

National Tribal Air Association's

**National Indoor Air Quality
Needs Assessment for Indian Country
Final Report**



NTAA
National Tribal Air Association

May, 2016

Acknowledgements

The National Tribal Air Association (NTAA) and NTAA's Indoor Air Quality Work Group wishes to acknowledge and thank the following individuals who contributed to this Final Report. This was a true team effort and the contributions of everyone listed below was instrumental in the production of this Final Report.

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1 Executive Summary

Indoor Air Quality (IAQ) is a growing concern for Native American Tribal communities as people spend most of their time indoors. As Native Americans are more likely to have compromised health due to asthma and other respiratory ailments, good IAQ practices are critical to protecting public health in Tribal communities

The National Tribal Air Association (NTAA) formed an IAQ Work Group (IAQWG) and conducted the *National IAQ Needs Assessment for Indian Country* to provide federal and Tribal policy makers with a national snapshot and better understanding of the IAQ needs of Tribal communities.

In 2015, the IAQWG quickly came to the conclusion that a better understanding of IAQ in Tribal communities was needed in order for the group to properly begin its work. A decision was reached to conduct a national needs assessment that was prepared and released to all federally-recognized Tribes on December 3rd, 2015. NTAA learned that this was the first recorded national needs assessment for IAQ in Tribal communities.

86 representatives from 83 federally recognized Tribes responded to NTAA's request for information through an on-line assessment form. NTAA collected Tribal input for 4 months from December, 2015 through March 31st, 2016. The needs assessment sought Tribal input on basic housing information, IAQ issues that each Tribe addresses in Tribal housing and how Tribal governments are addressing these issues.

Key findings from the NTAA's *National IAQ Needs Assessment for Indian Country* include:

- While a majority of the Tribes that responded have IAQ issues that need to be addressed, a lack of funding is preventing Tribes from administering IAQ programs.
- The small sample size of 83 Tribes highlighted a diverse range of unique IAQ concerns of Tribes and indicated direct consultation with individual Tribes by federal agencies would allow Tribes greater access to grants rather continuing with a "one size fits all" approach.
- The existing capacity of Tribal programs is not adequate to meet the current and emerging IAQ concerns of Tribal communities. 44% of all respondents indicated they have an IAQ program yet 80% indicated that they respond to IAQ issues.
- Federal IAQ grants lack flexibility to meet unique Tribal requests and fail to address the lack of administrative capacity of many Tribes to meet the grant requirements.
- More data is required to gain full national scope of IAQ in Tribal communities
- Tribal communities are in need of radon resistant or vapor barriers in their new construction and a lack of mitigation for radon post construction indicates the need for more testing and more funding for radon remediation.
- The most common IAQ priority reported by participating Tribes is mold, followed closely by asthma/COPD.

- Tribal respondents indicated that the most important priority for the NTAA IAQ Work Group was educating decision-makers in Congress/federal agencies about the need for increased funds for Tribal IAQ programs.
- Specific funding priorities identified include increased funding and training for home-based IAQ and asthma programs, as well as, the expansion of IAQ training for Tribal housing inspectors and maintenance staff.

As these findings demonstrate, more funding is needed to address public health concerns and promote public health through good IAQ practices to allow Tribal communities to flourish. Most importantly, these additional funds need to be made available to Tribes in a way that helps the Tribes build their capacity to administer IAQ programs with adequate administrative support within each unique Tribe.

2 Introduction and Needs Assessment Process of the NTAA IAQ Work Group

The National Tribal Air Association (NTAA) is a Tribal membership organization with over 100 member Tribes whose mission is to advance air quality management policies and programs consistent with the needs, interests, and unique legal status of federally recognized Tribes.

Additionally, the NTAA serves as a communication liaison and information conduit between Tribes, US Environmental Protection Agency (EPA), and other federal agencies. The NTAA was created to assist Tribes in air quality policy work while respecting and supporting Tribal sovereignty and the Tribes' rights to a government-to-government relationship with the federal government.

All federally recognized Tribes are eligible to become member Tribes of the NTAA. Tools, such as policy response kits, developed by the NTAA are available online for download and are readily accessible by members of the public at www.ntaatribalair.org.

NTAA Goals

- To advocate for and advance the development of Tribal air policy for the protection of environmental, cultural, and economic interests at all levels of government (Tribal, federal, state, local, and international);
- To promote the development, funding, and capacity building of Tribal air management programs;
- To promote and facilitate air quality policy and technical information that may include research, scientific and/or medical studies;
- To advance the recognition and acceptance of Tribal sovereign authority by conducting effective communication with and outreach to state, local, federal and international agencies, and to the general public; and

- To encourage and support appropriate consultation of state, local, federal and international agencies with all Tribal governments in accordance with Tribal structures and policies.

To learn more about the NTAA, please visit: www.ntaatribalair.org and www.tribalairquality.org.

IAQ in Tribal Communities

The American Indian is of the soil, whether it be the region of the forests, plains, pueblos, or mesas. He fits into the landscape, for the hand that fashioned the continent also fashioned the man for his surroundings.

— Luther Standing Bear (1868–1939) Oglala Lakota Sioux

Comprehensive data on all housing and quality needs among federally-recognized Tribes is difficult to come by. Anecdotal evidence suggests mold infestation, one important indicator of poor IAQ, is an extensive problem in Tribal housing. NTAA is attempting to gather, analyze and provide information concerning Tribal Housing IAQ needs. This interim report only captures a snapshot of Tribal IAQ needs in that, out of approximately 567 Tribes reached, 83 Tribes responded to the questionnaire. NTAA considers this response rate to be useful, but is not interpreting the lack of participation from other Tribes as an indication that they do not have IAQ issues. NTAA, therefore, intends to re-open the questionnaire and encourage the remaining Tribes to participate.

It is also worth noting that the U.S. Department of Housing and Urban Development (HUD) sponsored a 2014 interim report: *Continuity and Change: Demographic, Socioeconomic, and Housing Conditions of American Indians and Alaska Natives*. The report is part of the *National Assessment of Native American, Alaska Native, and Native Hawaiian Housing Needs*, and used secondary sources, predominantly the products of the U.S. Census Bureau, to document housing needs and conditions as well as trends in the circumstances (social, economic, and housing) of the American Indians and Alaska Native (AIAN) population. The interim report will combine with field research data, with a final report expected in 2016.

There is an inextricable link between housing and health on Tribal lands that stretches back to the origin of reservations when, beginning in the 1850s and '60s, the U.S. Government began pressing Tribes “to give up their old homes by the promise of assistance in building new ones.”¹ Often, when that promise was met, the Tribes weren’t necessarily better off. “By the 1870s, some of the first federally funded homes were recognized as substandard by government Indian agents, who noted some were devoid of furniture, in poor condition, decaying rapidly, and in some cases uninhabitable.”² The early twentieth century, through the 1970’s met with an Indian housing boom, primarily funded by HUD and the Bureau of Indian Affairs (BIA). The construction of tens of thousands of single-family homes was modeled on post-war tract housing, without regard for local climate, Tribal customs, heating preferences and quality assurance during the construction

1 Office of Indian Affairs. Annual Report of the Commissioner of Indian Affairs, for the Year 1877. Washington, DC: Government Printing Office (1877). Available: <http://digital.library.wisc.edu/1711.dl/History.AnnRep77>

2 Environmental Health Perspectives, Article, Healthier Tribal Housing: Combining the Best of Old and New (Nov 2012). Available: <http://ehp.niehs.nih.gov/120-a460/>

process.³ “HUD homes”, along with other ill-equipped, often overcrowded, substandard homes, exacerbates the problem by increasing the rate of wear and tear and indoor moisture levels. The inadequate size of pre-90’s units, customary extended family living arrangements, lack of housing and other socio-economic factors leads to the overcrowded conditions - it is estimated that at least 250,000 new housing units are needed on reservations nationwide⁴.

In 1996, Congress enacted the Native American Housing and Self-Determination Act (NAHASDA). NAHASDA provides Tribes with the authority over the use of HUD funds.⁵ Tribes have the ability to responsibly and thoughtfully design and build housing that meets their unique needs. Tribes are increasingly aware of their ability to create adaptive homebuilding designs through formalizing building codes. Multiple examples of contemporary building techniques, purposely incorporating sustainable, architectural design elements of traditional Tribal housing, have spurred interest in Indian country. Federal targeted infrastructure investments, i.e. in Arizona/New Mexico and Alaska, have improved the quality of housing; however, without accompanying maintenance efforts, improvements may be temporary in nature.⁶ Maintaining the integrity of a home can be expensive, especially for low-income families. Without adequate funding for maintenance, infrastructure gains could be lost.

