

# **Strong Heart Water Study Participatory Interventions to Reduce Arsenic Exposure among Private Well Users in American Indian Communities**

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**Funded by National Institute of Health R01ES025135**

# Strong Heart Water Study Team



**Dr. Ana Navas Acien**  
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**Dr. Lyle Best**  
Missouri Breaks Industries  
Research Inc (MBIRI)



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Missouri Breaks Industries  
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# Strong Heart Water Study Investigators

## **Missouri Breaks Industries Research Inc (MBIRI)**

- Mr. Joseph Yracheta
- Ms. Marcia O'Leary
- Dr. Lyle Best

## **Johns Hopkins Bloomberg School of Public Health (JHSPH)**

- Dr. Ana Navas Acien
- Ms. Elizabeth Thomas
- Ms. Martha Powers
- Dr. Joel Gittelsohn
- Dr. Allison Barlow
- Dr. Larry Moulton
- Dr. Kellogg Schwab
- Dr. Ana Rule

# Strong Heart Water Study Investigators

## **Local Indian Health Service Offices**

- Commander James Begeman
- Commander Kris Neset

## **Environmental Consultants**

- Mr. Reno Red Cloud, Water Administrator, Natural Resources Regulatory Agency, Oglala Sioux Tribe
- Mr. Robert Thompson, Director, Water Resource Management Department, Spirit Lake Tribe
- Mr. Carlyle Ducheneaux, CORE Grant Coordinator, Department of Environment & Natural Resources, Cheyenne River Sioux Tribe

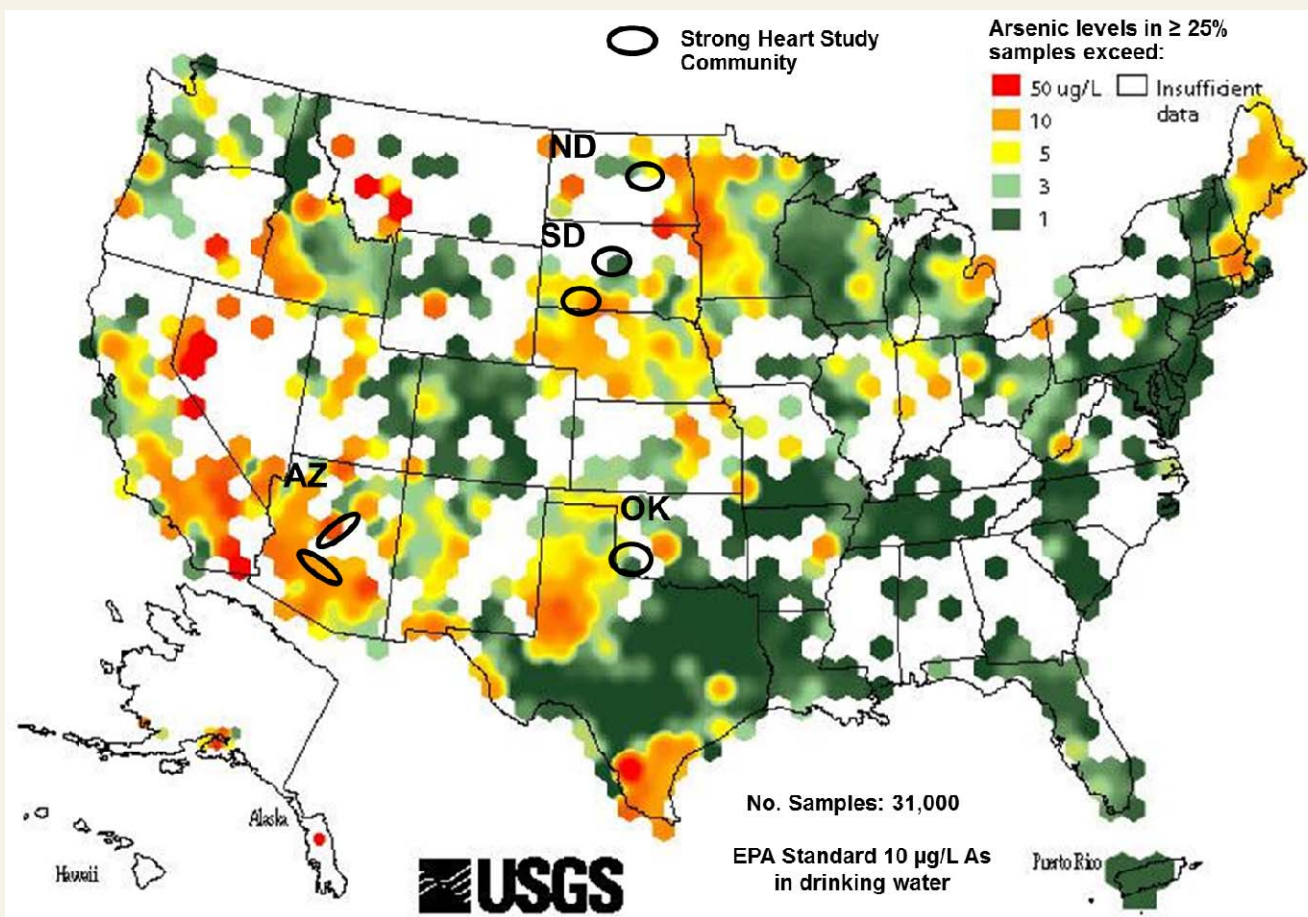
## **MedStar Health Research Institute**

