How-to-Guide for State Occupational Health Programs to Work with Tribal Nations

CSTE Occupational Health Subcommittee
August 2026

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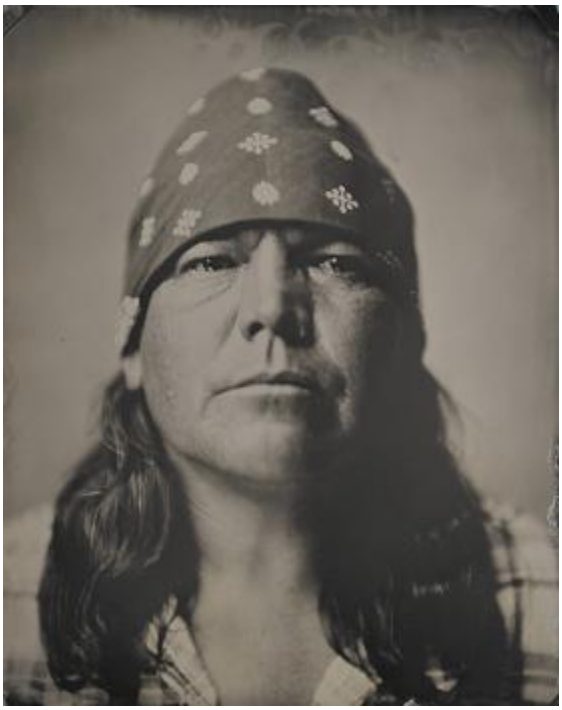

Peter J., fourth-generation ironworker
Mohawk Name
Kwan “ne” le (translation unavailable) *Tintype by Melissa Cacciola*
Reproduction photography by D. Primiano[30]

A Mohawk member of Local 40, a New York branch of the International Ironworkers’ union

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Table of Contents

Executive Summary

American Indian and Alaska Natives (AIAN) Tribes are sovereign nations and have unique legal status that state public health agencies must consider when working with Tribes. This document provides the framework for state occupational health programs to approach and work with Tribal Nations on occupational health issues that affect Tribal members. Given the occupational risks among AIAN people, the potential for there to be a lack of awareness of these occupational health risks, and the legal status of Tribal Nations, the Council of State and Territorial Epidemiologists (CSTE) Occupational Health Subcommittee wrote this guide to assist state occupational health programs on how to work with the Tribal Nations in their state.

Section A provides context on why this document was created.

Section B provides important steps to initiate working with Tribal Nations:**1)** How to identify the Tribal Nations in a state; **2)** How to identify the regional Tribal Epidemiology Center that covers the Tribal Nations in a state; and **3)** How to identify academic centers active in Tribal education and health issues. This section also summarizes the importance of reviewing both national and state specific policies and procedures for working with Tribal Nations including contacting the state health department's Tribal liaison before contacting a Tribal Nation directly.

Section C explains that a Tribal Nation may request a data use agreement (DUA) or a memorandum of understanding (MOU) prior to working with a state occupational health program and what these documents might include.

Section D describes how activities that require review and approval for research involving human subjects will differ from other human research activities conducted by state health departments. If there is involvement of Indian Health Service (IHS) facilities, staff or resources, this activity must be approved by an IHS Institutional Review Board (IRB). Specific IRB training is described for working with AIAN communities.

Section E describes how the important occupational health legal issues of workers' compensation and workplace regulations vary by Tribal Nation. This section also summarizes how the provision of medical care differs for AIAN people who live

on and off Tribal land. Finally, this section discusses the occupational health resources available to Tribal Nations by the Occupational Safety and Health Administration (OSHA) consultative service and the Health Hazard Evaluations (HHEs) provided by the National Institute for Occupational Safety and Health (NIOSH).

Section F, in combination with Appendices A and B, provides national data on the most common industries where AIAN people work and how a state can determine the most common industries that AIAN people work within individual states. This data on distribution of work combined with Bureau of Labor Statistic (BLS) data on acute traumatic fatalities among AIAN people are an initial approach to understanding the occupational health risks to AIAN people. Two case reports in Appendix B describe specific stories on how work has caused increased deaths in AIAN construction and mining workers as compared to non-Hispanic White workers.

Section G presents possible first steps for a state occupational health program to work with the Tribal Nations in their state. As states use this document, feedback from states will be used to modify and expand the guide as appropriate.