It is well documented that there are many indoor pollution sources, i.e., radon, moisture and mold, tobacco smoke, cleaning products, dust mites, cockroaches, and combustion products that cause IAQ problems inside homes. Inadequate ventilation can increase indoor pollutant levels by making outdoor air unavailable to dilute pollution sources and exhausting them from the indoor environment. It is also worth noting that high temperatures and humidity levels tend to increase concentrations of some pollutants.

Monitoring IAQ and maintaining healthy indoor environments is critically important to human health. The EPA has found that Americans spend as much as 90% of their time indoors, where levels of air pollutants are often 2, 5, or even 100 times higher than levels outside⁷. A recent study led by researchers at Harvard University compared the cognition of workers in conventional office buildings to their counterparts in well-ventilated buildings, and highlighted the value of healthy IAQ. The researchers found that people working in conditions with better-

3 Davis V. A discovery of sorts: reexamining the origins of the federal Indian housing obligation. Harvard Black Letter Law J 18:211-239 (2002). Available: <http://www.law.harvard.edu/students/orgs/blj/vol18/davis.pdf>

4 Prepared Statement of Cheryl A. Causley, Chairwoman of the National American Indian Housing Council. Testimony before the U.S. Senate, Committee on Banking, Housing, and Urban Affairs. 24 Jul 2012. Washington, DC. Available: <http://goo.gl/gwkVp>

5 HUD. NAHASDA (Native American Housing Assistance and Self-Determination Act of 1996) [website]. Washington, DC: U.S. Department of Housing and Urban Development (updated 6 Nov 2012). Available: <http://goo.gl/csWJc>

6 HUD Continuity and Change: Demographic, Socioeconomic, and Housing Conditions of American Indians and Alaska Natives; HUD Policy Development & Research, Jan 2014. Available: http://www.huduser.gov/portal/publications/pdf/housing_conditions.pdf

7 Environmental Protection Agency. (2016). Air and Radiation: Basic Information. Retrieved from <https://www3.epa.gov/air/basic.html>

than average air quality showed “significantly higher cognitive function” and scored nearly 300% higher when tested for cognitive strategy and information usage.⁸

For Tribal communities, IAQ has proven to be a growing problem to address. Tribal members with asthma are put at greater risk when exposed to poor IAQ. According to the U.S. Center for Disease Control, asthma is found in 12% of people living in Tribal communities – nearly double the current national average of 7%.⁹ Similar rates can be found in youth, 13.0% of American Indian/Alaska Native children suffer from asthma compared to 8.9% of all children in the U.S.¹⁰

In cold climates, people tend to spend even more time indoors and in homes and buildings made air tight to save heat and keep out the cold. However, without fresh air and adequate ventilation, indoor pollutants and humidity can rise to unhealthy levels. Smoke from woodstoves, fireplaces and steam baths contribute pollution to air indoors, as well as outside. Fumes and toxic pollutants from equipment, fuels, and chemicals kept in homes to prevent freezing, can escape into the confined air. Smoke from cigarettes and other tobacco products may also become more concentrated indoors where climates are harsh.

Radon is a major concern in many Tribal communities. It is a naturally occurring radioactive gas that is known to the EPA to be a carcinogen. It can be found in indoor air or drinking water, though the majority of radon is found in indoor air and caused by radon in the soil under homes. According to the EPA, radon is the number two cause of lung cancer, second only to smoking. Among non-smokers, radon is the leading cause of lung cancer. Radon causes 21,000 lung cancer deaths each year.¹¹ Radon contamination is preventable, but poor housing conditions and low use of radon resistant construction techniques throughout Indian Country have put many Tribal communities at risk.

Funding to address IAQ issues in Tribal communities is complicated by the fact that there is a complex web of multiple federal agencies with variable granting processes to address housing issues that either directly or indirectly address IAQ. For example, Tribes might seek help from a regional EPA office to fund a community outreach plan to improve IAQ in Tribal housing, or seek a grant from the U.S. Department of Housing and Urban Development (HUD) to mitigate mold in existing Tribal housing or seek a grant from Indian Health Services (IHS) for asthma prevention in Tribal schools. The complex web of programs, grants and resources often times take administrative resources that Tribes do not have in order to prioritize and secure the resources needed for their unique IAQ issue.

Many Tribes maintain separate housing and environmental programs that seek mutually exclusive housing or environmental funding, however IAQ issues often require coordination between these

⁸ Harvard T.H. Chan School of Public Health. (October, 2015). Green office environments linked with higher cognitive function scores. Retrieved from <http://www.hsph.harvard.edu/news/press-releases/green-office-environments-linked-with-higher-cognitive-function-scores/>

⁹ Centers for Disease Control and Prevention. Surveillance for asthma---United States, 1980--1999. In: CDC Surveillance Summaries (March 29). MMWR 2002;51(No. SS-1).

¹⁰ Asian Indian. Brim, Rudd, Funk, and Callahan. PEDIATRICS: 122(1). July 2008, pp. e217-e222.

¹¹ Environmental Protection Agency. (2016). Health risk of radon. Retrieved from <https://www.epa.gov/radon/health-risk-radon>

programs in order to provide a holistic solution based on both health and housing data that are often required by the grant applications. This coordination can take time and resources.

While EPA's Indoor Environments Division has worked recently to convene a working group with other federal agencies like HUD, IHS, and others that address IAQ, NTAA hopes the *National IAQ Needs Assessment for Indian Country* provides insight to federal agencies on how best to shift granting opportunities for Tribes and the unique IAQ issues described below.

NTAA IAQ Work Group's Process for the National IAQ Needs Assessment for Indian Country

In 2015, the NTAA's Executive Committee (EC) created the NTAA IAQWG as a response to a growing concern by NTAA member Tribes regarding a lack of resources available for addressing IAQ in Tribal housing. NTAA put out a call to NTAA member Tribes and federal partners for voluntary members. These members included Tribal members, air quality program staff from Tribal governments as well as federal employees from the EPA and HUD. Over forty members answered the call and volunteered to help.

The NTAA EC polled these volunteers in March 2015 to determine the possible scope of work and IAQWG operations. After initial feedback was provided, the IAQWG began holding monthly conference calls and initial discussions quickly revealed the need to have a baseline of data in order to understand and characterize the problem and provide policymakers with a national snapshot of IAQ needs in Indian Country. In addition to holding informational webinars for federal agencies that fund IAQ work in Tribal housing, the IAQWG also made a decision to develop a national needs assessment for IAQ in Indian Country in order to help fill the national data gaps that the NTAA IAQWG identified when starting its work.

In researching existing needs assessment on IAQ, it quickly became apparent that this kind of needs assessment did not exist at a national level and would be the first of its kind. Work Group members held several conference calls each month to develop questions for the needs assessment. Several IAQWG members worked to identify and develop appropriate questions which would eventually result into the final IAQ Needs Assessment that was reviewed and approved for release on December 3rd, 2015. Tribes were encouraged to submit their data via an online google form (See Appendix A) until February 28th, 2016. In an effort to seek greater input, the deadline was extended to March 31st, 2016. Tribal environmental professionals were asked to sit down with Tribal housing staff when filling out the Google form in order to work together as questions required both health and housing data. Access to the online form was provided via NTAA's website and paper copies were provided when asked by Tribal members who had difficulty accessing the online form.

After the deadline passed, the IAQWG held several conference calls with several members who volunteered to analyze the qualitative and quantitative data and to prepare this final report. The NTAA IAQWG envisions that this data is only partial and additional work is needed to fill the data gaps found in this final report.

It should be noted that this survey, along with many Tribal representatives, refer to many Tribal homes generally as "HUD homes." This is misleading, as HUD no longer owns any homes on

Tribal land, and these homes are in fact owned or managed by Tribal authority. Today, the term “HUD home” typically refers to '37 Act homes (once HUD homes but now owned or managed by Tribal Housing Authorities or private owners) or NAHASDA homes (homes built, bought, or managed by Tribes using HUD funds). In this report, these homes will be referred to as '37 Act/NAHASDA homes.

Demographics of the Tribes included in the NTAA IAQ Needs Assessment

NTAA received 86 submissions from 83 Tribes. Figure 1 shows the location of federally recognized Tribes that responded to the *National IAQ Needs Assessment for Indian Country* and Table 1 includes the estimated population of enrolled members in each EPA region. As is evident from the chart, the survey was relatively successful at achieving a broad geographical representation of Tribes.

Map of NTAA National IAQ Needs Assessment for Indian Country Tribal Respondents.



Figure 1 Map and Table of NTAA National IAQ Needs Assessment for Indian Country Respondents.

