

# Indoor air quality interventions with American Indian Communities: Creating culturally adapted intervention methods and educational tools

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# Disclaimer

- “Research reported in this publication was supported by the National Institute Of Environmental Health Sciences of the National Institutes of Health under Award Number R01ES022583. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.”



# Elders Project

- Describe the American Indian Elders and Kids indoor air quality project
- Discuss methodology of intervention
- Examine educational methodology used to promote best practices in wood stove use
- Community Advisory Board and community collaboration key

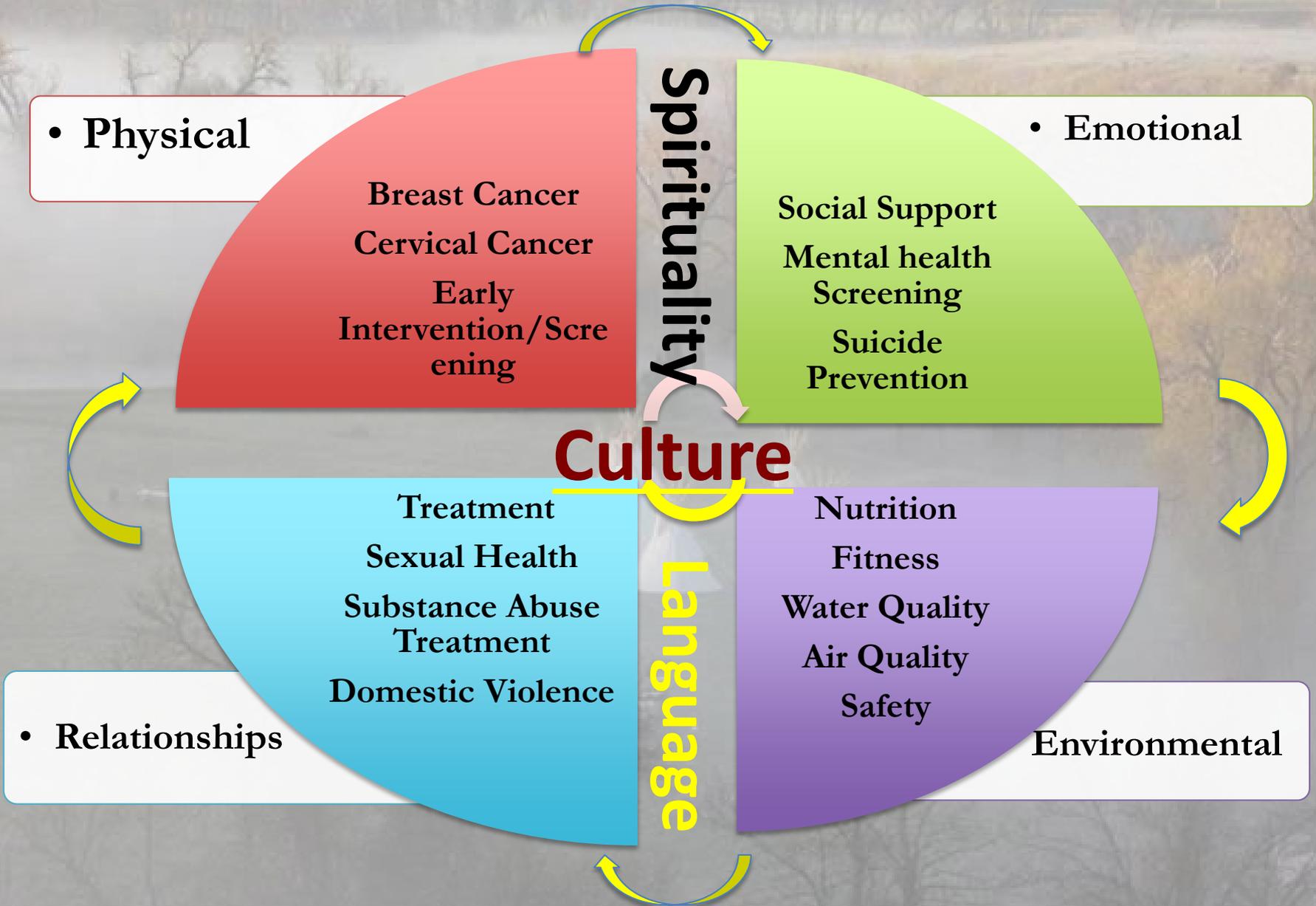


# Historical factors

- Tribal communities are the original indigenous human population in the United States
- Survival required healthy air, water, land, botanical, & animal populations
- AIAN population collapse followed direct warfare, disease epidemics, and systematic efforts to discontinue indigenous cultures
- AIANs were later forcibly moved or restricted to reservation lands which were usually less desired for agricultural or mining resources



# Holistic Health



# Background

- A critical need exists for efficient community-based interventions aimed at reduction of environmental exposures relevant to health.