A. Introduction: Why Create a How-to-Guide to Tribal Occupational Health Collaboration?

This document provides background and resources for state Occupational Health Surveillance (OHS) programs who are interested in working with the Tribal Nations within their states. The National Institute for Occupational Safety and Health (NIOSH) funds 23 state occupational health programs[1]. Tribal collaboration is an explicit goal of both the Council of State and Territorial Epidemiologists (CSTE) Occupational Health Subcommittee and of NIOSH to improve the health, safety, and well-being of American Indian and Alaska Native (AIAN) workers.

In 2023, NIOSH, in collaboration with Tribal Nation partners, Tribal-serving organizations, state health departments, academia, and other federal partners published the American Indian and Alaska Native (AIAN) Worker Safety and Health Strategic Plan[2]. Intended for Tribal and non-Tribal entities supporting Tribal Nation occupational health, the plan offers a potential roadmap for

advancing nationwide research and outreach initiatives to protect AIAN workers from injuries, illness, and fatalities through research, practice, policy, and capacity building. The NIOSH Strategic Plan provides a high-level roadmap for Occupational Safety Health professionals, including state OHS programs, and is a resource that state occupational health programs should review. What the NIOSH Strategic Plan document did not do, because of its multi-audience focus, was provide the detailed and essential background information that state OHS programs need to know before reaching out to Tribal Nations. This document fills that gap by providing state OHS programs with basic context and resources related to:

1) Working effectively and respectfully with Tribal Nations, and
2) Tribal Nation occupational health structures.

Section B and Appendix A cover the first point by building on existing resources for state-based epidemiologists on how to work effectively and respectfully with Tribal Nations. Those resources are referenced here, and general (non-occupational health) information in this guide aligns with what is found in those documents.

Related to the second point, CSTE has developed a Tribal Epidemiology Toolkit for Improving Data Quality and Data Sharing with Indian Country (https://tribal.cste.org/). Our new document provides occupational health specific resources to ensure that OHS program staff have a basic understanding of the legal landscape affecting Tribal occupational health including workers' compensation and the Occupational Safety and Health Administration (OSHA). We also include sections on the AIAN workforce and AIAN occupational health case studies, which document the importance of occupational health in AIAN communities. The workforce data and case studies are valuable for OHS program staff and may also help to increase Tribal partners' interest in occupational health. OHS programs will need to highlight both historical and ongoing work patterns among Tribal members that lead to workplace injuries and illnesses. Tribal Nations, like other public health partners, are engaged in multiple public health issues. OHS will need to work with Tribal Nations to increase understanding about OH and to identify areas where state surveillance efforts can provide OHS expertise and support the priorities of Tribal Nations.

B. Setting the Stage: What States Need to Know to Work Effectively with Tribes and Tribal Organizations

1. Identify Partners

1.a. Tribal Nations

As sovereign nations, Tribes must be recognized and interacted with on a government-to-government basis. Tribal Nations hold the authority to self-govern which extends to the protection and promotion of health. Under federal law, federally recognized Tribal Nations, their designees, and the Tribal Epidemiology Centers are all public health authorities for the purposes of public health action and data management. If your state does not have an official Tribal liaison or consultation process, determining the correct level of contact for introductions is critical. For example, a program director is not the appropriate representative to send to a Tribal chairperson. Many state health departments have a Tribal liaison, and it is important to identify this person within the state health department and reach out to them before contacting a Tribal Nation directly. Federal policy requires official Tribal Consultation to be done by federal agencies prior to taking action that may impact Tribal Nations. Some states have consultation requirements, but not all, so it is worth verifying what your state requires. Tribal Consultation is a space for informed mutual decision making, it is not just an "engagement session."

The Bureau of Indian Affairs legally recognizes 575 Tribal Nations; 231 are located in Alaska. Fourteen states have no federally recognized Tribal Nation[3]. Notably, there are also more than 300 Tribes that are not recognized by the federal government or lost their recognition during the Termination Era in the 1950' and 1960's. These Tribes may or may not be recognized by the states and have more limited authorities recognized by law.