The following table includes the 83 Tribes that responded to NTAA in each EPA region and their estimated population. This table shows that according to NTAA estimates, at least 14% of all Federally-Recognized Tribes responded to the NTAA National IAQ Needs Assessment for Indian Country and represents and estimated 26% of the total population of Indian Country.

Demographics of Tribes included in this NTAA IAQ Needs Assessment		
EPA Region	Number of Tribes that responded	Estimated population of enrolled members
AK*	13	13,146
10	8	17,500
9	18	230,307
8	4	26,166
7	5	18,981
6	14	106,816
5	15	94,490
4	2	2,761
2	1	6,362
1	3	4,332
Total Tribes Responding	83 (14% of all Tribes)	520,861 (26% of federally enrolled Tribal population)
Total Number of Tribes and Total Population	567	1,969,167**

Table 1 Demographics of Tribes included in this NTAA IAQ Needs Assessment.

*AK is listed separately from Region 10 due to NTAA's ongoing acknowledgment of Alaskan Natives' unique status in Indian Country. For example, NTAA seats two representatives for Alaska and two representatives for Region 10 on NTAA's Executive Committee.

** The U.S. Bureau of Indian Affairs (<http://www.bia.gov/cs/groups/public/documents/text/idc1-024782.pdf>) estimated that the sum of population indicators associated with all federally recognized Tribes in the year 2010 was 1,969,167. However, the U.S. Census in 2010 recorded the total American Indian/Alaska Native (AI/AN) population at 2.9 million, which includes state recognized and non-federally recognized Tribes (U.S. Census, 2010 Census Redistricting File)

3 Key Findings and Observations

3.1 Quantitative Findings and Observations on Tribal Housing

The quantitative data and observations provide an outline of the types and characteristics of Tribal housing and insight into specific housing related health hazards found in the homes of Tribal residents. The general housing characteristics are as follows:

Types of Construction

Wood Frame Construction was the most frequently identified construction type used, with Trailer/Mobile Home and Prefab/Modular being the next most common. Additional types identified are masonry, traditional Tribal housing designs, motor home, stucco, and travel trailer. See chart below:

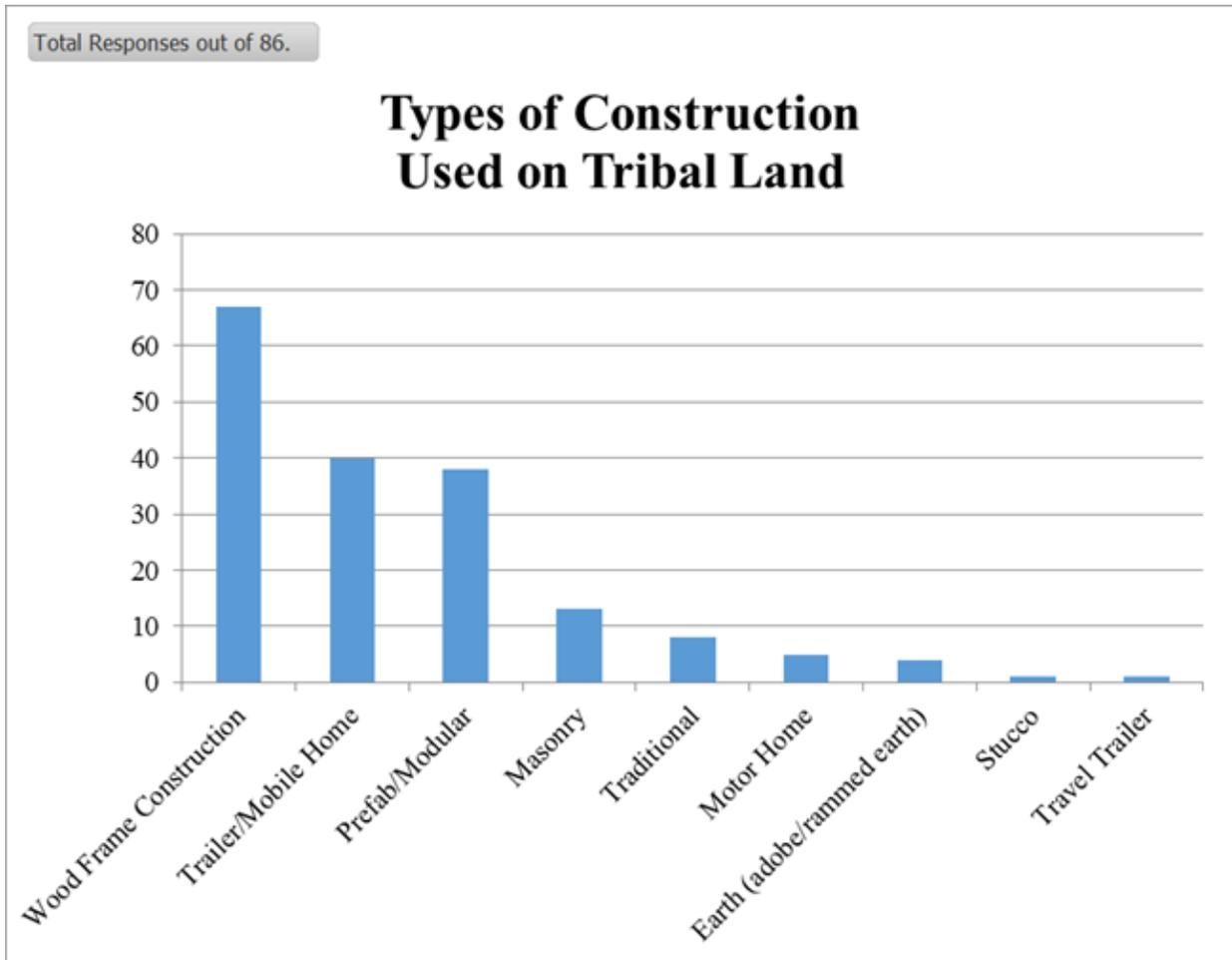


Figure 2 Types of Construction Used on Tribal Lands.

Heating Methods

Respondents were asked to identify the most common heating method used in their housing stock. Wood stoves, natural gas/LPG, and electric were the most common responses, with oil (heating oil/diesel) and radiant floor heating being the next most common. Additional sources identified are coal stoves, kerosene, pellet stoves, fire places, and solar. See Figure 3 below:

