FEATURE STORY

American Indian/Alaska Native Environmental Health Programs and Strategies

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Introduction

American Indian/Alaska Native (AI/AN) populations experience widespread health disparities, including lower life expectancies and higher rates of chronic diseases than the U.S. population (Indian Health Service, 2019). Because AI/AN communities are often located in rural areas, they can encounter difficulties accessing medical care or public health services (Boccuti et al., 2014). Tribal communities are especially vulnerable to environmental hazards such as exposure to toxic substances and disasters including wildfires, heat waves, and droughts. In addition, many tribal communities are in the southern and western U.S., where the adverse impacts of climate change are strongest (Norton-Smith et al., 2016). Despite limited funding and awareness, many tribal health agencies have implemented environmental health programs and services to address these issues.

In 2022, the National Environmental Health Association, (NEHA), in partnership with the Centers for Disease Control and Prevention (CDC) and Agency for Toxic Substances and Disease Registry (ATSDR), hosted the American Indian/Alaska Native Environmental Health Recognition Awards to elevate and raise awareness of these efforts. The awards sought to recognize tribal agencies or tribal colleges or universities that had developed a unique environmental health program, strategy, or initiative. Award submissions were solicited during April and May 2022 and were evaluated based on how well the program addressed health equity gaps, enhanced capacity of the environmental health workforce, and incorporated indigenous ways of knowing, among other criteria.

Ultimately, three award submissions were selected for the Gold, Silver, and Bronze Awards. In addition to sharing their stories with NEHA, each winner also participated in a panel discussion at the NEHA 2022 Annual Educational Conference & Exhibition. The panel was moderated by Dr. Patrick Breysse, director of the National Center for Environmental Health and the Agency for Toxic Substances and Disease Registry (NCEH/ATSDR) within CDC.

"NCEH/ATSDR is committed to addressing environmental health concerns within the American Indian/Alaska Native communities," Breysse said. "Our hope is that all communities across America that are disproportionately bearing the brunt of environmental hazards and injustices have equal opportunity to thrive in healthy environments."

Gold Award Winner

Northwest Portland Area Indian Health Board

The Northwest Portland Area Indian Health Board (NPAIHB) provides public health services to the 43 federally-recognized tribes in Oregon, Idaho, and Washington. In 2020, NPAIHB entered into a Public Law 93-638 Title I contract with the Portland Area Indian Health Service (IHS) to assume the responsibility and funding for delivering the Environmental Public Health (EPH) Program. This program aims to assess environmental conditions and implement interventions to prevent environmentally caused disease or injury. In addition to the annual IHS contract funding, the program receives funding from CDC, the U.S. Environmental Protection Agency, and the Oregon Health Authority.

To identify the areas of greatest need within the tribal communities served by NPAIHB, EPH Program staff gathered data via community environmental health assessments (CEHAs). Holly Thompson Duffy, environmental health science manager of the EPH Program, described the variety of indicators collected in the CEHAs. "We have social factors [such as] socioeconomic status...household composition, housing, and transportation," she said. "And then we have different kinds of ecosystem threats and pressures like toxic emissions, issues with food and water, outdoor air quality indicators, indoor air quality indicators, drinking water indicators, stream water quality ones."

Additionally, the CEHAs facilitate the collection of data on health outcomes such as gastrointestinal issues, vectorborne diseases, childhood lead poisoning, asthma, and cancer, as well as tribal public health policies and programs. EPH Program staff plan to conduct these assessments every 5 years and evaluate trends over time.

The EPH Program also works to incorporate tribal traditional ecological knowledge into programs and services. Celeste Davis, director of the EPH Program, explained the process of collecting this knowledge. "It starts with talking with each of the tribes and asking them to identify traditional knowledge keepers. Once those individuals in the tribal community are identified, then we set up interviews with them," Davis said. "Ultimately, we would like to create a code book around traditional ecological knowledge, and we want to use it to inform our practices." Davis added that EPH Program staff typically identify around 10 traditional knowledge keepers in each community and provide each participant with an honorarium or gift card.