1.b. Tribal Epidemiology Centers

The Indian Health Service (IHS) funds 12 Tribal Epidemiology Centers (TECs), which serve federally recognized AIAN Tribal Nations in their area by managing public health information systems, investigating diseases of concern, managing disease prevention and control programs, responding to public health emergencies, and coordinating these activities with other public health authorities[4]. Established by Congress under the Indian Healthcare Improvement Act (IHCIA), the TECs are

all considered public health authorities for the purposes of the Health Insurance Portability and Accountability Act (HIPAA) and other federal laws.

1.c. Academic Centers and Training Programs

Academic programs may have existing occupational health programs or integrate health and safety training in the educational services that they provide to Tribal members. Reaching out to the academic centers in your state is important to understand what activities are already taking place. These academic centers may provide a framework to disseminate occupational health information to Tribal members. A list of the Tribal colleges and universities that qualify for funding under the Tribally Controlled Colleges and Universities Assistance Act of 1978 (25 U.S.C. 1801 et seq.) or the Navajo Community College Act is available on line[5]. In addition to the Tribal colleges within a state, examples of several occupational health programs and training programs that occupational health programs may wish to contact as potential partners are listed below.

- The National Ironworkers Training Program for American Indians Inc provides 11-week ironworkers vocational training programs, financial assistance, work clothes, tools, and job apprenticeship placement services to eligible Native Americans[6].

- The Centers for American Indian and Alaska Native Health (CAIANH) was established in 1986 and is a large, comprehensive, and long-standing program. Its mission is to promote the health and well-being of American Indians and Alaska Natives, of all ages, by pursuing research, training, continuing education, technical assistance, and information dissemination within a biopsychosocial framework that recognizes the unique cultural contexts of this special population. CAIANH houses numerous projects funded by a wide range of private, state, and federal agencies, and partners with human service organizations in more than 200 urban, rural, and reservation communities[7].

- Johns Hopkins University – Center of Indigenous Health supports and implements public health interventions designed for the indigenous people. The Center has a long-standing relationship that date back to the 1980s with Tribal Nations in the southwest U.S., including the Navajo and the While Mountain Apache Tribal Nations. The Center has helped

to implement programs to respond to priority concerns with over 150 Indigenous communities in the United States as well as around the globe. The Centers core divisions include Research, Education, and Training, Policy and a Best Practices Core that share proven programs with Indigenous communities in the U.S. and worldwide[8].

Two examples of programs that are focused on a single state are listed below. Similar programs may be at other state universities.

- Michigan State University Native American Institute. The mission of the Michigan State University Native American Institute is to produce and further scholarship and programming for the benefit of Tribes, American Indian communities, and Native organizations[9].

- University of North Dakota Department of Indigenous Health and the University of North Dakota School of Medicine & Health Sciences Indigenous Trauma & Resilience Research Center (ITRRC). These Departments provide opportunities to promote synergy across research, education, service, and training that focuses on improved health outcomes for all people. The focus of the ITRRC is to build research capacity and infrastructure to ultimately address conditions that negatively impact health status and identify protective factors of Tribal connectedness and resiliency.

1.d. Indian Health Service - Division of Environmental Health Services

The Division of Environmental Health Services, part of IHS, provides direct services and technical assistance to Tribal Nations regarding environmental health issues. These services may overlap/relate with occupational health issues. These services include:

- Collecting data for action at the community level
- Identifying and controlling risk factors that affect the health of the community
- Funding and evaluating local environmental health (EH) projects and interventions
- Advocating at the federal and regional levels

- Building the capacity of Tribal Nations to manage their own EH programs

2. Policy/Training on Working with Tribal Nations

Occupational Health programs should be aware that different entities have produced policies and training for working with Tribal Nations. These are general policies and training and not specific to the area of occupational health. Tribal Nations have repeatedly expressed frustration that data access is suboptimal or unavailable to respond to public health threats. In 2024, CSTE published the policy brief "Enhancing Data Access to Improve AIAN Health: a Framework for State and Local Public Health Officials."[10] This policy brief addresses the multiple reasons affecting access to data by Tribal Nations. The document recommends actions that state and local public health officials can take to start or strengthen data sharing initiatives and rebuild trust with the Tribal Public Health Authorities in their service areas. It also includes a legal analysis of HIPAA as it relates to Tribal public health activities.