- Biomass smoke exposures due to residential wood stove use are common among rural Native American communities
- Such exposures have been associated with respiratory disease in susceptible populations.
- Wood stoves are often the most economic and traditionally preferred method for heating/cooking
- Resource scarcity can result in burning of improper wood fuels, further contributing to high levels of indoor particulate matter.

# Indoor Air Quality and Associated Risk to Elders

- Studies conducted in rural and Native American communities examining indoor levels of fine particulate matter (PM<sub>2.5</sub>) have frequently found levels that exceeded similar health-based air quality standards such as the National Ambient Air Quality Standards (NAAQS).
- Native elderly populations are particularly susceptible to reduced lung function or chronic conditions such as asthma, COPD, and bronchitis.

# Preliminary Findings

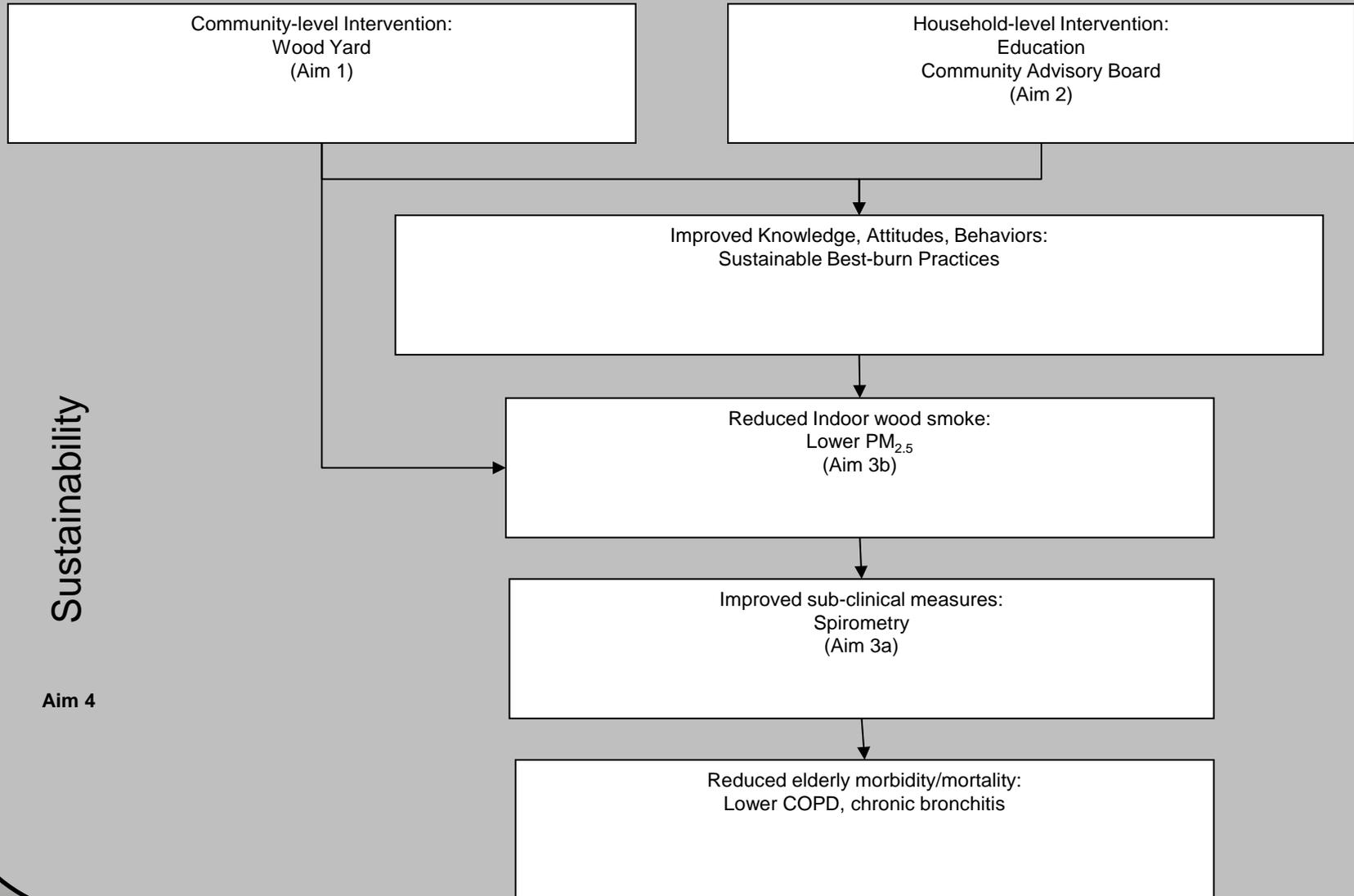
- Improving the efficacy of household level interventions (e.g., air filtration units) can reduce indoor exposures to biomass smoke
- Educational interventions may be a more sustainable approach for promoting healthier practices in wood stove use.
- Fuel efficiency can also lower costs associated with wood heating