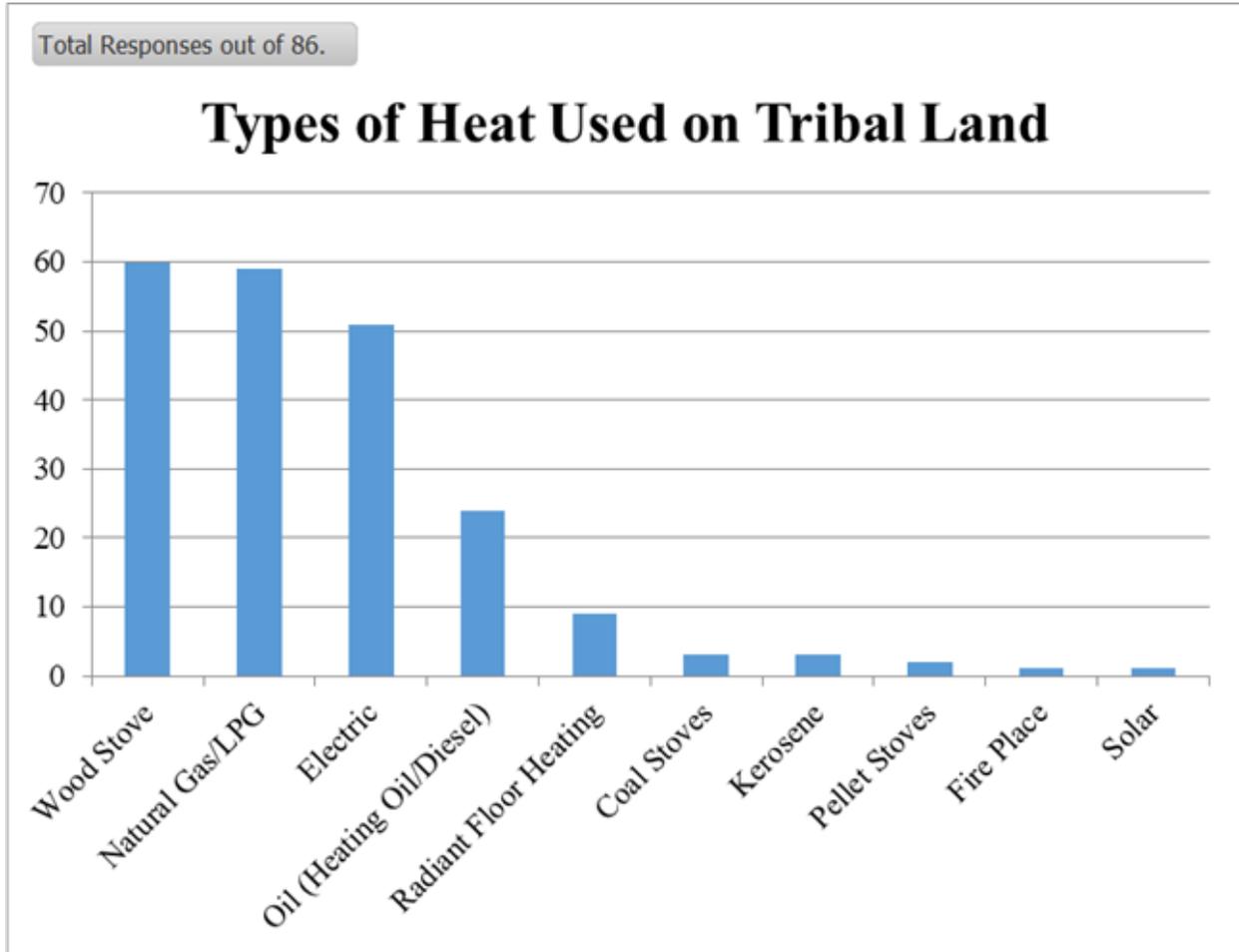


Figure 3 Heating sources used in Tribal homes.

Heat Delivery Source

Respondents were also asked to identify the most commonly used heat delivery sources in their housing. A heat delivery source can also be the same as the heating source but commonly includes heat delivery methods such as fans. Central/forced air was the most commonly identified source, with wood/coal burning stoves and floor or wall heaters being the next most common. Additional types of heat delivery sources identified were radiant floor heating, portable stoves, pellet stoves, toyostoves, electric baseboard, fire place, none, cooking stove, and window units. See chart below:

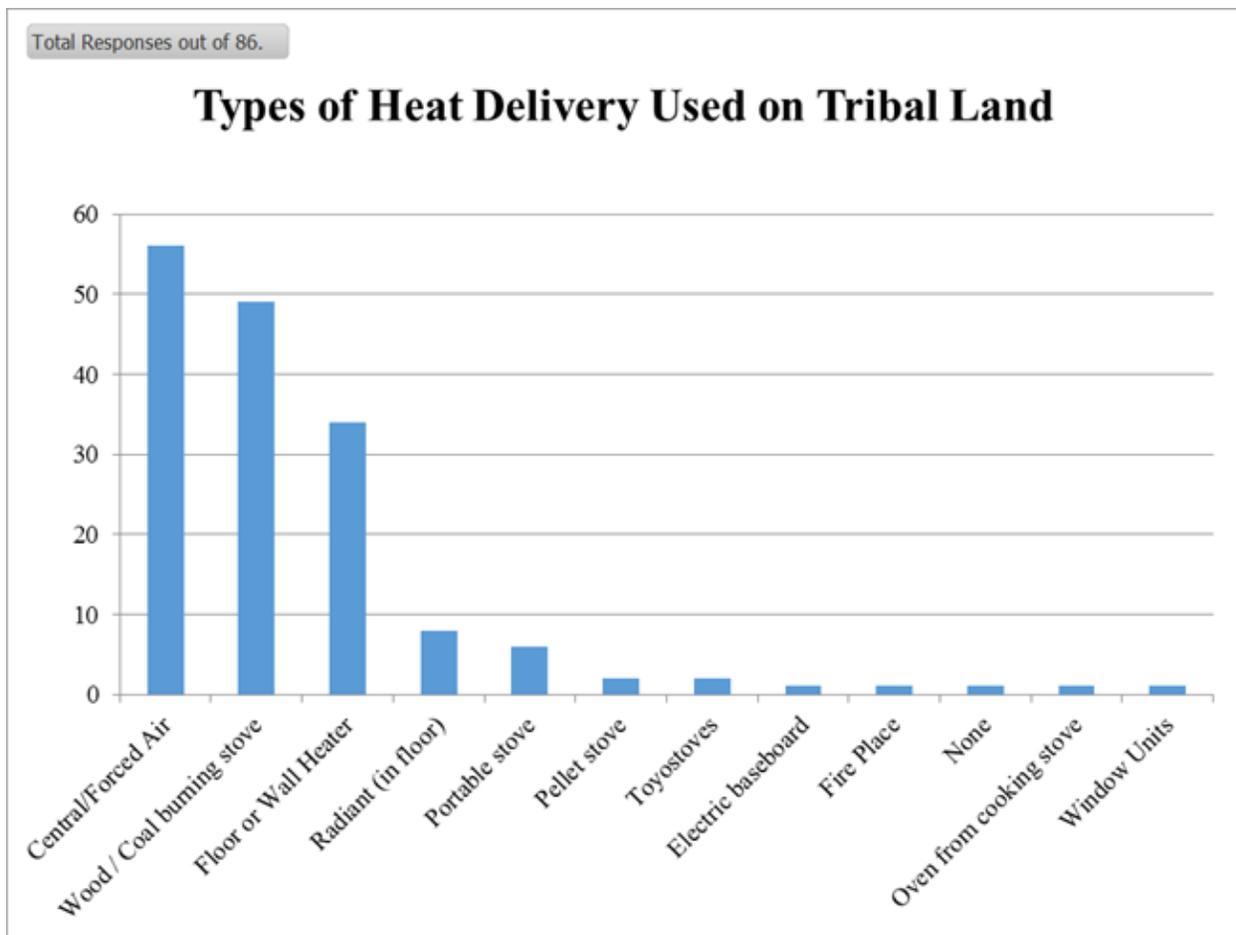


Figure 4 Types of Heat Delivery Used on Tribal Land.

Indoor Air Quality Hazards

The assessment asked respondents whether specific IAQ hazards were a concern and to what degree. These hazards listed in the assessment were:

- *mold due to exterior moisture intrusion;*
- *mold due to interior moisture issues;*
- *mold due to inadequate ventilation;*
- *volatile organic compounds;*
- *carbon monoxide;*
- *wood smoke from a direct (indoor) source;*
- *wood smoke from a neighborhood sources;*
- *biological pollutants: dust mites, cockroaches, rodents, animal dander;*
- *environmental tobacco smoke at home or at workplace;*

- *asbestos;*
- *lead;*
- *radon;*
- *indoor clutter and/or poor ventilation;*
- *pollution from home heating units (coal, toyostoves);*
- *historic methamphetamine contamination;*
- *other second hand smoke (incense, vaping, etc.).*

Respondents were asked to rate these hazards on a 0-5 scale with 0 meaning no concern and 5 meaning significant concern. As seen in Figure 5 below, the three categories of mold had the highest level of concern, averaging between 3.5 and 4.0. Indoor clutter and/or poor ventilation, biological pollutants, and environmental tobacco smoke were reported to have the next highest average level of concern.



Figure 5 Housing-Related Health Hazards

Other Trends in Tribal Housing

Looking at the hazards broken down by size of population of the Tribes, there were no significant differences; the trends were generally the same. Tribes were asked what percentage of their homes are modular/manufactured and what percentage are built on elevated pilings. The averages were 19.4% and 12.9%, respectively, but the range went from 0% to 90% for modular/manufactured and 0% to 100% for elevated pilings; there was a very large variation of responses. Tribes were asked what percentage of homes did not have indoor plumbing and whether homes have flush toilets; averages were 8.6% and 8.3% respectively.

Over 45% of respondents reported that IAQ concerns are reported to Tribal leaders from word of mouth with many other sources such as health care workers, housing staff and other providing input. EPA regional offices are the most frequently cited source of funding for IAQ activities, with a few other sources mentioned. From the 83 Tribes responding, 49 stated that their Tribe has done some sort of IAQ assessment with 34 stating that they have not.

3.2 Qualitative Findings and Observations on Tribal Housing

For purposes of this section of the IAQ needs assessment report, the series of responses to the following questions were analyzed to produce qualitative findings and observations on Tribal housing (the complete list of questions can be found in Appendix A of this report):

1. *Name of Tribes, Village or Band*
2. *Summary of the area served*
3. *Primary Contact Information*
4. *Does your Tribe currently have IAQ related activities or generally respond to IAQ concerns?*
5. *Does your Tribe currently have an IAQ Program? If so, please list the Tribal departments or agencies involved in dealing with community/residential IAQ issues*
6. *Estimated amount of total Tribal homes*
7. *Briefly describe geography/climate.*
8. *Are there any other unique details to share about the housing?*
9. *Is overcrowding of homes an issue for your community?*
10. *Are there any other comments you wish to share with the NTAA IAQ Work Group?*
11. *Select the types of construction used in the majority of houses on Tribal land.*
12. *Select the types of heat delivery used in the majority of houses on Tribal land.*
13. *Briefly describe the soil type and geography (sandy, clay, terrain, rural/urban/etc.)*
14. *What agencies/staff is/are mainly responsible for Tribal housing?*
15. *Are there any other housing types?*
16. *Select the types of heat used in the majority of houses on Tribal land.*
17. *In addition to natural ventilation through windows and doors, what other kinds of ventilation methods exist?*

The results of this *IAQ Needs Assessment in Indian Country* support other HUD needs assessment conclusions as well as other published anecdotal articles. For instance, the climate and geographic representation of respondents' Tribes range from sub-arctic (very cold) to very hot and dry. 85% of respondents indicated that their Tribal land is located in a cold climate.