The National Indian Health Board (NIHB) represents Tribal governments—both those that operate their own health care delivery systems, and those receiving health care directly from IHS. NIHB is a non-profit organization located in Washington DC that provides advocacy, policy formation, and analysis, legislative and regulatory tracking, direct and timely communication with Tribal Nations, research on Indian health issues, program development and assessment, training, and technical assistance programs and program management. NIHB has developed a training module for state and federal government officials on effective engagement with the Tribal nations[11].

There is an older 2009 course titled Working Effectively with Tribal Government on-line that was based on an earlier 2003 Environmental Protection Agency course[12]. Individual states may have developed policies and designated liaisons for working with Tribal Nations. An occupational health program should check to see whether there is a state specific policy for working with Tribal Nations in their state. There are two examples of state specific policies: 1) the Arizona Tribal Consultation Guide published in 2022 relates to education and students[13]; and 2) Individual departments in the state of California have their own directives for working with Tribes[14].

C. Data Use Agreement (DUA)/Memorandum of Understanding (MOU)

A Tribe is a sovereign nation and may request a signed agreement before working with a representative from a state health department or some other entity. Formal DUAs/MOUs are an important tool for upholding Tribal sovereignty, business agreements should not be considered an appropriate alternative.

The agreement will be developed by the Tribal Nation. Examples of topics that the agreement may cover are:

- Consulting and collaboration
- Data sharing, access, and control
- General assistance
- Assistance with the creation of an assessment tool if needed.
- Publication and messaging of Tribal-specific data
- Assistance with data entry, collection, analysis, and reporting if needed.

The issue of how products are shared and with whom and the confidentiality of data are important topics that need to be covered. Even if a formal DUA/MOU is not signed, confidentiality, and release of reports are important topics that should be addressed at the initial steps of working with a Tribal Nation. CSTE strongly encourages OH programs and states in general to uphold Tribal sovereignty by deferring to Tribal Nations on the how, what, when, and why data are collected and shared on Tribal members.

D. Data Considerations for Research and Public Health

It is important to remember that Tribal sovereignty gives Tribal Nations oversight to determine if and how research can take place on Tribal lands and with their enrolled citizens.

Tribal Nations have the authority to:

- Establish their own Institutional Review Boards (IRBs)
- Approve or deny requests for research
- Decide how research is reviewed and conducted
- Require research activities to stop

- Review research reports, press releases, or publications before they are publicly shared
- Negotiate exclusive or shared ownership of research results
- Decide if, how, and what cultural knowledge or practices are shared
- Restrict use of Tribal identifiers in research reports

Research involving IHS facilities and IHS data follows the Health and Human Services Office for Health Protection rules[15].

The definition of "research" includes:

1. basic and clinical research;
2. behavioral studies;
3. anthropological studies;
4. the development of clinical and public health methods and techniques for practical application to the Indian Health program, and;
5. studies to determine the extent of health problems, or solutions thereof.

Excluded from this broad definition are peer review, quality assurance and medical audit activities, and retrospective, concurrent, or prospective medical chart review. Also, excluded from a requirement for clearance by an Institutional Review Board (IRB) are studies which do not involve treatment of or risk to any individual or human subject which are conducted internally, and which are subject to the normal administrative management controls, policies, procedures, and review.

In addition, the following categories of research involving human subjects are exempt from IRB clearance:

1. research involving surveys or interviews in which anonymity of subjects is assured;
2. research involving the collection or study of existing data, documents, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded so that the subjects cannot be identified;
3. research conducted in established or commonly accepted educational settings, involving normal educational practices; and
4. research involving public behavior if anonymity of subjects is assured.

Studies conducted by external groups (non-Public Health Service) are usually included within the definition, whether or not there are risks to human subjects, if IHS staff, records, or facilities will be utilized or involved in such studies, unless specifically exempted by one of the conditions noted above. The Area Chief Medical Officer will determine whether any proposed study or activity can be excluded or is subject to review as prescribed in this issuance.

Public Health Surveillance

Occupational health projects that use secondary data sources may be considered public health surveillance and require different approval procedures. "All proposed research projects planning to collect information for non-clinical purposes from groups of IHS patients should review their protocol with the appropriate Tribal IRB Chair to determine whether the proposed activities are considered research or whether the proposed activities are not covered by 45 CFR 46. Activities not covered may include quality assurance (QA) projects or public health surveillance activities. Such non-research activities, however, may still fall under the privacy requirements of HIPAA, Privacy Act, or require other approvals."[15]

Human participant research conducted in IHS facilities or with IHS staff or resources must be approved by an IHS IRB. Their website provides contact information[16].