# Methods

- Two-level intervention strategy to reduce exposure to indoor biomass smoke among elderly and pediatric tribal members in multiple communities:
  - Northwestern, Alaskan Native, Southwestern tribal communities, & Western Montana
- Community-based participatory research techniques have been used to tailor intervention approaches to meet the cultural context of each participating community.

# Conceptual model

Conceptual model of two-level intervention and outcomes.



Sustainability

Aim 4

# Program Details

- Community Advisory Board Formation
- Qualitative analyses of Focus Group transcripts
- Data informed educational interventions
  - Elderly, wood recipients, 126 total homes.
    - 3 cohorts of 21 starting in winter 2014/2015 at Location 1
    - 2 cohorts of 30 and 33 at Location 2 starting during winter 2016/2017.

# Health and Exposure measures

- Pulmonary function (EasyOne spirometer) and frequency of respiratory symptoms and infections (questionnaire).
- Pediatric focus: lower respiratory infections
- Evaluated 2X during the baseline winter and 2X during intervention winter (4X total)
- Exposure measured in multiple ways
  - (MicroPem, DustTrak, Qtrack, Cotinine swabs)

# MicroPEM holders

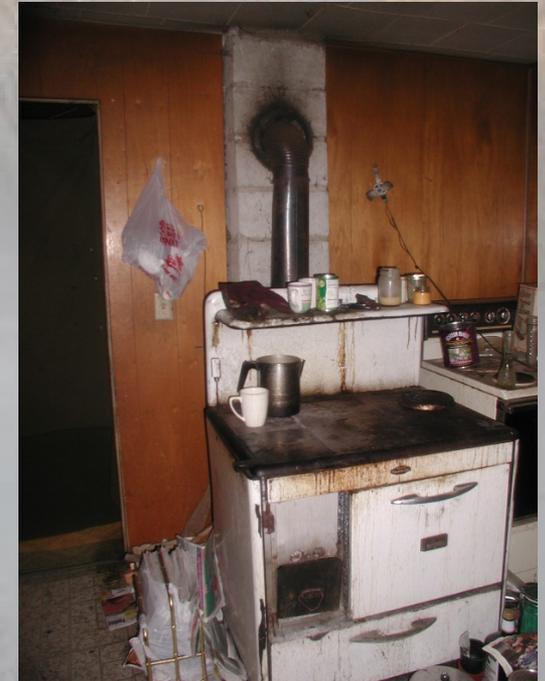


# Timeline

Timeline. Community-level and household-level interventions (Start Date: April 1, 2014; End Date: March 31, 2019).