Conducting CEHAs and collecting traditional ecological knowledge has allowed

EPH Program staff to prioritize activities and ensure that services are culturally appropriate. Over the past 2 years, EPH Program services have included COVID-19 response, emergency management, occupational health, housing and septic system remediation, energy sovereignty, and more. Davis is pursuing funding to implement a climate and health program in the near future. "The Indian Health Service does not fund climate change and it's not part of what they consider their environmental health services. But that doesn't stop us from looking at it as the existential crisis of our lifetime," she said. "We have done some key informant interviews of Oregon and Idaho tribes to understand what their environmental health priorities are, and climate change obviously came out as one of those issues."

Duffy has been developing a 4-year work plan for a future climate and health program. She explained that for the first couple of years, the EPH Program will be doing an assessment of the work that tribal communities are currently doing regarding climate and what their needs are. "The goal is to shift into identifying indicators of climate and health for tribal health departments and to work with clinics to determine these indicators of climate change that can be tracked and managed and assessed over time," she stated. "And then there's a component of incorporating traditional ecological knowledge into those indicators."

In addition to climate services, the EPH Program also plans to expand its home visit programs to address elevated blood lead levels and asthma and provide sampling services for private wells. NPAIHB Institutional Environmental Health Manager Matthew Ellis will work to address environmental health and infection prevention in the healthcare sector, as well as occupational hazards for tribal workers in other industries.

Davis explained that because there are so few resources for tribal environmental health, it is difficult to maintain an adequate tribal health workforce. "There's quite a bit of turnover," she said. "Most [tribal agencies] want to hire professional people with credentials, but trying to hire someone with an REHS [Registered Environmental Health Specialist] in a rural place—whether you're a county or a tribe—is challenging. Tribes often hire someone who came from a county health department. But sometimes it's not the right fit. For whatever reason, working in a tribal community just doesn't work."

To address this workforce shortage, EPH Program staff hope to identify individuals in the community who are interested in becoming tribal environmental health specialists. "What we're trying to do right now is just talk about the basic skill sets [we] want for someone and then see if we can help mentor and work with them," Duffy explained.

Davis added that although it has been difficult at times to communicate the importance of environmental health services to tribal communities, the EPH Program has ultimately succeeded in building trust and providing services that have not been previously accessible. "I do feel that because of our work in COVID-19, we have gained trust," she stated. "It's taken a while to get everybody on board. It's challenging to build a program from the ground up. We are just barely 2 years into it as a program, so as far as I'm concerned, I think we're doing fantastic."

For tribal communities that are interested in implementing their own environmental health programs, Davis recommends looking to CDC, IHS, and other nations that have established environmental health programs for guidance and resources. Tribal communities can also reach out directly to Davis.

Davis stressed that while collaboration with nontribal organizations or agencies on environmental health programs is appreciated, it is important for these organizations to receive cultural sensitivity training and to respect tribal sovereignty.

Duffy noted that every tribal community is unique and outside organizations should be sensitive to these differences when working with them. She also highlighted the importance of identifying advocates for environmental health. "It's all about finding champions within the communities: who can really take what you're saying and advocate for it within the community. And you rarely get that in the first person that you talk to and so that persistence—but being polite and respectful in following up—is critical as well," she said.

Ultimately, Davis and her colleagues believe that the EPH Program has been largely successful because it is a tribal-run program, and thus has a unique understanding of the environmental health needs of the community. In the future, EPH Program staff plan to focus on bringing together public health professionals across NPAIHB to build a community of practice and mobilize collective action. By incorporating empirical data, community participation, and tribal ecological knowledge, the EPH Program aims to eliminate environmental hazards and health inequities and ensure the health, sustainability, and sovereignty of tribal communities in the Portland area.

This section was based on an interview with NPAIHB staff Celeste Davis, Holly Thompson Duffy, Matthew Ellis, and Melino Gianotti. Other NPAIHB staff involved in the EPH Program include Senior Environmental Health Specialist Shawn Blackshear, Environmental Health Scientist Ryan Sealy, Environmental Health Specialist Antoinette Ruiz, Environmental Health Informatics Specialist Nicole Smith, and Environmental Health Specialist Lela Rainey Brown.