82% of Tribal homes are of wood frame construction. Not surprisingly, 64% of respondents reported that overcrowding of homes is problematic and continues to get worse. 54% reported that homelessness is an issue as well in their communities. There is also a data gap with over 10 communities not knowing if these issues exist on their Tribal lands.

Other indicators of indoor air pollution problems involve heat delivery systems and heat sources. More than 50% of respondents reported that some or most occupants use combustion or wood stoves as their main heat delivery system, with coal, wood or heating oil/diesel serving as the primary fuel type. Without proper ventilation and modern, EPA-approved wood stoves, it is not surprising that one of the top ranked IAQ concerns was mold-associated with inadequate ventilation. Although 17 respondents indicated that they use Heat Recovery Ventilator (HRV, ERV, AAHX) systems for ventilation, one responded that they had identified improper installation of the HRV systems. This might indicate that education and resources to maintain ventilation systems in place for comfort and health are critical.

37 cited Tribal Housing Authorities as managers of Tribal housing and most who responded indicated that either a Housing Authority or some type of Housing Department manages Tribal housing. More information is needed to find out if this could relate directly with the reported number of Tribes who have IAQ related activities or respond to IAQ concerns. The level of capacity within Tribal Housing Authorities was not directly surveyed but the informed and thoughtful responses are indicators of potential capacity and the desire to increase knowledge base in IAQ related topics.

3.3 Quantitative and Qualitative Findings and Observations on IAQ in Tribal Housing

The percentage of '37 Act/NAHASDA homes on Tribal lands vary widely across different communities. About ¼ of respondents indicated that these homes account for between 20-30% of housing in their community, while another ¼ indicated that between 80-90% of their housing is '37 Act/NAHASDA homes. Three Tribes don't have any '37 Act/NAHASDA homes at all while housing in four communities is exclusively '37 Act/NAHASDA homes.

Duplexes are not common in Tribal communities with most answers in the 0-20% range. Trailers/mobile homes ranged from 10-30% for 43 Tribes to 0% for 20 Tribes.

Manufactured homes/modular homes came in the 10-30% range for 45 Tribal communities with 0% in 23 communities. Multifamily or apartment building are also uncommon – 39% of respondents indicated zero apartment buildings and 28 responded that approximately 10% of their housing is apartment buildings.



Figure 6 highlights the stark differences of housing types between different Tribes.

The age of homes is also important in understanding the integrity of the housing frames and the quality of the materials used. There is no doubt that homes built 75 to 100 years ago had more natural building materials that have lasted, but now are getting “old”. 10-20% of homes in 71 communities were built before 1950. The data also shows that the housing boom occurred between the years 1950-1990 with 50 respondents reporting up to 30% of homes built by 1978 and 53 communities having up to 40% of homes built before 1990. After 2001 the amount of new Tribal homes being built decreased with 32 Tribes stating that only 10% of homes were built during this time.

Estimated Percentage of Houses on Tribal Land that were built/bought in 1950-1978:

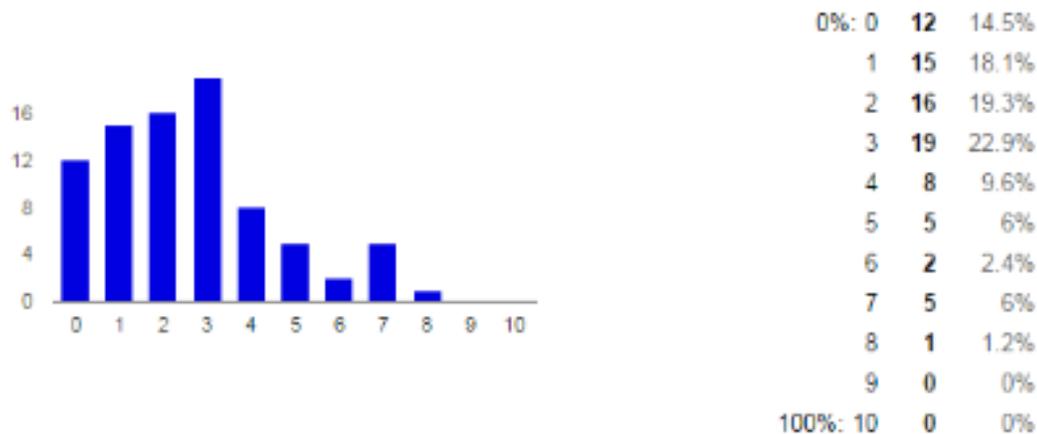


Figure 7 Estimated % of Houses on Tribal Land that Were Built or Bought Between 1950-1978

Estimated Percentage of Houses on Tribal Land that were built/bought in 1979-1990:

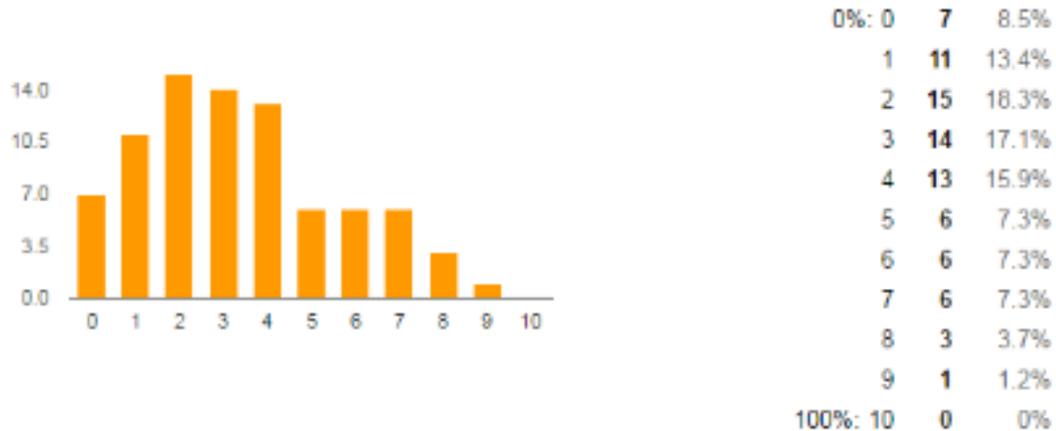


Figure 8 Estimated % of Houses on Tribal Land that Were Built or Bought Between 1979-1990.

Most of the homes in 32 communities have stated that they do not have radon resistant or vapor barriers in their new construction while 10% in 20 territories do. When it comes to post construction radon mitigation, 51 Tribes indicated they are not engaged in any form of mitigation, and 21 Tribes engage in some mitigation. This indicates the need for more testing and more funding for remediation work.

Most of the homes in this assessment do not have a basement, and are either built on slabs or have vented crawl spaces. 60 Tribes have 10-30% of their homes on slabs or vented crawl space. Up to 30% of homes in over 30 Tribal communities sit on dirt. Wood foundations, crushed stone and elevated pilings were very minimally used.

It is also interesting to see that there are some communities that have homes with no plumbing or indoor flush toilets. This assessment did not indicate whether this is by choice or due to lack of resources to develop the infrastructure. 23 respondents indicated that 10-20% of their homes did not have indoor plumbing and 22 indicated their homes did not have indoor flush toilets.

Home size square footage was about average at 1,000-1,299 sq. feet for 35 Tribal communities. Eight respondents did not know what the average square footage of the homes are. 30 respondents stated that their average per home is 5-6 occupants.

The number of occupants per house was predominantly in the “4 and under” group with a total of 35 respondents. There were also about 30 responses that indicated the average occupancy was between 5 and 6 people per housing unit. The data does not indicate if this was considered part of the overcrowding issue or not.

3.4 Quantitative Findings and Observations on Tribal Air Programs Addressing IAQ in Indian Country

Addressing IAQ issues in Indian Country can be characterized as spotty, at best. Eighty-three Tribes responded to this needs assessment, and of those only 37 (44%) identify as having an IAQ program. Yet, 67 (78%) Tribal respondents indicated that they respond to IAQ issues. According to survey results, the majority of IAQ issues are discovered through word-of-mouth within the Tribes or communities.