Funding Year	PA	Year 1		Year 2		Year 3		Year 4		Year 5	
		Spring/ Summer	Fall/ Winter								
IRB/tribal approvals, updates, renewals	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP	NP
Training		X		X		X		X		X	
<b>Community 1 Intervention</b>											
Community-level											
Community dev. of program		[Bar]									
Establish wood yard/dist. program		WY#1 and WY#2									
Evaluate impact and sustainability			[Bar]								
Household trial											
Cohort #1 (n=21)			M1●	Intervention	M2●						
Cohort #2 (n=21)				M1●	Intervention	M2●					
Cohort #3 (n=21)						M1●	Intervention	M2●			
<b>Community 2 Intervention</b>											
Community-level											
Community dev. of program			[Bar]								
Establish wood yard/dist. program						WY#1			WY#2		
Evaluate impact and sustainability							[Bar]		[Bar]		[Bar]
Household trial											
Cohort #1 (n=30)					M1●	Intervention	M2●				
Cohort #2 (n=33)							M1●	Intervention	M2●		

# Goals improve air quality via behavior change



# Community Level

- At the community level, we are working to facilitate local development of a tribal agency-led wood bank program ensuring that elderly and/or persons with need have access to dry wood for heating.



# Household level

- At the household level, we will use a three arm randomized placebo-controlled intervention trial to implement and assess education/outreach on best burn practices (Tx1).
- The content and delivery strategies of the education intervention have been adapted by Community Advisory Board to each community according to stakeholder input.
  - This educational intervention will be evaluated against an indoor air filtration unit arm (Tx2), as well as a placebo arm (Tx3, sham air filters).
  - Tx3 will be used in comparison with the other two treatment arms to evaluate the penetration and efficacy of the community-level wood bank program.

# Research Questions

- Outcomes will be evaluated with respect to changes in pulmonary function measures and respiratory symptoms and conditions among household elders.
- We hypothesize that locally-designed education-based interventions at the community and household levels will result in efficacious and sustainable strategies for reducing personal exposures to indoor particulate matter, and lead to respiratory health improvements in elderly Native populations.

# Goals of programs

- Goal is to advance knowledge of cost-effective environmental interventions with Native American and Non-NA communities
- Inform sustainable multi-level strategies in similar communities throughout the US to improve respiratory health among at-risk populations.



# Educational intervention

- Focus group
- Key Informant interviews
- Vetting best practices curriculum and materials aimed at a elder and pediatric populations
- Creation of Digital stories and educational materials
  - Digital stories are short community produced videos aimed at promoting environmental or public health and community activism. The creator of each story holds the “rights” to share their story with family, community, or wider audiences

# Finding collaborative solutions

- Community psychology and public health promotion efforts have begun to embrace new ways of engaging Native American communities.
- Most effective agents of public health change are indigenous community members
- Digital storytelling is one tool to promote knowledge as well as community healing
- Hope: seek effective ways to increase impact of science-based knowledge & best practices within tribal communities.



Belcourt 2013



# Family is community and culture matters

Prevention and health requires seeing, sharing, and investing in the strengths and solutions residing within our communities (science, scholars, students, and communities)



# Thank you for investing in Native Health!

- Many thanks to community partners and Symma Finn (NIEHS)
- Research partners Johnna Boulafentis, John Degroot, Howard Teasley, Leslie Smith, Julie Simpson, Desirae Ware, Emily Weiler, Kathrene Conway, and Carolyn Hester
- Johnnye Lewis (UNM)
- Billie Kipp (Blackfeet Community College)

**Dr. Belcourt is also supported by a JPB Environmental Health Fellowship award granted by The JPB Foundation and managed by the Harvard T.H. Chan School of Public Health.**

- Artist Beadwork and Pouches thanks to Giselle Forest (Assiniboine) and Lynne Pinkham (Nez Perce)
- Funded for project provided by NIEHS R01ES022583