Silver Award Winner

Albuquerque Area Southwest Tribal Epidemiology Center

The Albuquerque Area Southwest Tribal Epidemiology Center (AASTEC), founded in 2006, serves 27 nations in the IHS Albuquerque Area. In 2016, AASTEC established the Tribal Healthy Homes Project (THHP) that aims to identify and survey tribal homes for indoor air quality exposures, chronic health conditions, and potential injury risk factors.

Dr. Sheldwin Yazzie, deputy director of AASTEC, explained that THHP arose out of an interest among AASTEC staff to expand environmental health work with tribal communities. An environmental health survey disseminated by AASTEC in 2017 to tribal community partners in the IHS Albuquerque Area identified home radon exposure as a concern, which led to the development of THHP. The project has received funding from IHS, the University of New Mexico Center for Native Environmental Health Equity Research, and CDC.

AASTEC staff used a community-based participatory approach to design the project, which involved identifying key stakeholders in each tribal community to design and implement a customized home assessment tool.

Dr. Joseph Hoover, a faculty member in the Department of Environmental Science, faculty associate with the Indigenous Resilience

Center at the University of Arizona, and codirector of the University of New Mexico Center for Native Environmental Health Equity Research, explained the importance of working with community members when developing the assessment. "Every community has different priorities and we really strive to make sure that those are identified early on in a collaborative process so that we can design tools and facilitate something that's appropriate for each community," he said.

Each community selected tribal members to participate in the project. These members worked with AASTEC staff (and collaborators like Dr. Hoover) to develop a data collection tool tailored for conducting home assessments in each community. AASTEC staff also assisted in training community members to conduct home assessments, assess homes for fall injury risk factors using an injury prevention checklist, and measure home indoor radon concentration levels (Figure 1).

Next, community members utilized the collected data to identify and prioritize housing remediation and mitigation services. These services included securing floors, repairing steps, installing handrails, replacing smoke detector batteries, and providing fire extinguishers.

Dr. Yazzie explained that THHP provides an opportunity for tribal communities to enhance home radon information in their communities and identify any needed home repairs. In addition to measuring home indoor radon, THHP also collects fall and injury prevention data, interior and exterior housing quality data, and geospatial data. After data collection, the data were returned to tribal community partners.

"I think that the data set that's been generated through THHP has been really beneficial because sometimes the resources to immediately address those deficiencies, or those safety concerns or environmental hazards, aren't immediately available," Dr. Hoover said. "But having up-to-date information and having accessible data for grant applications has really made a very positive impact."

When implementing THHP, AASTEC staff honored tribal traditions, ceremonies, and practices, and found common ground between tribal communities, environmental health priorities, and funding priorities. Dr. Yazzie and Dr. Hoover noted that community partners successfully managed this work alongside their tribal community events and responsibilities.