Does your Tribe currently have an IAQ Program? (85 responses)

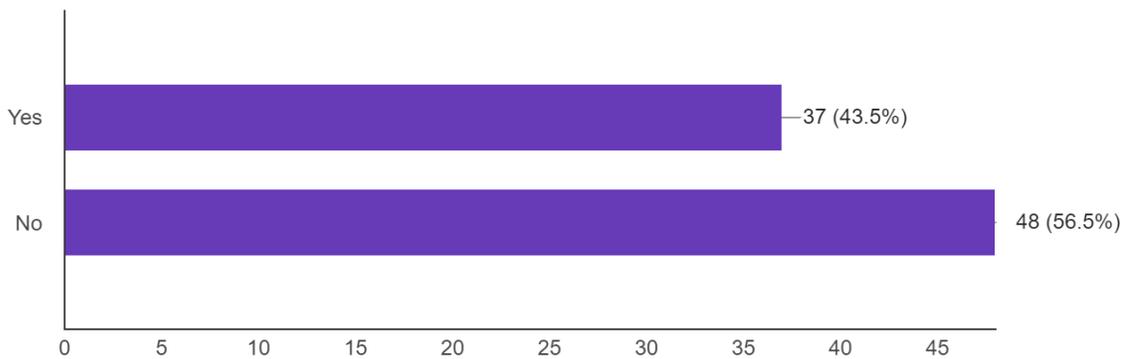


Figure 9 Survey results, percent of Tribes with and without an Indoor Air Quality program.

Does your Tribe currently have IAQ related activities or generally respond to IAQ concerns?

(85 responses)

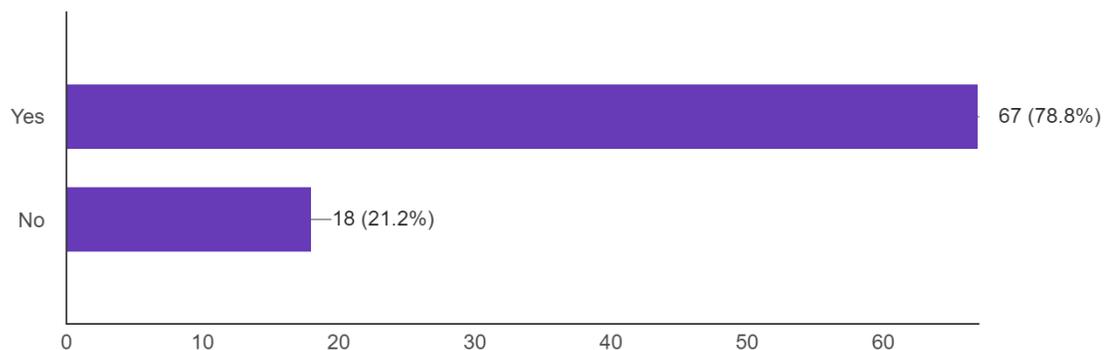


Figure 10 Survey results: percent of Tribes that currently have Indoor Air Quality related activities or respond in some way to IAQ concerns.

Each Tribe has different IAQ priorities as well; this depends on Tribal council, demographics, regional climates, and other diverse factors of each Tribe. The IAQ needs assessment asked respondents to prioritize topics/issues they have, or will have in the future. While most categories

showed high priority by the respondents, in general, the following priorities were identified (based on the highest priority represented as a 5):

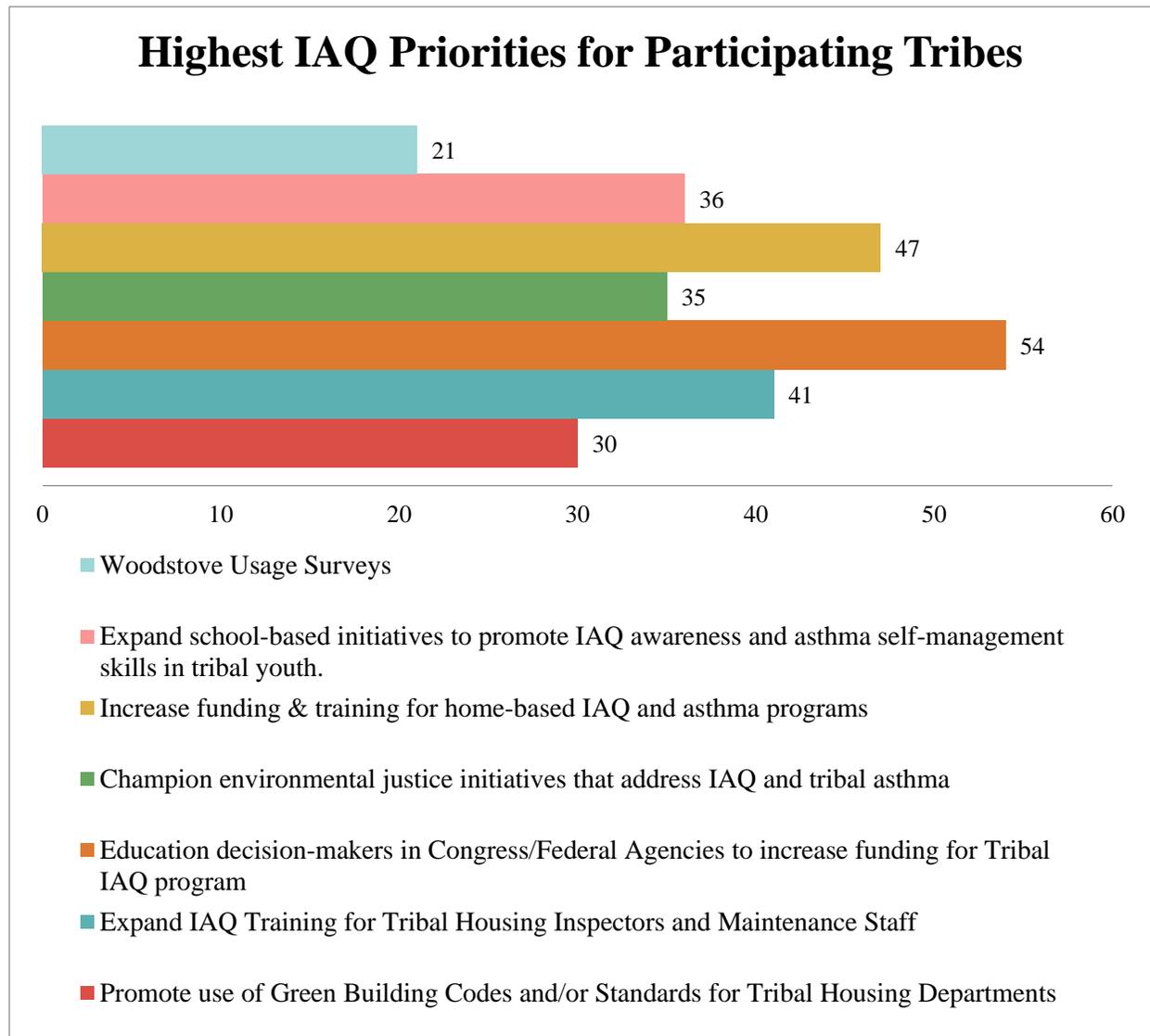


Figure 11 Survey results: Highest IAQ Priorities of Participating Tribes.

Tribal responses indicated that the most important priority for the NTAA IAQ Work Group was educating decision-makers in Congress/federal agencies about the need for increased funds for Tribal IAQ programs. Other important priorities include increased funding and training for home-based IAQ and asthma programs, as well as, the expansion of IAQ training for Tribal housing inspectors and maintenance staff.

Most Tribes responded with the estimated amount of Tribal homes in the range of 100-500. Tribes with 500-1000 homes was the second most common amount, and less than 100 was the third most common.