- First, consult list of IRBs to see geographic Areas that IRBs represent
- Projects to be conducted in Areas without a functioning IRB should be submitted the National IRB (NIRB) by emailing the proposal to IRB@ihs.gov and mailing one full hard copy to NIRB, c/o Rachael Tracy at 5600 Fishers Lane, MS 09E10D, Rockville, MD 20857.
- All proposed research must first have obtained formal, written approval of the appropriate Tribal government(s).
- Evidence of support from the facility's Chief Executive Officer (CEO) must also be provided, to document that the project will not use IHS resources in a manner that would adversely impact the health care provided at the facility.

Considerations for sharing findings using IHS data/facilities

- Presentations or publications based on research approved by the IHS IRB(s) must be approved by the Publications Review Committee (PRC) or the IRB(s) that reviewed and approved the research study.
- Manuscripts submitted for publication that contain findings about specific Tribal Nations, even if the Tribal Nations are not named in the manuscript, must be accompanied by approval from the relevant Tribal government(s).

Training considerations

- Human Subjects training requirements can be time intensive; some Tribal nations or TECs may require additional modules for conducting research with/in Tribal communities. Training of OH staff on cultural humility and proper Tribal engagement is important, whether or not IRB-approved research will be conducted.

Additional Resources

- Dr. Cynthia Pearson – Ethics: Research Ethics Training for Health in Indigenous Communities[14]
    - Research Resources Overview | Indigenous Wellness Research Institute (iwri.org)
- CITI Program Webinar Research with Native American Communities ($300 per organization, $49 per individual)[15]

E. The Legal Landscape of Tribal Occupational Health

Industries owned by Tribal Nations (e.g., casinos, farming, fish, or timber enterprises) are covered by OSHA regulations, which are enforced by Federal OSHA or in state plan states by the state OSHA program. However, if workers were solely involved in Tribal matters (e.g., Tribal government employees) they would not be covered by OSHA. It is up to each Tribal Nation to determine laws and policies for workers not covered by OSHA. Some Tribal Nations have set up a Tribal Occupational Safety and Health Administration (TOSHA) and have opted to adopt OSHA standards, while some others have developed additional health and

safety standards. It is possible for a Tribal Nation not to have any occupational standards in this area.

Variation in the laws of Tribal nations was described in a 2017, CDC's Office for State, Tribal, Local and Territorial Support (OSTLTS) report that provided examples of occupational safety and health laws, child labor laws, and workers' compensation insurance among a small number of Tribal Nations. Given that each Tribe is a sovereign nation, these codes and laws varied by Tribes. There is no information in the document to assess how many Tribal Nations have laws that address these issues[17].

Some Tribal Nations have developed comprehensive occupational health programs. For example, the Alaskan Native Health Consortium, which was formed in 1998, is a non-profit Tribal health organization designed to meet the health needs of Alaska Native and American Indian people living in Alaska. It offers support programs in areas of Occupational Health & Safety, and Industrial Hygiene[18]. Two hundred thirty-one (40%) of all federally recognized Tribal Nations are in Alaska.

Other examples of occupational health programs in Tribal Nations are highlighted in two YouTube interviews of occupational health staff of the Navajo and Shoshone-Bannock Tribal Nations[19,20].

Additional Considerations

1. Workers' Compensation

State workers' compensation agencies do not regulate Tribal employers and therefore Tribal employers are not required to have workers' compensation to cover medical and wage loss costs for injured workers. Tribal Nations may: 1) elect to take part in state workers' compensation systems; 2) enact their own workers' compensation law; or 3) elect to leave issues of compensable injury to civil lawsuits that would be heard in Tribal court. Accordingly, individual Tribal Nations in a state may handle workers' compensation differently.

2. Provision of Medical Care

The IHS is within the Department of Health and Human Services and is responsible for providing health services to members of federally-recognized Tribal Nations. A list of 1,007 IHS clinics and hospitals by state is located on the IHS website [21].