- Dr. Jason Umans
- Dr. Barbara Howard

# Ethical Approvals

- **Indian Health Service Great Plains Area Institutional Review Board (IRB)**
- **Oglala Sioux Tribal Research Review Board**
- **Johns Hopkins Bloomberg School of Public Health IRB**

# Study Rationale

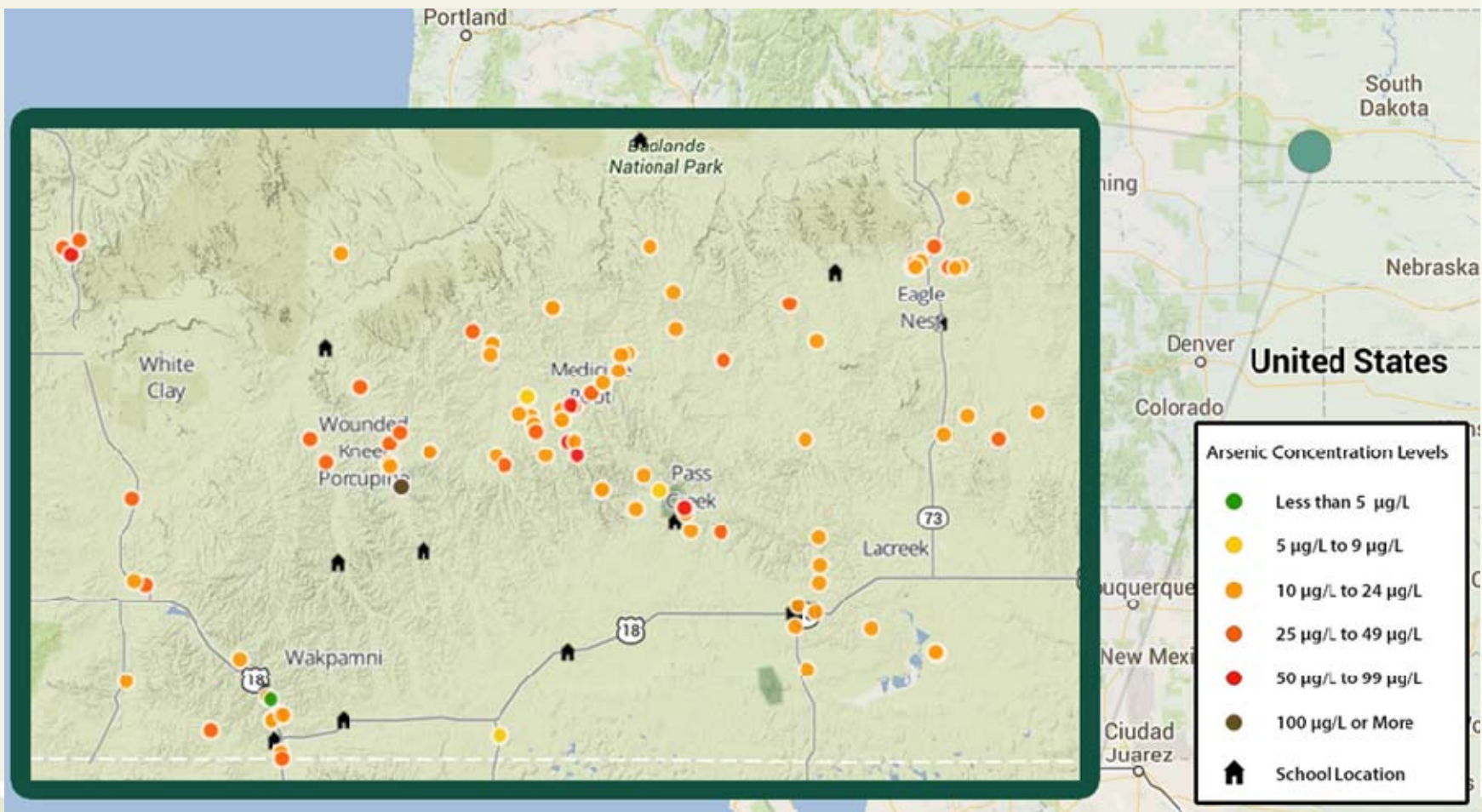


Source: Ryker. *Geotimes* 2001;46:34-36



# Study Rationale

**Arsenic levels in private wells in Oglala Sioux Nation in 2007 (N=97)**  
**Data provided by Oglala Sioux Tribe Land Office**



# Summary of Health Findings in Strong Heart Study

## **Chronic Elevated Arsenic Exposure Associated with:**

- **↑ Heart Disease**
- **↑ Cancer Mortality of Lung, Prostate, and Pancreas**
- **↑ Diabetes**
- **↑ Kidney Disease**

## **References:**

- Zheng et al. *Epidemiology* 2015;26:620-7. PMID: 25929811
- Kuo et al. *Diabetes Care* 2015;38:620-7. PMID: 25583752
- Tellez-Plaza et al. *Circ Cardiovasc Qual Outcomes* 2013;6:626-33. PMID: 24255048
- Moon et al. *Annals of Internal Medicine* 2013;159:649-59.
- Garcia-Esquinas et al. *Cancer Epidemiol Biomarkers Prevention* 2013;22:1944-53
- Zheng et al. *Am J Kidney Dis* 2013;61:385-94. PMID: 23142528.
- Gribble et al. *Am J Epidemiol* 2012;176:865-74. PMID: 23097256.



# Objective of Strong Heart Water Study

**Develop and evaluate the effectiveness of participatory interventions to reduce arsenic exposure among private well users in American Indian communities from North Dakota and South Dakota who have participated in the Strong Heart Study**