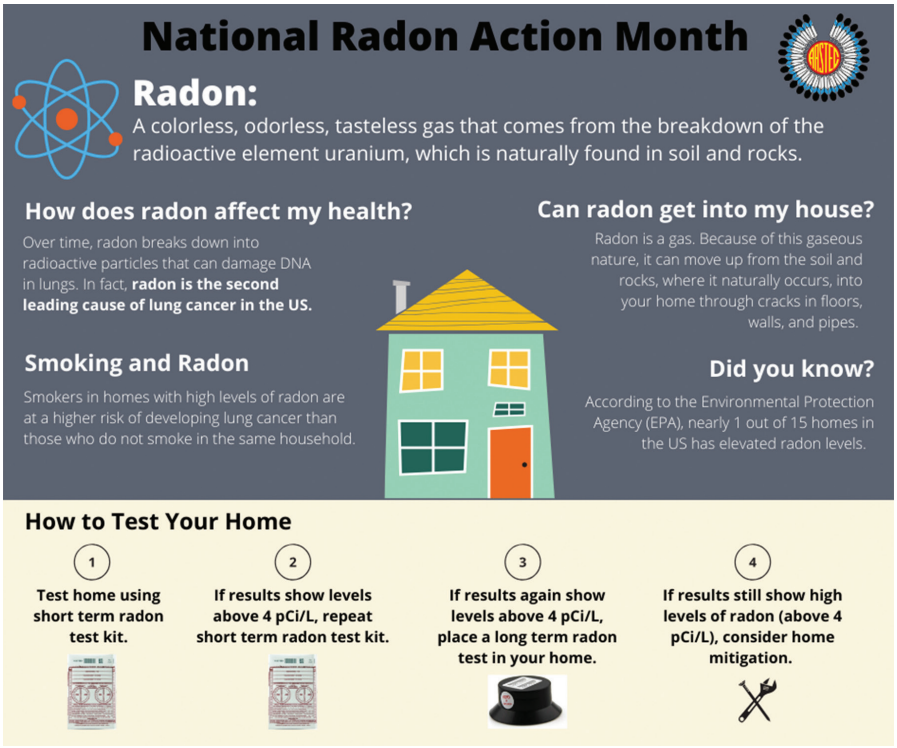
THHP was able to adapt to COVID-19 restrictions during the pandemic to facilitate virtual training. Prior to the pandemic, THHP activities were conducted in person, which facilitated communication, networking, and relationship building.

As part of THHP, AASTEC staff developed a geospatial data collection tool that integrates location information with a survey on building conditions and environmental exposures. A pilot project funded by the National Indian Health Board will work on expanding this healthy home survey tool for COVID-19 case investigation and storage in the AASTEC Southwest Indigenous Data Portal. This project will further support community efforts to conduct different environmental health assessment activities beyond healthy housing.

Reflecting on the elements that contributed to the success of the project, Dr. Yazzie and Dr. Hoover highlighted the need to identify key stakeholders and obtain necessary permissions before implementing an environmental health program in a tribal community.

FIGURE **1**

Flyer Created by the Albuquerque Area Southwest Tribal Epidemiology Center to Promote National Radon Action Month



Flyer courtesy of Sheldwin Yazzie, Albuquerque Area Southwest Tribal Epidemiology Center.

Bronze Award Winner

Diné College School of STEM Summer Internship Program

Corporations operated hundreds of uranium mines throughout the Navajo Nation in Arizona over many decades. When the market for uranium dried up, these mines were abandoned, leaving brownfield sites polluted with uranium ore scattered across the reservation. Today, faculty from Diné College in Tsaile, Arizona, are working to remediate contaminated areas and reclaim the land for community use. Each year, the Diné College School of STEM (science, technology, engineering, and mathematics), sponsored by grants from the National Science Foundation, U.S. Envi-

ronmental Protection Agency (U.S. EPA), and CDC, hosts a summer internship program that trains up to 15 students in brownfield remediation methods. These methods include toxicology, measurement of environmental toxins, community engagement, and strategies for cleanup.

According to Dr. Donald K. Robinson, Jr., associate professor at Diné College, the program provides room, board, and a stipend for all students who complete the internship. Dr. Robinson works with Dr. Laurel Berman, an environmental health scientist at CDC, to provide hands-on brownfield remediation training (Photo 1). "The training involves identifying the toxic area and designing restoration or cleanup methods to make it visually acceptable to the community," Dr. Robinson said. "This summer we're also learning GIS to identify digital mapping methods for brownfields."

Interns and faculty communicate directly with Navajo Nation residents to collect community input on land reclamation projects. The Navajo reservation is divided into approximately 100 chapters that each convene monthly public meetings. When Dr. Robinson's team starts work on a brownfield, he contacts the president of the chapter in which that brownfield is located and asks to present on the remediation project at the next chapter meeting. "We'll schedule ourselves on the agenda, go to the meeting and publicly speak, and then ask for questions and comments. Sometimes we're requested to come back with more information on certain things," Dr. Robinson explained. "We'll get community feedback on what they would like as far as reclamation."