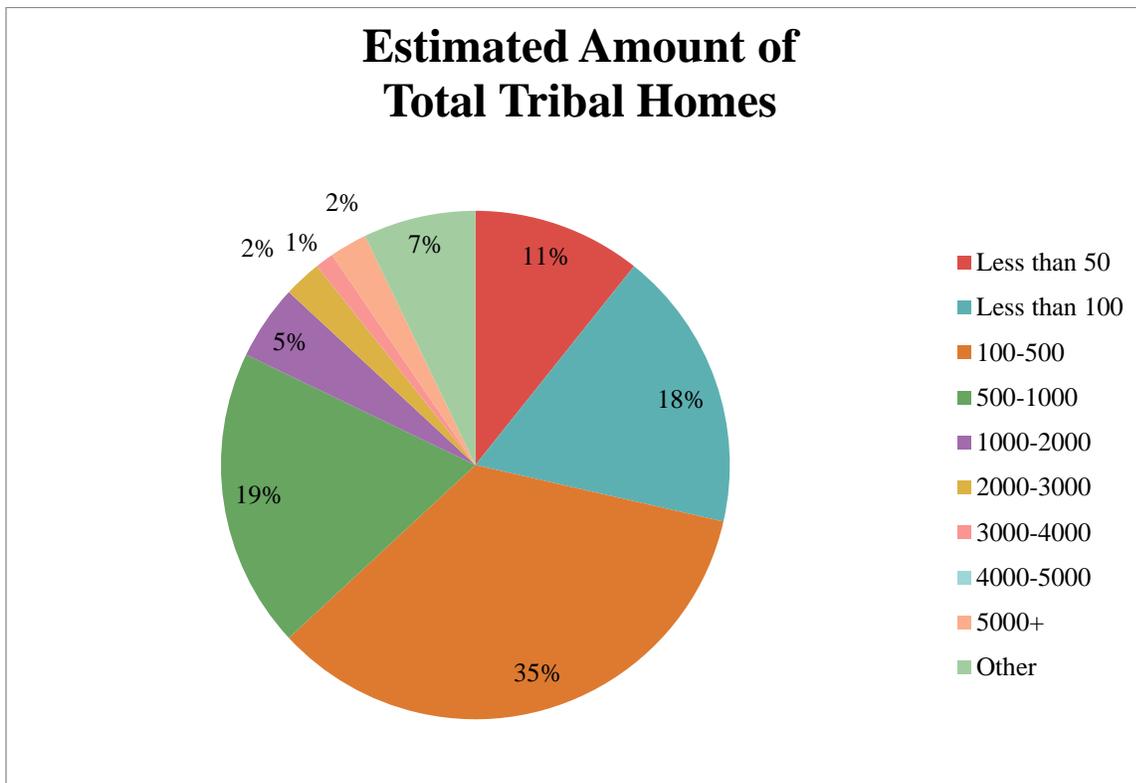


Figure 12 Survey Results: Estimated Number of Tribal Homes.

Available Program Utilization

Various housing assistance and/or programs are available for Tribal staff to utilize for improving the indoor air environment of Tribal housing. These resources include but are not limited to; weatherization assistance, weatherization and health assistance, healthy home outreach workers, and firewood sharing programs.

The majority of Tribes that responded have utilized a weatherization program (66.7% have or currently use this program). This was the only program listed on the survey that the majority of respondents actually use. There seems to be a big gap between home weatherization and healthy home education.

A surprising number of Tribes that responded had never utilized the other three programs, including 87% of Tribes that have never used a program that combines weatherization with home inspections (including Tribes that would like to do so in the future), 83% have never used a firewood sharing program, and 78% have never used home health outreach workers.

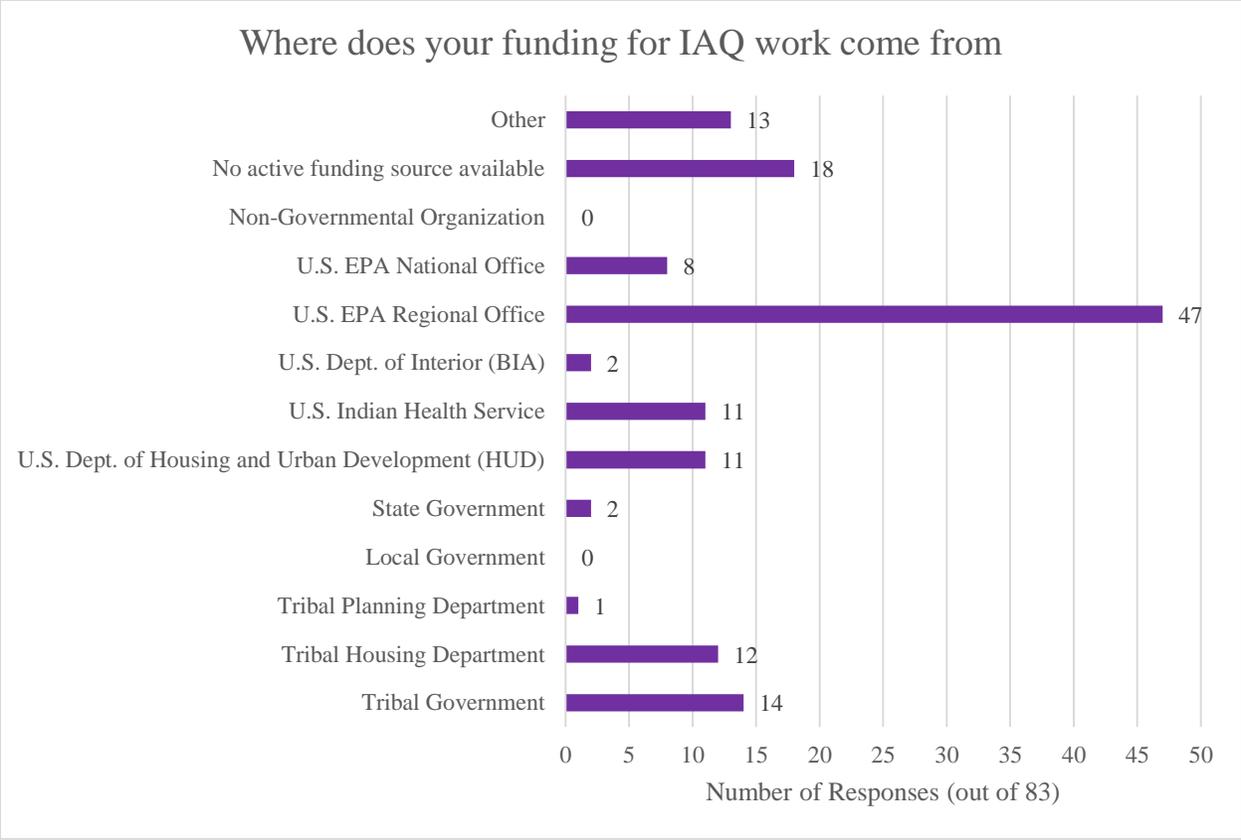


Figure 13 Survey Results: Number of Respondents Indicating Funding Sources Being Utilized by Tribes

3.5 Qualitative Findings and Observations on Tribal Air Programs Addressing IAQ in Indian Country

As with many other questions addressing IAQ in Indian Country, the most popular reasons Tribes are not utilizing existing programs are training, funding, and a lack of technical capacity within the Tribes. Other reasons listed included lack of equipment and resources, that other agencies are completing indoor air issues for them, and that some new air programs haven't started IAQ projects yet. Many Tribes (42/44) expressed interest in learning more about existing programs, and other IAQ issues.

One of the most telling results in this section was with the Tribes' single biggest need: funding. There are existing programs and project grants available, but this data shows that most Tribes are either not receiving that information or that barriers exist which prevent the Tribes from applying. One thing to consider is that Tribes may need to build administrative capacity for researching and writing grants, and consider that a funding issue. Funding needs to be available to Tribes so that capacity can be increased and IAQ projects initiated. While there is no quantitative data on the number of staff in the natural resources or environmental departments, many Tribes operate very small departments that are 100% grant funded. These employees often operate under multiple projects, such as General Assistance Program (GAP), water quality, and air quality, and may not have time to complete additional objectives.

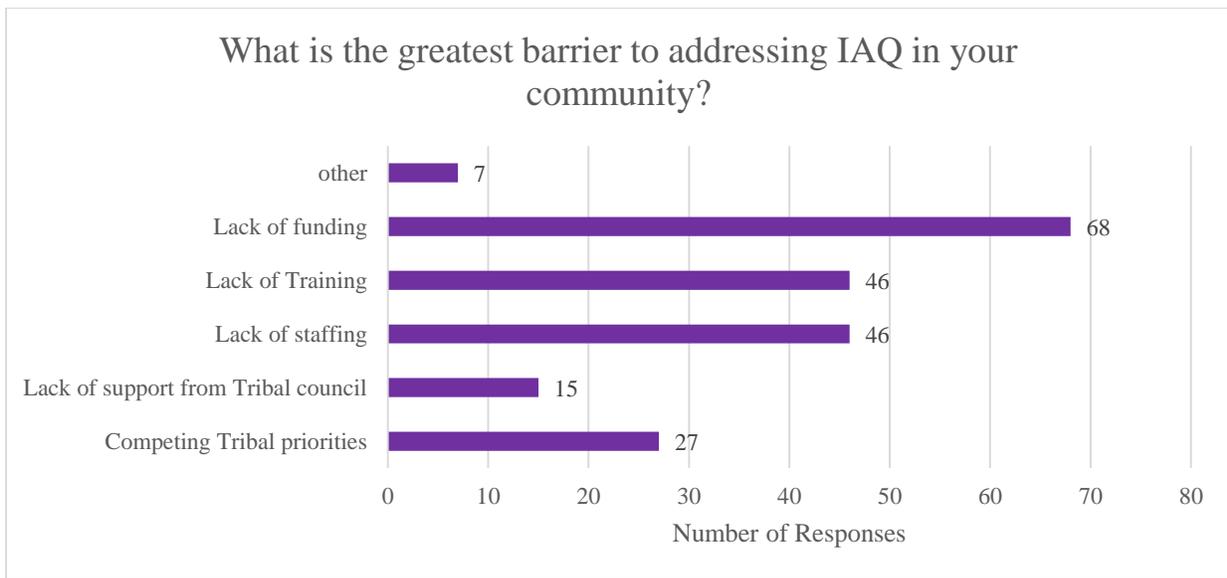


Figure 14 Survey Results: Number of Respondents Indicating Their Greatest Barriers to Addressing IAQ.

