up into two pieces: the environmental health and human health. On the environmental health, we're talking about the air, the water, the vegetation, and the ground itself. On [the] human health side, there's a whole bunch of concerns that we have.

Johnson: And in fact, scientists have linked the sites with adverse health effects. Johnnye Lewis told me about a project she spearheaded with funding from NIEHS.

Lewis: We started off with a survey. We then backed that up with collection of biological samples and also looking at clinical assessments and medical records. We found not only the relationship to kidney disease, which was what we started looking for — just living within a mile or so of these mines increases the likelihood of things like hypertension and a relationship to autoimmune disease and immune dysfunction.

Johnson: They've linked these health conditions with living near an abandoned mine site. What's less clear is exactly how people are being exposed to contaminants. Johnnye's team has documented unsafe levels of uranium in some of the drinking water sources used by the community. People also come into direct contact with the contaminated soil because the sites often have no markings or fences. Children play in the soil, people walk across it, it gets picked up in the wind. Teddy says this widespread contamination is especially troublesome for his community because their lifestyle and history is so closely tied to the land.

Nez: When our environment is contaminated, destroying the sacred sites, contaminating and breaking this natural law…we use the herbs, the water, and everything else, so those are damaged.

Johnson: Many of the communities affected by abandoned mines are extremely remote. They grow their own food. They haul water from local, unregulated sources. So even though the populations may be small, the impacts can be wide-ranging.

Lewis: When you get into any kind of land-based lifestyles and land-based communities, which most of the Tribal communities still are, those impacts of environmental contamination can escalate really rapidly. You have to look at these communities within the context of how they use their resources, how their exposures are going to happen, and sensitivity to diseases.

Johnson: Although Johnnye and Teddy are focused on a small, remote community, it is one of a huge number of small, remote communities facing the same problem. Johnny said there are about 1,100 abandoned uranium mines and waste sites that are on Navajo lands, out of 10,400 sites scattered across the American West. And if you include other types of hardrock mines, that number balloons to a half a million abandoned mining and mine waste sites across the U.S., according to the Mineral Policy Center.

Johnnye said she's learned a few lessons through her research that probably would benefit many communities living with abandoned mines.

Lewis: Part of the way that we approached this was that the only way this kind of project would be successful and meet the community's needs would be if we, from the beginning, integrated policymakers, healthcare providers, and researchers and community members into one group where the communication was very regular, so that the results of the research could be rapidly integrated.

Johnson: For example, Johnnye's team has shared their research findings with local healthcare providers so they can know which health conditions to watch for and can talk to patients about whether they might have been exposed to contaminants from the mines. That sort of information could help providers and patients in any community with abandoned mines.

Thanks to Teddy Nez and Johnnye Lewis for joining us today. Visit our website for more information about the environmental health legacy of mining. You've been listening to Environmental Health Chat. I'm your host, Anne Johnson, and our podcast is brought to you by the Partnerships for Environmental Public Health, a program of the National Institute of Environmental Health Sciences. Find us online at niehs.nih.gov/podcasts.