At the meetings, Dr. Robinson, who is not Navajo himself, makes sure to have Navajo representation present. "A lot of times we have to translate into Navajo because some of the people in the chapter are not English-speaking," he said. "So, I make sure I have a Navajo speaker who's fluent and who understands science and can explain the science to the general public."

Having input from Navajo Nation members allows the Diné College team to understand the relationship between the Navajo people and their environment, and to incorporate traditional ecological knowledge and cultural guidance into remediation activities. Together, the Navajo community and Diné College faculty have come up with a variety of courses of action to address the risks

Photo 1. *Diné College interns participate in a mock brownfield remediation activity. Photo courtesy of Gina Bare, National Environmental Health Association.*

of abandoned mines and uranium transport sites. "On the Navajo reservation, the traditional ecological understanding of the interaction between the people and the animals, ecology, and geology—the rocks, the uranium—is an important consideration. So there's a number of suggestions [for] what the local people want to do about the mines," Dr. Robinson said.

Dr. Robinson's current U.S. EPA grant is focused on assisting U.S. EPA and training Navajo students in cleaning up and reclaiming contaminated areas in Cove, Arizona, where abandoned uranium mines and truck stops where uranium ore was transported pose an environmental health risk to current residents. For the past 8 years, Dr. Robinson's team has collected and analyzed samples from soil, water, plants, and most recently, livestock tissue. "A general finding is the areas are not as polluted as we anticipated," he stated. "There are some exceedances of U.S. EPA standards for uranium, but it's not huge."

Dr. Robinson explained that these findings are especially important to ranchers who raise sheep, goats, and cattle on formerly mined areas. "When ranchers take their animals to market and the buyers find out that they're from Cove, they don't want to buy their animals [because] they think that the animals are contaminated," he said. "So, our study is important to tell the chapter and the ranchers and the public that no, actually the animals are just fine." This study will conclude in December 2022, at which point Dr. Robinson's team will be able to determine the level of uranium contamination of livestock tissue.

Other areas of the reservation, however, have significantly higher levels of contamination. Dr. Robinson explained that in some cases, it is difficult to obtain U.S. EPA funding for remediation because these areas are not sufficiently populated to meet U.S. EPA standards. "The federal designation for toxic areas is based on a certain population level and because we're so rural, a lot of highly polluted areas do not meet the standards, so we have to go through other sources for financing the cleanup," he explained.

Despite these challenges, Dr. Robinson's team, in conjunction with other scientists working on the same projects, has made substantial progress in reclaiming contaminated land throughout the Navajo Nation over the course of the grants. By training student interns in environmental assessment and brownfield remediation methods, the Diné College summer internship program ensures that future generations of environmental health professionals will be equipped with the tools and knowledge to protect the health of the Navajo community. According to Dr. Robinson, the students find the training valuable and enjoyable, and many return to the internship program for a second or third summer.

Dr. Robinson believes that academic institutions are generally interested in working with communities to implement environmental health programs and encourages tribal community members to collaborate with scientists. "People come to me all the time wanting to implement programs and administer grants for environmental health. As a PhD research trained scientist, I know generally how to do research and write grants and teach. And I just say yes," he stated. "The only thing you need is energy and time and a willingness to do it."

Conclusion

Thanks to the dedication of tribal environmental health professionals, these programs will improve the health and well-being of thousands of AI/AN individuals. As the effects of climate change and other environmental hazards grow more severe, continuing to provide environmental health services to some of the country's most vulnerable communities remains essential. Addressing these hazards can reduce health disparities and improve the overall well-being of AI/AN communities.

NEHA is committed to amplifying success stories and providing resources for tribal communities seeking to strengthen their environmental health programs. As the

three award-winning programs demonstrate, involving community members and incorporating traditional ecological knowledge is key to developing environmental health interventions that are sustainable and equitable. Tools and resources provided by the award winners can be found online at www.neha.org/2022-AI-AN-Award-Winners.

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