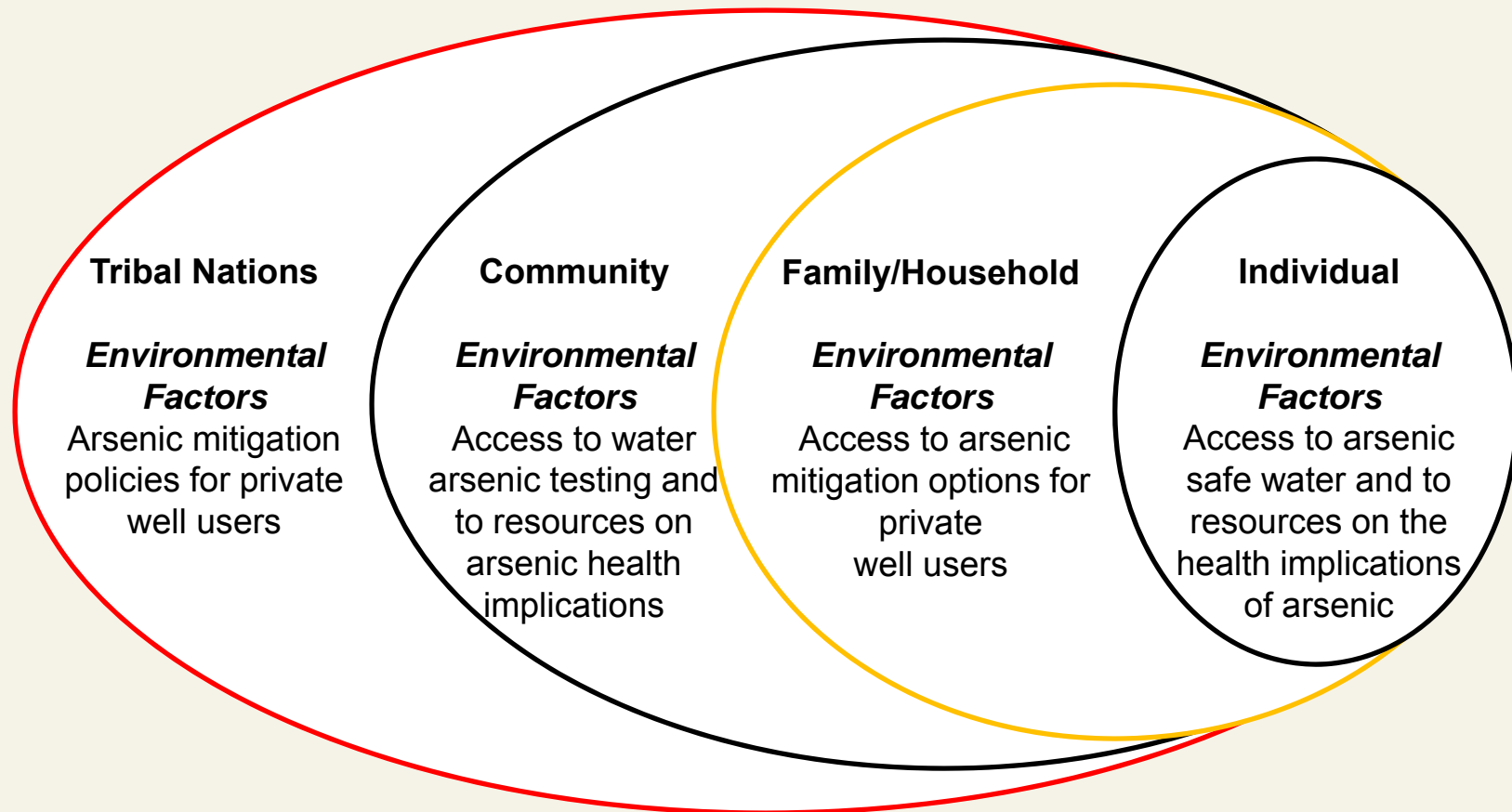


# Aim 1 of Strong Heart Water Study

**Aim 1: Develop sustainable participatory arsenic interventions through formative research and community engagement.**

- In-Depth Interviews
- Community Workshops
- Intervention Development
- Pilot of Interventions