In addition to these IHS facilities, the IHS supports the Urban Indian Program for AIAN people who live off Tribal lands[22]. The overwhelming majority (70%) of AIAN people live off Tribal lands in urban and peri-urban areas though they may frequently travel back to Tribal lands. Urban Indian Health Programs (UIHPs) are private non-profit programs that receive partial Federal funding under Title V of the Indian Healthcare Improvement Act to provide urban AIAN people with a wide range of health and social services. These range from simple outreach and referral programs to full-blown ambulatory care clinics. There are 76 UIHP sites [23].

AIAN individuals 65 years or older or those on Social Security Disability are eligible for Medicare. AIAN individuals are also eligible for Medicaid and Children's Health Insurance program if they meet a state's income requirements.

3. Services from OSHA Consultation and NIOSH

OSHA offers free consultative services for employers including Tribal Nations to provide review and recommendations to prevent occupational health injuries and illnesses and to meet OSHA standards.

NIOSH provides technical assistance and health hazard evaluations to companies including Tribal companies to investigate concerns about potential occupational health issues and to investigate disease outbreaks.

F. The American Indian/Alaskan Native Workforce and Occupational Injuries and Illnesses

NIOSH has calculated the national Tribal workforce by National Occupational Research Agenda (NORA) sectors[26] (see **Appendix A**). Calculation of the distribution of the Tribal workforce in one's own state is a useful first step to assess potential occupational health risks to AIAN people in a state. Appendix A provides the step-by-step process to perform this calculation by state. It is important when reviewing both national and state data to understand data quality

issues and proper race/ethnicity determinations to understand the limitations of this workforce data. The analysis can perform estimates for both AIAN only and AIAN in combination with another race or races (see **Appendix A**). Use of AIAN only data alone perpetuates disparities by deliberately excluding significant numbers of AIAN people. Racial misclassification is a significant issue for AIAN data and small numbers often impact the ability to do effective research/public health activities. Accordingly, us of AIAN only data should not be the sole data calculation.

In 2023, NIOSH conducted a review of the occupational safety and health literature on AIAN workers to better understand what is known about issues affecting AIAN workers[26]. The review was limited by the small number of articles identified and historical nature of some of the articles, reflecting the likelihood that findings could be out of date. General themes across the reviewed articles point to the need for increased overall awareness and education regarding injury prevention and risks associated with occupational injuries and fatalities among AIAN workers. The lack of AIAN research in most NORA sectors indicated the need for heightened research efforts directed toward AIAN workers. The review article NIOSH staff published in 2023 highlighted five points:

- Safety and health research is lacking for AIAN workers.
- Improving the tracking of occupational injuries and illnesses for AIAN workers is vital.
- Risks to AIAN workers in healthcare, services, and trade sectors are virtually unexplored.
- Culturally appropriate messages and education for AIAN workers are needed for high-risk occupations.
- Additional research is needed to better understand social determinants of health among AIAN people.

AIAN workers comprise 2.7 million or 1.8% of the total U.S. workforce. The BLS Census of Fatal Occupational Injuries (CFOI) identified 363 AIAN workers killed on-the-job from 2012– 2021, an average of 36 fatalities each year; Construction (87, 24 %), Agriculture, Forestry, Fishing and Hunting (50, 13.8%), and Transportation and Warehousing (37, 10.2%) were the three most common industries where the deceased had worked[26].

The medical literature contains tragic examples of occupational health hazards to AIAN workers. **Appendix B** contains two cases studies of occupational injuries

and injuries that have occurred to AIAN workers from segregation into dangerous work. Case Study #1 describes the deaths of 34 Mohawk Indians in a single bridge construction disaster[27-30]. Case Study #2 describes how Navajo uranium miners developed lung cancer, chronic obstructive pulmonary disease (COPD), and silicosis from discriminatory placement in the more hazardous jobs in uranium mines[31-39].

G. Possible First Steps

The following are possible first steps for a state health department to take to explore occupational health issues with the Tribal Nations in their state:

1. Identify stakeholders in your state: Tribal Nations; Tribal Epidemiology Center; Health Department Tribal Liaison Office; and Academic Centers.
2. Determine what, if any, previous work on occupational health has been done with Tribal Nations in your state and if there are infrastructure/staff at the Tribal Epidemiology Center or Tribal Nation level to address occupational health in your state.
3. Determine size and industry distribution of Tribal workforce in your state (**Appendix A**).
4. Consider the feasibility of conducting a needs assessment with Tribal Nations on occupational health issues.