IAQ encompasses a vast array of issues, and many Tribes identified unique problems. Mold was the most common priority, along with asthma, road dust, and all aspects of outdoor burning.

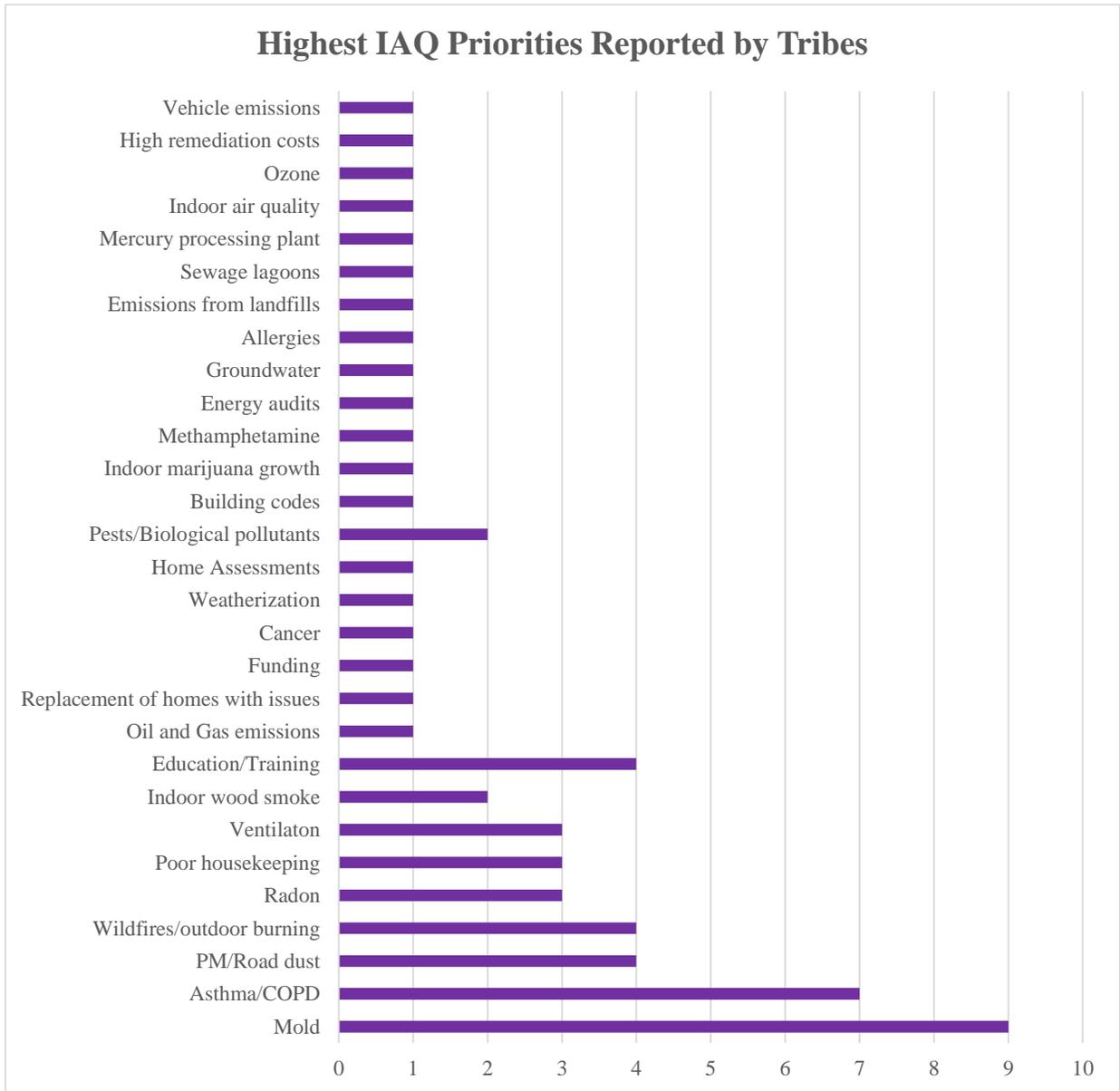


Figure 15 Survey Results: Number of Respondents Indicating Their Highest IAQ Priorities.

As this section shows, there are as many IAQ problems as there are individual Tribes, and a one-size-fits-all solution would be impossible to find. Funding and training are desperately needed to begin addressing IAQ concerns in Indian Country.

4 Recommended Funding and Service Solutions to Address Unmet IAQ Needs in Indian Country

While non-competitive Federal Funding would be ideal, there should be another program similar to GAP that allows for variety in work but also for Tribes to both gain capacity and maintain it. More collaboration between funding agencies and Tribes would be beneficial to let Tribes know what options are available. Agencies such as HUD could make applying for grants easier since most programs are small and have a wide array of other duties to complete.

It is critically important that Tribal IAQ concerns are immediately addressed in order to protect human health. Based on the findings of this needs assessment, NTAA recommends the following:

- **Conduct further needs assessment:** *Work with Tribes to conduct a full IAQ needs assessment. While this document provides a look at IAQ needs across Indian Country, further analysis is needed to fully understand the diverse concerns and needs of each Tribal community. A needs assessments could also include IAQ issues in non-residential spaces like schools, day-cares, community/Tribal buildings.*
- **Individual consultation:** *Every Tribe faces unique IAQ issues stemming from climate, housing, etc. It is important to consult with Tribes individually to determine their specific needs and assist them in the most efficient way possible. With greater participation, region-specific trends could help federal agencies and IAQ stakeholders to work on IAQ issues with Tribes in a more specific way.*
- **Increase IAQ funding:** *IAQ programs are expensive. Many Tribes are unable to administer IAQ programs without funding and/or technical support. Specific funding priorities identified include increased funding and training for home-based IAQ and asthma programs, as well as, the expansion of IAQ training for Tribal housing inspectors and maintenance staff.*
- **Streamline grants:** *Grant requirements can be difficult for Tribes to achieve, making it difficult for many Tribes to get IAQ funding. This is especially true for Tribes with small budgets that are unable to meet fund-matching requirements. Including administrative costs that Tribes incur for grant administration would help build capacity in Tribes to address IAQ issues.*
- **Address urgent concerns:** *Radon is a major IAQ concern in Indian Country. Tribal housing conditions are below national average, and often lack radon resistant or vapor barriers – even in new construction. Funding for radon testing and remediation is needed.*
- **Getting the word out:** *It is critical to educate decision-makers in Congress and federal agencies about the need for increased funds for Tribal IAQ programs.*

5 Conclusions

Poor IAQ poses serious health risks, including cancer, asthma, heart disease, and early development of dementia. Due to variety of factors such as poor housing or environmental conditions, Tribal communities are at higher risk from these health impacts. Today, American Indians and Alaska Natives experience higher than U.S. average rates of various cancers, asthma, heart disease, and diabetes mortality – all of which are linked to poor air quality.

The NTAA IAQWG hopes this final report assists Tribal governments, Tribal air quality programs and Tribal communities to learn about IAQ in their own communities and do all they can to protect public health by addressing IAQ. The NTAA IAQWG is also reminded of the trust responsibility of the federal government and hopes this final report can help federal agencies adapt their granting requirements and processes to meet the unique IAQ needs of Tribal communities.

While the NTAA IAQ Needs Assessment for Indian Country provides clear insights into IAQ issues within Indian Country, it is also clear that data gaps still exist that prevent a holistic understanding of the national scope of IAQ challenges for all federally-recognized Tribes. The NTAA IAQWG will continue to advance IAQ funding policies that will provide Tribes with easier access to the resources necessary to address the unique IAQ issues in Tribal communities. The NTAA IAQWG hopes this final report advances that important work to protect public health in Tribal communities.