# Multi-Level Model for Strong Heart Water Study



# Water Arsenic Testing

## Laboratory Testing



# Installing Arsenic Removal Device



# Use of Arsenic Removal Device





# Replacing Arsenic Filter Cartridge



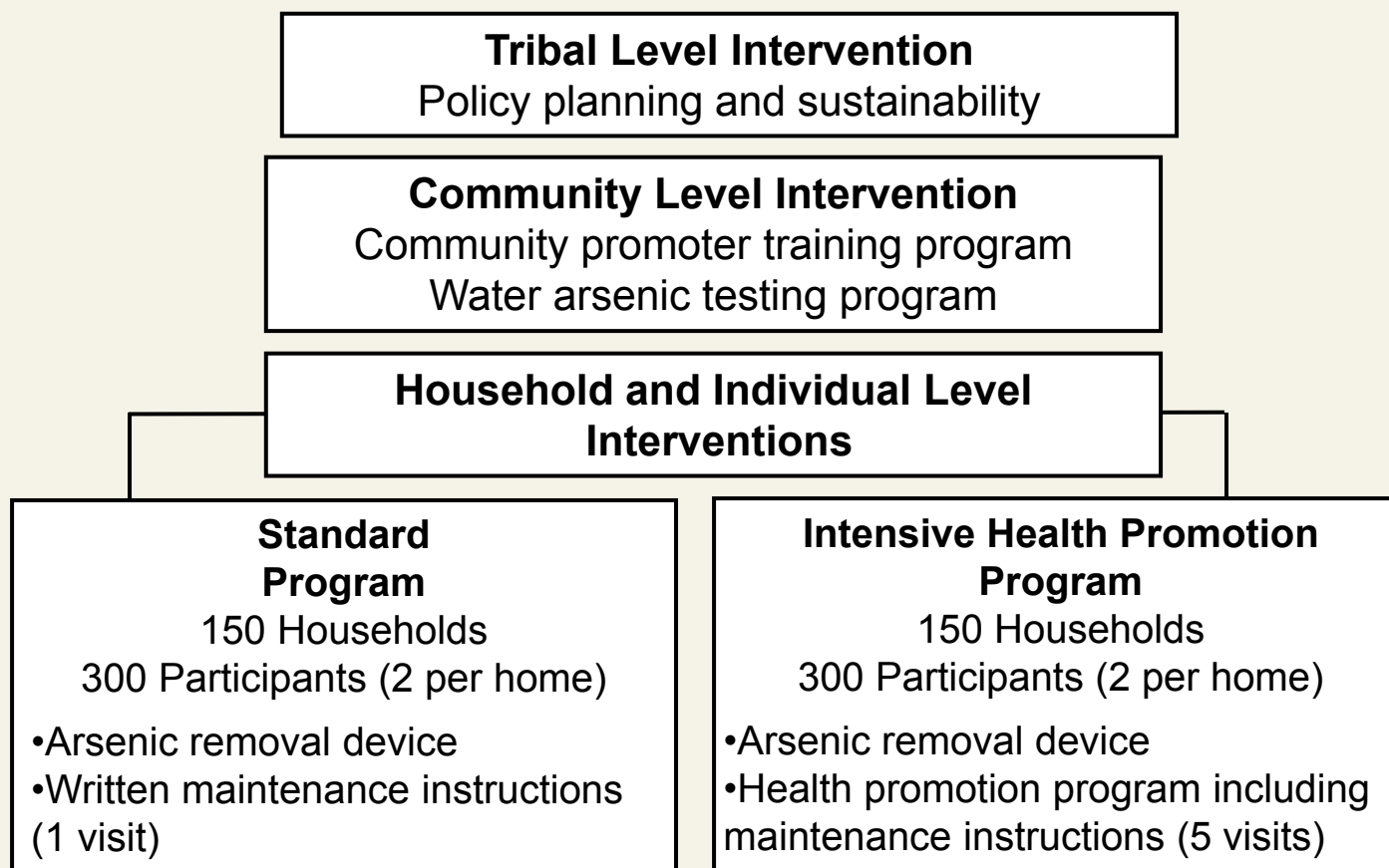
## Aim 2 of Strong Heart Water Study

### **Aim 2. Evaluate the effectiveness of an arsenic intervention program in reducing arsenic exposure**

- Conduct a randomized controlled trial
- Compare arsenic in urine and markers of heart disease and respiratory health pre and post intervention
- Evaluate long-term sustainability of intervention (1-3 years post intervention)

# Strong Heart Water Study for Private Wells

## Randomized Controlled Trial



Funded by National Institutes Environmental Health Sciences (R01ES025135)

# Aim 3 of Strong Heart Water Study

## **Aim 3. Disseminate the study findings to American Indian Nations and Indian Health Service**

- Disseminate the Strong Heart Study arsenic findings
- Inform sustainable arsenic mitigation policies based on the results of the developed intervention program



# Questions