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Appendix A: Calculating AIAN Workforce

To obtain estimates of the American Indian and Alaska Native employed persons for a state, one can use the NIOSH Employed Labor Force (ELF) query system. ELF is one of the applications within NIOSH's Work-related Injury Statistics and Resource Data Systems (WISARDS). Table 1 shows the estimates of AIAN employment by NORA sectors for the whole United States. A similar approach can be used to calculate estimates for an individual state.

Table 1. AIAN Employment by National Occupational Research Agenda (NORA) sector, United States, 2020.

NORA Sectors	AIAN People in Workforce
Agriculture, Forestry, and Fishing	28,877
Construction	144,847
Healthcare and Social Assistance	211,576
Manufacturing	132,012
Mining (includes Oil and Gas Extraction)	16,408
Services (includes Public Safety)	695,309
Transportation, Warehousing, and Utilities	82,896
Wholesale and Retail Trade	236,624
Total	1,548,549

By using the ELF query system, the steps below are consistent with the Profile Demographics section, Measure #6 (P6, Number of employed persons by age group) of CSTE's "OCCUPATIONAL HEALTH INDICATORS: A Guide for Tracking Occupational Health Conditions and Their Determinants". Rather than rendering estimates by "age group," the following steps provide estimates for AIAN employed persons, either alone or in combination with other races and/or ethnicities.

How to Calculate Estimates of Employed American Indian and Alaska Native Persons by State

Using the NIOSH Employed Labor Force (ELF) query system (https://wwwn.cdc.gov/Wisards/cps/cps_estimates.aspx), complete the Estimates Selection Steps 1 through 4.

1. ELF Step 1:

   Select "Number of Workers"

2. ELF Step 2:

   a. Select the "Time Period" of interest.

      Please note, it is possible to select multiple categories for this and other query parameters by holding the *Ctrl* key down while clicking on an individual criterion.

   b. Select "Location" for the State(s) or Region(s) of interest.

      If necessary, click "Expand Options" at the top-right corner of the query parameter to make the parameter's options available.

   c. For the "Demographics" category:

      i. Go to the "Race(s)" parameter

      ii. To obtain estimates for American Indian and Alaska Native Only (sometimes referred to as AIAN Alone) employed persons, select:

         1. "American Indian, Alaskan Native only"

      iii. To obtain estimates for both American Indian and Alaska Native Only and AIAN in combination with another race or races, select all of the following (using *Ctrl* key + Click):

         1. "American Indian, Alaskan native only,"
         2. "White-American Indian,"
         3. "Black-American Indian,"
         4. "American Indian-Asian,"
         5. "White-Black-American Indian,"

6. “White-American Indian-Asian,”
7. “White-Black-American Indian-Asian, “and
8. Select all and “American Indian- Hispanic”

3. ELF Step 3:
    a. Select State for the “Column Variable”
    b. Select Race for the “Row Variable”
    c. Select Composite Weight for the Weight Option
4. ELF Step 4:

    Select “Submit Query”

The ELF system will then process your request using the selected parameters. The results may appear very quickly or take a minute or two to produce the results, depending on the complexity of the query.

Ensure the “Query Results” display the correct “Query Parameters.” If the parameters used are correct, you can export those results as a .csv, .rtf, or .pdf file by selecting the icon for “Excel,” “MS Word,” or “AdobePDF” adjacent to “Export To:.” The exported file will then appear in the “Downloads” folder of your computer.

Please note that the ELF system recommends the following when reporting estimates from the ELF system:

1. *Estimates should be rounded to the nearest thousand.*
2. *Estimates less than 1,000 are unstable and should not be reported.* (Practically speaking, such results could be shown as <1,000.)

Appendix B: Case Studies

Case Study #1 – Mohawk Ironworkers

In August 1907, the collapse of a bridge under construction near the Kahnawake Reserve in Canada killed 34 Kahnawake Mohawk ironworkers.

For more than 120 years, six generations of Mohawk Indian ironworkers, known for their ability to work high steel, have helped shape New York City's skyline; the Empire State Building, the Chrysler Building, the George Washington Bridge, the World Trade Center.

Two YouTube videos [27, 28], a video on Facebook[29], and a photography exhibit[30] are available about Mohawk Ironworkers.

An example of a photograph: Mohawk ironworker Joe Regis, circa 1960. Bethlehem Steel.

Case Study #2 – Navajo Uranium Miners

Increased risk of lung cancer, COPD and silicosis occurred among Navajo miners, who had more exposure to radon and silica in uranium mines because of preferential job placement for white miners (See an excerpt and references below from a book chapter in Health Disparities in Respiratory Medicine [31]).

"Significant uranium mining began in the USA during World War II. The mines were predominately located in the southwest on the Colorado Plateau where the four states of Arizona, Colorado, New Mexico, and Utah abut. In this region, major deposits of uranium were identified on the Navajo Reservation. Four centers of mining and milling were established there, and there are an estimated 1,000 abandoned shafts on the reservation[32]. Mining was the primary industry offering job opportunities for most Navajo individuals, and the peak years of mining occurred from 1948 to 1969. Although the risk of lung cancer among uranium miners was first recognized in Europe as early as 1879 and was made compensable in Europe in the 1930s, there were no regulatory standards for limiting radiation exposure during the peak years of mining on the Navajo reservation[33]. Navajo miners were paid minimum wage, and they worked underground blasting, building wooden supports, digging blasted rock (muckers), transporting ore, and milling ore. Foremen were white and thus did not spend as much time underground.

Mining dust contains radon progeny which produce alpha particles responsible for the increased lung cancer risk. The nomenclature for expressing radon progeny exposure is based on working levels. A working level (WL) is the amount of radon progeny in a liter of air that releases a specified amount of alpha radiation. Exposure to a WL for 170 h (the average number of work hours in a month) equals a working level month (WLM). Background levels of radon progeny from radon contamination in homes cause the average person in the general population to have a lifetime exposure of 10–20 WLM. In contrast, WLM exposures in miners with lung cancer ranged from 465 to 16,467[34]. Current workplace regulations allow up to 4 WLM/ year or 160 WLM over a 40-year working lifetime.

From 1969 to 1982, 72% of the lung cancer cases among Navajo men in the New Mexico Cancer Registry had been employed by a uranium mine versus 0% of controls in a matched case–control study[35]. This corresponds to an infinite odds ratio with a 95% CI lower limit of 14.4. Thirty-eight percent of the uranium miners with lung cancer in this study were nonsmokers, while the other 62% of Navajos

with lung cancer averaged only one to three cigarettes per day. Consistent with the low smoking burden in the case control study of Navajo miners with lung cancer, a survey of Navajo miners showed low smoking prevalence (41% ever smokers) and low cigarette consumption among active smokers[32]. An extension of the New Mexico cancer registry case–control study until 1993 continued to find a high percentage (67%) of lung cancer in Navajo men to be attributable to past work in the uranium mines. This later study was able to calculate an odds ratio since some controls in this later study had worked in the uranium mines; the investigators found an odds ratio of 28.6 (95% CI 13.2–61.7) compared to matched Navajo men with non-respiratory cancer[25]. Surveys of white miners have found appreciably higher cigarette smoking rates, with only 18 % of white miners having never smoked versus 59 % in the Navajo miners[36]. The joint effect of cigarette smoking and radon progeny exposure is synergistic[37]. Despite the lower smoking rates in Navajo miners, lung cancer risk between white and Navajo miners were similar and are indicative of higher radon progeny exposure in Navajo miners[37, 38].

A cross-sectional study of miners who participated in the New Mexico Miners Outreach Program found that Navajos who had worked in the uranium mines demonstrated an increased risk of chronic obstructive pulmonary disease (COPD), low lung function (FEV1), and radiologic evidence of pneumoconiosis in relation to years worked[39]. However, this was not true of white miners who had worked in uranium mines. In this study, 73% of Navajo miners had never smoked cigarettes, and those who had smoked cigarettes averaged 6.4 cigarettes per day. In contrast, only 22% of white uranium miners had never smoked cigarettes, and among those who had the average were 20.3 cigarettes per day. Thus, the increased risk of respiratory disease in relation to work only occurred among Navajo miners, despite decreased cigarette smoking among Navajo compared to white uranium miners.